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CUSTOMER CENTRICITY: NEW CUSTOMER-FOCUSED MODELS DRIVEN BY TECHNOLOGY

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CUSTOMER CENTRICITY: NUEVOS MODELOS CENTRADOS EN EL CLIENTE IMPULSADOS POR LA TECNOLOGÍA

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RESUMEN DEL PROYECTO

La revolución tecnológica enfocada en el cliente

La tercera revolución industrial, impulsada por Internet y las tecnologías de digitalización, está cambiando todo el panorama empresarial [1]. Las empresas ahora se enfrentan a la "Era del Cliente" [2], y convertirse en una organización centrada en el cliente ya no es una buena idea o simplemente una palabra de moda: es un imperativo para sobrevivir y tener éxito [3]. Y lo mismo que la tecnología es el motor de estos cambios, también es el habilitador clave para que las empresas transformen su modelo operativo y entreguen una experiencia superior al cliente, que es el factor de éxito definitivo en un mercado redefinido [4].

A lo largo del siglo XX la tecnología ha ido ganando importancia y se ha ido implementando en todos los sectores, fundamentalmente por la utilización masiva de software empresarial y la extensión del uso de internet. La Industria 4.0 surgió en 2011 como una estrategia altamente tecnológica en Alemania, integrando robótica, sensorización, Internet of Things y elementos de inteligencia artificial [5]. En el año 2020, el número de dispositivos conectados crecerá hasta 50 mil millones en todo el mundo [6]. El uso extendido de Internet ha provocado la caída de las barreras comerciales y ha permitido vivir en un mundo global, con implicaciones para las compañías en términos de escala y competitividad [7]. La globalización conduce a una mayor competencia entre las empresas a medida que se reducen los costes y pueden vender a precios más bajos [8]. Esto hace que aumente el nivel de competitividad y las empresas deban buscar nuevas ventajas competitivas [9]. Muchas empresas están cambiando su estrategia y enfocándose más en el cliente [10].

Los consumidores también han cambiado sus hábitos de consumo y están utilizando la tecnología con más frecuencia, lo que les facilita obtener más información sobre los productos y servicios que van a comprar, pudiendo comparar precios en tiempo real e incluso compartiendo valoraciones de marcas, productos y distribuidores: [11]. Hoy en día los consumidores están en comunicación continua y simultánea entre ellos [12]. De esta forma se ha cambiado el ciclo de compra, de los consumidores, que antes seguían un recorrido lineal; ahora los consumidores evalúan los productos y servicios antes y después de su compra, ofreciendo mucha información al resto de clientes [13]. Las empresas deben saber gestionar la información que obtienen sus clientes además de conocer sus necesidades para poder obtener ventajas competitivas [14].

Es por ello que las empresas de todos los sectores están utilizando la tecnología para convertirse en *customer centric companies* [15]. Gracias a la tecnología las empresas pueden conocer a sus clientes y ofrecerles el servicio que estos esperan, desarrollando la experiencia del cliente como

un elemento de diferenciación competitiva en el mercado [16]. Las empresas líderes en sus mercados están cambiando sus modelos de negocio colocando a los consumidores en el centro [17]. De esta forma son capaces de conocer en profundidad a los clientes, sus hábitos de compra y sus preferencias, e incluso desarrollar modelos predictivos respecto a su potencial de consumo: tener información sobre sus clientes y utilizar la tecnología les permite predecir futuras compras y además modificar sus productos o servicios para poder satisfacer sus necesidades [18].

Para poder entender como estos cambios están afectando a las empresas se debe estudiar a los consumidores, a las empresas y el entorno [19]. Utilizar esta metodología permite comprender la importancia del cliente como un proceso que incluye a todas las partes interesadas de una empresa que entran en juego cuando se someten a una transformación digital [20]. Para comprender los cambios que deben realizar las empresas se han realizado unas hipótesis sobre los nuevos modelos de negocio. Con este objetivo se ha utilizado el modelo que ofrece Porter [21] y se han cambiado las descripciones de los diferentes bloques para poder comprender el mercado en el que juegan las empresas hoy en día. También se ha realizado un exhaustivo estudio sobre las principales tecnologías que emplean las empresas líderes en el mercado. Se ha podido detectar que existen cuatro tecnologías que permiten a las empresas ser *customer centric: Internet of Things, Cloud Computing, Big Data* y *Customer Relationship Management*. Todas ellas se basan en la recuperación y análisis de datos sobre los clientes y sus necesidades.

Este documento tiene como objetivo comprender los cambios que están sufriendo las empresas debidos a la tecnología. Además, se pretende describir – y, hasta cierto punto, anticipar - el papel que juega la tecnología en el mundo empresarial en cuanto a la relación con los clientes y entender qué cambios han de realizar las empresas para poder obtener una ventaja competitiva. A lo largo de este documento se van a analizar las principales tecnologías que permiten a las empresas ser *customer centric*. Y se hará un estudio en profundidad del sector *retail* en el que se describirán los principales casos de éxito de dicho sector. Por último, se analizará Amazon Go, como ejemplo práctico para poder entender los beneficios que tiene implementar tecnología en una empresa.

Tecnologías disruptivas

La primera tecnología que se ha estudiado es el Internet de las Cosas (IoT). Esta tecnología trata de conectar objetos cotidianos a Internet, pudiendo crear una red de sensores interconectados [22]. Empresas de todos los sectores han empezado a instalar sistemas de IoT para poder tener información sobre sus productos y sus clientes [23]. Se han analizado tres proveedores de este tipo de tecnología: Cisco, Amazon y Honeywell. Las tres empresas permiten crear una red mediante el uso de dispositivos, pero Cisco se ha centrado principalmente en el desarrollo de esta tecnología aplicada a cada sector [24]. Por otro lado, Amazon ha creado los Dash Buttons que permite a las empresas interactuar con los clientes [25]. Y finalmente Honeywell ha creado una solución llamada IIoT (Industrial Internet of Things) que está focalizada en el uso del IoT en las empresas [26]. Se puede observar que las soluciones que ofrece el IoT son diversas y que quedan muchos avances que modificaran la forma en que las empresas realizan sus actividades [27].

La tecnología IoT está siendo de gran importancia en el sector *retail* porque ofrece muchas soluciones [28]; entre otras, se han podido identificar los wearable (dispositivos que llevan los

usuarios puestos y que permiten tener información sobre ellos) [29]; los *beacons* (pequeños dispositivos empleados principalmente para hacer marketing de proximidad) [30]; y etiquetas RFID y códigos QR (que permiten guardar información que puede ser útil para las empresas o para los clientes) [31]. Un ejemplo del uso de IoT en el sector *retail* es la empresa Tesco, que ha utilizado códigos QR para crear un supermercado virtual en el metro de Seúl, de manera que los viajeros pueden escanear los códigos y hacer la compra mientras esperan el metro [32].

Las siguientes tecnologías que se han analizado son la computación en la nube y *big data & analytics*, que ofrecen la posibilidad de almacenar y analizar grandes cantidades de datos y extraer información relevante [33]. Gracias a esta tecnología las empresas son capaces de comprender toda la información que han obtenido – por ejemplo, de sus clientes - y pueden buscar tendencias que les permitan predecir el futuro [34]. Unas de las principales características de esta tecnología es el hecho de pagar solo por lo que se utiliza ya que se ofrece "*as a Service*" [35]. Estas dos tecnologías se complementan y ofrecen un sistema que ayuda mejorar la gestión de la información de las empresas [36]. Es por ello que muchas empresas tecnológicas ofrecen las dos tecnologías en conjunto. Por ejemplo, IBM Watson, ofrece un servicio de almacenamiento y análisis de datos que ayuda a todo tipo de empresas a sacar el mayor provecho de la información que recopila [37].

Las empresas en el sector *retail* están beneficiándose de los servicios que ofrecen las grandes empresas tecnológicas ya que pueden ajustar la tecnología a la demanda, consiguiendo optimizar sus costes [38]. Además, este tipo de tecnología permite a las empresas conocer a sus clientes y optimizar sus procesos de compra [39]. También ofrece a las empresas utilizar aplicaciones ya existentes para poder mejorar sus procesos creando, por ejemplo, una aplicación móvil de forma rápida y con un coste bajo [40]. Un ejemplo de una empresa en el sector *retail* que ha sabido sacarle partido a la tecnología *cloud computing* y *data analytics* es Domino's Pizza. Esta cadena de pizzerías tiene una alta demanda a la hora de las comidas y mediante la contratación de un sistema de *cloud computing* pueden emplear los servidores de una tercera empresa para poder aumentar su capacidad de procesamiento de pedidos durante las horas punta. De esta forma la empresa optimiza sus dispositivos y además es capaz de almacenar toda la información en un único servidor pudiendo acceder a la información de sus clientes desde cualquier local [41].

Por último, se ha estudiado la tecnología *Customer Relationship Management* (CRM). Se trata de un sistema que permite tener una visión completa de cada cliente, al crear un perfil para cada uno en el que se incluye toda su información [42]. Los sistemas de CRM permiten crear un vínculo entre la información que obtienen las empresas y los clientes [43]. Este tipo de tecnología permite tener, por ejemplo, una lista de las siguientes mejores acciones (*next best actions)* personalizadas para que cada cliente sea tratado de forma individual [44]. Además, permite a las empresas dividir sus clientes en segmentos para poder lanzar campañas de marketing personalizado y aumentar así las ventas [45]. La principal empresa que ofrece un sistema CRM es Salesforce. Su sistema ofrece una visión fácil de comprender de los clientes que permite a los empleados tener la información que necesitan siempre a su disposición para ofrecer el mejor servicio posible a sus clientes [46].

En el sector *retail* uno de los principales usos de los sistemas CRM es la creación de una empresa multicanal, que ofrezca un servicio consistente sin importar el canal utilizado [47]. Además, las empresas pueden conocer toda la información sobre sus clientes asegurándose que el servicio o

producto que les ofrecen cumple con sus necesidades [48]. Un ejemplo de una empresa en el sector *retail* que ha empleado un sistema de CRM es Philips. Mediante el uso de la tecnología Philips ha conseguido tener una visión 360º de los diferentes clientes pudiendo comprender los cambios en sus necesidades mejorando su satisfacción [49].

Caso de uso: Amazon Go

Se ha desarrollado un caso de estudio de la empresa Amazon, que ha abierto un nuevo supermercado, Amazon Go. Este supermercado utiliza la tecnología para reducir sus costes y mejorar el proceso de compra de sus clientes [50]. Para entrar en el supermercado es necesario tener la aplicación y usar un código QR que permite identificar a cada cliente [51]. Una vez dentro de un supermercado las cámaras y los sensores de proximidad (*Beacons*) son capaces de localizar a cada uno de los clientes [52]. Además, las cámaras y los sensores de peso que se han instalado en las estanterías permiten al sistema identificar los productos que el cliente incorpora a su cesta de la compra [53]. De esta forma el sistema es capaz de saber qué productos ha comprado cada cliente y los puede añadir a su cuenta. Los clientes no necesitan pasar por la caja ya que todos los productos han sido añadidos de forma automática a su cuenta de pago. [54].

Gracias a la tecnología la empresa ha reducido el coste de empleados ya que no necesitan empleados en las cajas de sus establecimientos [55]. Además, pueden enviar publicidad personalizada cada uno de sus clientes cuando está en la tienda y, con este tipo de marketing personalizado y en tiempo real, puede aumentar las ventas hasta un 3% [56]. Más allá del impacto económico (en reducción de costes e incremento de ventas) la tecnología permite a Amazon Go una mejor experiencia del cliente (para su segmento objetivo) y un elemento de diferenciación respecto a la competencia. Por ejemplo, se ha podido comprobar que el tiempo necesario para realizar la compra se ha reducido notablemente, aumentando así la satisfacción de los clientes [57]. También es importante destacar que el sistema reduce la posibilidad de robo tanto por parte de los empleados como de los clientes [58].

Conclusiones

Tras la realización de este trabajo, se ha podido concluir que la tecnología es hoy un elemento clave para que las empresas evolucionen su modelo de negocio, pasando de estar "orientadas a producto" a centrarse en el cliente; y esto es clave en un momento en que el cliente ha tomado mayor protagonismo en un entorno hipercompetitivo e hiperconectado. Se ha podido comprobar que el uso conjunto de las tecnologías IoT, *cloud computing*, *big data analytics* y CRM permite a las empresas tener grandes ventajas como el caso de Amazon Go. Además, se ha podido confirmar que las empresas conocen mejor a sus clientes y por lo tanto son capaces de mejorar los productos y servicios que les ofrecen. Asimismo, se ha podido constatar los cambios que en los hábitos de consumo de los clientes y como la tecnología les ofrece una mayor cantidad de información, obligando a las empresas a evolucionar para poder ofrecerles un buen servicio. Las empresas que no cambien sus modelos de negocios para ser *customer centric*, estarán en desventaja competitiva poniendo en riesgo su futuro.

Otra de las conclusiones que se ha podido extraer es que el entorno en el que desarrollan sus actividades las empresas ha cambiado. En el siglo XX se utilizaban las economías de escala como

barrera para evitar que otras empresas entrasen en un mercado, pero Internet ha roto esas barreras. Hoy, gracias a la tecnología, incluso pequeñas compañías como las *start-ups* pueden competir con las grandes empresas también. Además, los compradores son los que tienen el control sobre los productos ya que tienen el poder gracias a la información que obtiene mediante la tecnología. Las empresas deben tener en cuenta que podrían aparecer nuevos competidores y productos sustitutivos gracias a la tecnología. Por último, es importante destacar que los competidores son mucho más agresivos ya que la tecnología les permite realizar cambios en sus negocios de forma rápida y fácil. Estos cambios en el entorno de las empresas condicionan y obligan a implementar tecnología de forma ágil para poder ser competitivas.

La tecnología ha abierto una amplia gama de soluciones y posibilidades que han mejorado la atención al cliente. Durante la era de la información, es decir, durante el siglo XX, las empresas del sector minorista utilizan diferentes métodos para llevar a cabo la comercialización. Principalmente, las empresas enviaban avisos a sus clientes a través de buzones, ofrecían cupones de descuento cuando realizaban compras y usaban las tiendas para informar a sus clientes sobre ofertas genéricas. Esto ha cambiado gracias a la tecnología, y en esta nueva era del cliente, las empresas ya no usan estos métodos para la comercialización. Hoy en día las empresas del sector *retail* utilizan principalmente las aplicaciones y redes sociales para llevar a cabo la comercialización de sus establecimientos. Como se ha podido analizar a lo largo del documento, la mayoría de las empresas que han realizado una transformación digital tienen una comunidad de clientes que acumulan puntos o reciben descuentos después de sus compras. Además, en el sector *retail*, se está explotando el uso de las redes sociales para dar a conocer marcas y productos. Este nuevo método es mucho más económico y efectivo que el correo anterior y permite que las empresas conozcan a sus clientes en detalle. En el siglo XXI, el marketing personalizado se puede llevar a cabo gracias a la tecnología, que permite que cada cliente tenga una publicidad diferente y se centre en sus necesidades. Y, adicionalmente, permite a las marcas estar en contacto continuo – o al menos más frecuente – con sus clientes, consiguiendo así una mayor vinculación y fidelidad.

Este documento contribuye a la literatura existente ya que no se había hecho un estudio previo de las tecnologías que ayudan a las empresas a ser *customer centric*. Además, permite a las empresas conocer algunas de las actividades que empresas en el sector *retail* están empleando para mejorar sus negocios. De esta forma podrán realizar sus inversiones en tecnología sabiendo los resultados que se pueden obtener y reduciendo el riesgo de realizar una mala implementación. También sirve como catálogo para nuevas empresas que no sepan como introducir la tecnología en sus modelos de negocio.

Para concluir, es importante destacar que la tecnología y las capacidades de computación se desarrollan a gran velocidad: tecnologías emergentes como la inteligencia artificial van a tener un impacto enorme en la estrategia empresarial y en la relación de compañías y marcas con sus clientes (empezando por tecnologías como los *chatbots* o los asistentes virtuales). El camino para poner al cliente en el centro a través de la tecnología está empezando, y el recorrido que tiene cambiará el modo en el que empresas (incluso otras organizaciones como las administraciones relacionadas con ciudadanos) se relacionan con sus clientes, impactando profundamente en su modelo operativo y económico.

CUSTOMER CENTRICITY: NEW CUSTOMER-FOCUSED MODELS DRIVEN BY TECHNOLOGY

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ABSTRACT

The technological revolution focused on the customer

The third industrial revolution, powered by the Internet and digitation technologies, is changing the whole business landscape [1]. Companies are now facing the "Age of the Customer" [2], and becoming a customer-centric organization is no longer nice-to-be or just buzzword: it is an imperative to survive and succeed [3]. And just as technology is the engine of these changes, it is also the key enabler for companies to transform their operating model and deliver superior customer experience, which is the definitive success factor in a redefined market [4].

Throughout the 20th century technology has been gaining importance and has been implemented in all sectors, mainly due to the massive use of business software and the extension of Internet use. Industry 4.0 emerged in 2011 as a highly technological strategy in Germany, integrating robotics, sensorization, Internet of Things and artificial intelligence elements [5]. By the year 2020, the number of connected devices will grow to 50 billion worldwide [6]. The widespread use of the Internet has caused the fall of trade barriers and allowed us to live in a global world, with implications for companies in terms of scale and competitiveness [7]. Globalization leads to greater competition among companies as costs are reduced and they can sell at lower prices [8]. This increases the level of competitiveness and companies must seek new competitive advantages [9]. Many companies are changing their strategy and focusing more on the client [10].

Consumers have also changed their consumption habits and are using technology more frequently, which makes it easier for them to obtain more information about the products and services they are going to buy, being able to compare prices in real time and even sharing ratings of brands, products and services. distributors [11]. Today, consumers are in continuous and simultaneous communication with each other [12]. In this way, the purchasing cycle of consumers has been changed, who previously followed a linear path; now consumers evaluate products and services before and after their purchase, offering more information to other customers [13]. Companies must know how to manage the information their clients obtain, as well as knowing their needs in order to obtain competitive advantages [14].

That is the reason for which companies across all sectors are using technology to become customer centric [15]. Thanks to technology, companies can get to know their customers and offer them the service they expect, developing the customer experience as an element of competitive differentiation in the market [16]. Leading companies are changing their business models by placing consumers at the centre [17]. In this way they are able to obtain an in-depth knowledge about the customers and the products they have purchased, their purchasing habits and their

preferences, and even develop predictive models regarding their consumption potential: having information about their customers and using technology allows them to predict future purchases and also modify their products or services to meet their needs[18].

In order to understand how these changes are affecting businesses, consumers, companies and the environment must be studied [19]. Using this methodology allows the comprehension of the importance of the client as a process that includes all the stakeholders of a company that come into play when they undergo a digital transformation [20]. As to understand the changes that companies must make, hypotheses have been made about the new business models. For this purpose, the model offered by Porter [21] has been used and the descriptions of the different forces have been changed in order to understand the market in which companies play today. An exhaustive research on the main technologies used by leading companies in the market has also been carried out. It has been possible to detect that there are four technologies that allow companies to be customer centric: Internet of Things, Cloud Computing, Big Data and Customer Relationship Management. All of them are based on the recovery and analysis of data about customers and their needs.

This document aims to understand the changes that companies are suffering due to technology. Furthermore, it is intended to describe - and, to a certain extent, anticipate - the role that technology plays in the business world in terms of the relationship with customers and understand what changes companies must make in order to obtain a competitive advantage. Throughout this document an analysis of the main technologies that allow companies to be customer centric will be done. And an in-depth study of the retail sector will be done, in which the main success stories of that sector will be described. Finally, Amazon Go will be analysed as a practical example to understand the benefits of implementing technology in a company.

Disruptive technologies

The first technology that has been studied is the Internet of Things (IoT). This technology tries to connect everyday objects to the Internet, being able to create a network of interconnected sensors [22]. Companies from all sectors have started to install IoT systems to have information about their products and their customers [23]. Three providers of this type of technology have been analysed: Cisco, Amazon and Honeywell. The three companies allow the creation of a network through the use of devices, but Cisco has focused mainly on the development of this technology applied to each sector [24]. On the other hand, Amazon has created the Dash Buttons which allow companies to interact with customers [25]. And finally, Honeywell has created a solution called IIoT (Industrial Internet of Things) that is focused on the use of IoT in factories and supply chains [26]. It can be seen that the solutions offered by the IoT are diverse and that there are many advances that will modify the way in which companies carry out their activities [27].

IoT technology is of great importance in the retail sector because it offers many solutions [28]; among others: wearables (devices that users wear and that allow to have information about them) [29]; beacons (small devices used mainly for proximity marketing) [30]; and RFID tags and QR codes (which allow to store information that can be useful for companies or for customers)[31]. An example of the use of IoT in the retail sector is the company Tesco, that has used QR codes to

create a virtual supermarket in the subway of Seoul, so that travellers can scan the codes and make their purchases while waiting for the metro [32].

The following technologies that have been analysed are cloud computing and big data & analytics that offer the possibility of storing and analysing large amounts of data and extracting relevant information from them [33]. Thanks to these technologies, companies are able to understand all the information they have obtained -for instance, from their customers- and can look for trends that allow them to predict the future [34]. One of the main characteristics of this technology is the fact of paying only for what is used since the technologies are offered "as a Service" [35]. These two technologies complement each other and offer a solution that helps improve the management of company information [36]. That the reason why many technology companies offer the two technologies together. For example, IBM Watson, offers storage and a data analysis service that helps all types of companies to get the most out of the information they collect [37].

Companies in the retail sector are benefiting from the services offered by large technology companies, since they can adjust technology to demand, thus optimizing their costs [38]. In addition, this type of technology allows companies to know their customers and optimize their purchasing processes [39]. It also offers companies to use existing applications to improve their processes, for example, by creating a mobile application quickly and at a low cost [40]. An example of a company in the retail sector that has known how to take advantage of cloud computing and data analytics technology is Domino's Pizza. This chain of pizzerias has a high demand when it comes to meals and by hiring a cloud computing system they can use the servers of a third company to increase their order processing capacity during peak hours. In this way, the company optimizes its devices and is also able to store all the information in a single server, being able to access the information of its customers from any location [41].

Finally, Customer Relationship Management (CRM) technology has been studied. It is a system that allows a complete view of each client, by creating a profile for each one in which all their information is included [42]. CRM systems allow to create a link between the information obtained by companies and customers [43]. This type of technology allows having, for example, a list of next best actions so that each client is treated individually (Jenkinson, 2009). Furthermore, it allows companies to divide their clients into segments in order to launch personalized marketing campaigns and thus increase sales [45]. The main company that offers a CRM system is Salesforce. Its system offers an easy-to-understand vision of clients that allows employees to have the information they need at their disposal to offer the best possible service to their clients [46].

In the retail sector one of the main uses of CRM systems is the creation of a multi-channel company, which offers a consistent service regardless of the channel used by clients [47]. Moreover, companies have access to all the information about their customers making sure that the service or product offered to them meets their needs [48]. An example of a company in the retail sector that has used a CRM system is Philips. Through the use of technology Philips has managed to have a 360º view of the different clients, being able to understand the changes in their needs improving their satisfaction [49].

Study case: Amazon Go

A case study of the Amazon company has been developed, which has opened a new supermarket, Amazon Go. This supermarket uses technology to reduce its costs and improve the purchasing process of its customers [50]. To enter the supermarket, it is necessary to have the application and use a QR code that identifies each customer [51]. Once inside, cameras and proximity sensors (Beacons) are able to locate each of the customers [52]. Furthermore, the cameras and weight sensors that have been installed in the shelves allow the system to identify the products that clients include in their shopping carts[53]. In this way the system is able to know what products each customer is buying and can add them to their account. Customers do not need to go through the checkout line as all products have been automatically added to their payment account [54].

Thanks to technology, the company has reduced the cost of employees since they do not need employees in the cash registers of their establishments [55]. In addition, they can send personalized advertising to each of their clients when they are in the store and, with this type of personalized marketing and in real time, they can increase sales up to 3% [56]. Beyond the economic impact (in reducing costs and increasing sales) the technology allows Amazon Go to offer a better customer experience (for its target segment) and an element of differentiation from the competition. For example, it has been possible to verify that the time necessary to make the purchase has been significantly reduced, thus increasing customer satisfaction [57]. It is also important to note that the system reduces the possibility of theft by both employees and customers [58].

Conclusions

After the completion of this work, it has been concluded that technology is today a key element for companies to evolve their business model, going from being product-oriented to customer-oriented; and this is key at a time when the client has taken a leading role in a hyper-competitive and hyper-connected environment. It has been possible to verify that the joint use of IoT, cloud computing, big data analytics and CRM technologies allows companies to have great advantages such as the case of Amazon Go. In addition, it has been confirmed that companies know their customers better and therefore are able to improve the products and services they offer. Likewise, it has been possible to verify the changes in the habits of consumption of the clients and how technology offers a greater quantity of information, forcing the companies to evolve in order to offer them a good service. Companies that do not change their business models to be customer centric will be at a competitive disadvantage putting their future at risk.

Another conclusion that has been drawn is that the environment in which companies develop their activities has changed. In the 20th century economies of scale were used as a barrier to prevent other companies from entering a market, but the Internet has broken those barriers. Today, thanks to technology, even small companies such as start-ups can compete with large companies. Furthermore, buyers are those who have control over the products because they have the power thanks to the information obtained through technology. Companies must take into account that new competitors and substitute products could appear thanks to technology. Finally, it is important to note that competitors are much more aggressive as technology allows them to make changes in

their business quickly and easily. These changes in the companies' environment condition and force the implementation of technology in an agile manner in order to be competitive.

Technology has opened a wide range of solutions and possibilities that have improved customer service. During the information age, that is, during the 20th century, companies in the retail sector use different methods to carry out marketing. Mainly, companies sent notices to their customers through mailboxes, offered discount coupons when they made purchases and used stores to inform their customers about generic offers. This has changed thanks to technology, and in this new era of the customer, companies no longer use these methods for marketing. Nowadays, the companies of the retail sector mainly use the applications and social networks to carry out the commercialization of their establishments. As has been analysed throughout the document, most of the companies that have made a digital transformation have a community of clients that accumulate points or receive discounts after their purchases. In addition, in the retail sector, the use of social networks to promote brands and products is being exploited. This new method is much more economical and effective than the previous mail and allows companies to know their customers in detail. In the 21st century, personalized marketing can be carried out thanks to technology, which allows each client to have a different marketing strategy and focus on their needs. And, additionally, it allows brands to be in continuous contact - or at least more frequently - with their customers, thus achieving greater bonding and loyalty.

This document contributes to the existing literature since there are no previous study of the technologies that help companies to be customer centric. In addition, it allows companies to know some of the activities that companies in the retail sector are using to improve their businesses. In this way they can make their investments in technology knowing the results that can be obtained and reducing the risk of a bad implementation. It also serves as a catalogue for new companies that do not know how to introduce technology into their business models.

To conclude, it is important to point out that technology and computer skills are developed at great speed: emerging technologies such as artificial intelligence are going to have a huge impact on business strategy and on the relationship of companies and brands with their customers (starting with technologies such as chatbots or virtual assistants). The path to put the client in the centre through technology is starting, and the journey that has changed the way in which companies (including other organizations such as citizen-related administrations) get in touch with their customers, impacting deeply on their operational and economic model.

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Lucía Domínguez García-Guijas

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Chapter 1: Introduction

This first chapter is an introduction to the master thesis. It includes a brief introduction to customer centricity and to how the market places are changing. It then explains the need to carry out this research which main reason is the changing market and how the companies' business models are not correctly structured anymore. The main objectives of this study are then explained and the methodology that will be used is described. Finally, the working hypotheses have been defined based on Porter's profitability analysis.

1.1. Overview

We live in a world in which technology has a great importance. By the year 2020 the number of connected devices will grow up to 50 billion globally (EY,2013). Inventions like the Internet have caused trade barriers to fall and have permitted us to live in a global world (Gilpin and Drache, 2001). Globalization leads to a higher competition between companies as costs are reduced and they are able to sell at lower prices (Beck, 1998). This makes companies increase their competitiveness and lose their competitive advantages (Herrera, 2002). As to obtain a competitive advantage, many firms are changing their strategy and becoming more customer-focused (PricewaterhouseCoopers, 2011). This means that the customers are the main actors of businesses.

The recent events in the global economy and the irruption of the Internet in the world, have made important changes in the communication schemes. Nowadays consumers are in continuous and simultaneous communication with each other (Rifkin, 2014). This fact has made many multinational institutions realize that one of the most important things is to be well positioned in the actual society using new technology to achieve this. These companies are fighting in an aggressive market, so they have to make profitable their investments and find new business strategies to meet customer needs (PricewaterhouseCoopers, 2016). In addition, the evolution of technology has allowed a lower cost provision of information which has obliged companies to become more customer centric (Teece, 2009).

All this affects the majority of companies which must undertake strategic transformations which will affect what had been their core business and through which their financial strategies were valid (Accenture, 2014). The new challenge is to change form a product focused firm to a customer focused firm.

The main differences between a customer centric company and a product-focused one can be found in different aspects for example the business's philosophy (vision and mission statement), the firm's structure, the performance metrics or the way the firm is managed. Product centric firms sell products whereas customer centric ones serve customers. The main difference in this change in the philosophy is that in a customer focused company the decisions starts with the customer and the company works upwards in their value chain to create the product or service needed by the consumer (Stefanou et al., 2003). This change in the vision of the company affects all the other elements of a business.

In a product-focused business, the product features are highlighted. Meanwhile a customer focused firm concentrates on the product's benefits and on how the product meets the customers' needs. As to achieve these changes the firm's must focus on the customers segments rather than the

products they offer. To do this the organizational structure must change their product sales team to a customer relationship team. And instead of counting the number of new products or the market share per product, they focus on the customer satisfaction or the rate of customers that are loyal to the brand. Finally, customer centric companies manage a portfolio of customer and not a portfolio of products and customer knowledge is an important asset (Shah et al., 2006).

The main reason for this thesis, to understand the changes that must be undertaken and how does technology help the companies do it. In addition, this document aims to study the technologies that are available to allow companies from different sectors transform their business models to become customer centric. As to understand the benefits of each tool available a benchmark of the different successful cases throughout the main sectors of the global economy (healthcare, retail, transport…) will be carried out.

This document will be a descriptive and explanatory research in which different sources of information will be used: academic papers and business consulting documents. The documents that will be treated will be mainly from authors and consulting firms with a global view as to have a wider vision of customer centricity worldwide. The analysis by sectors will be carried out in the most mature markets and with international companies to ensure the validity of the study.

The master thesis will be based on authors that have a great influence such as Galbraith, Bruin or Fader. As to study the main trends and understand how the markets are changing, what challenges companies must face and what technologies are available to help them become customer centric, papers and studies from the most important business consulting firms (Boston Consulting Group, PricewaterhouseCoopers, Mc Kinsey, Bain…) will be used.

1.2. The need to carry out the thesis

Throughout the history, human beings have created new inventions to make life easier. This fact has enabled the society to evolve and change the way things are done. These developments can be seen in technologies, especially in the last centuries, which have helped reduce time and cost, and optimize processes when producing goods and services (Lasi et al., 2014). This has led to 4 different eras in industry: industry 1.0, industry 2.0, industry 3.0 and industry 4.0 (Gartner,2013).

Industry 1.0 started in the nineteenth century with the invention of hydropower and the discovery of new applications for the steam power. It enabled machines to do the hard work that employees used to do and therefore reduce the production time. The creation of electricity revolutionised the world setting the start of the industry 2.0. Along with electricity came mass production as electrical machines made a way in production, leaving steam machines obsolete. The development of portable machines made production easier and more flexible giving power to the enterprises that were able to invest in technology. In addition, attention was drawn to new management techniques that reduced time. Examples of these techniques are division of labour (Smith, 1776), the study of movements (Gilbreth, 1911) or just in time (Toyota, 2018).

Automation broke in during the last decades of the 20th century when integrated circuits enabled machine to work with no operators. This was set as the start of industry 3.0. With this new level of technology, bills of material were no longer needed, instead companies started to install ERP (Enterprise Resource Management) systems. It consists of a software that organizes and manages

a company's business processes by sharing information across functional areas, integrating business processes, facilitating interaction and providing benefit to global companies. With this system, information flows are easier to handle and hence companies that have implemented an ERP where able to have a competitive advantage (Beard and Summer, 2004).

An ERP system enabled companies to grow internationally as they could manage their factories from the other part of the world. As companies were competing on costs, enterprises were able to outsource their production to cheaper countries and therefore offer a competitive priced product. In conclusion during the industry 3.0 the most important skill that a company needed to survive was supply chain management.

Finally, Industry 4.0 has arose in 2011 as a highly technological strategy in Germany (Almada-Lobo, 2016). Although it appeared in Germany, it is estimated that it will have an international impact. The concept tries to define a smart factory that will be controlled by a Cyber-Physical System (CPS). This will give companies the ability to have a flexible production that will be able to interact with both clients and the products being produced (Kagermann, 2015). This will increase the company's competitiveness and efficiency.

This new industrial revolution obliges companies to evolve as their competitive advantages will no longer be valid. A research carried out by PricewaterhouseCoopers (2016) shows that companies who are not transforming to keep aligned with the actual technology and developing qualified teams to meet customer necessities will not survive. Another of the key findings of the study is that companies need to put the customer at the centre of their business. The firms which are able to put the customer at their core and build and industrial structure that allows them to have the technology need in the industry 4.0 era will be the leaders of their markets.

The main problem of the transformation needed by the companies is that there are still many challenges that will arise in the industry 4.0 and new technologies continue to evolve. In order to understand the changes that companies must undertake and the technologies that will enable them to keep up with the customers' needs and requirements this master thesis will be done. The understanding of the new markets, customers and the changes companies must do to continue being profitable will be studied. Furthermore, technologies that have already been implemented by different firm throughout a variety of sectors will be analysed and described, to be able to draw the future lines that companies will need to follow.

1.3. Objectives

The aim of this project is to analyse the sectors and companies with disruptive initiatives that improve customer centricity based on new technologies. As it has been explained, these new technologies will give them a competitive advantage in the next few years and will become crucial for the firm's survival. These initiatives will be described, and their impact will be studied along with the new focus they provide. Furthermore, all technologies identified in the project will be evaluated in their application sectors in order to study their future potential.

The project's main objective is to learn the role that customer centricity has within a company's strategy and study its impact on the market position, economics and business sustainability. This will be done through an assessment of the technologies enabling to develop innovative customer

engagement and providing a superior customer experience. Finally, best practice from leaders will be analysed to learn from their strategy and an analysis of the current situation of the technologies used will be done.

As to understand the main movements and investments of companies the retail sector an in-depth analysis will be carried out in order to compare the technologies that are becoming vital for companies in this sector. Customers are evolving, and these changes will directly affect the retail sector as it is one of the biggest sectors in the world. The technologies aforementioned will be analysed for the retail sector as to comprehend their potential the different solutions that are offered nowadays. A comparison between the retail sector in the 20th century and the actual retail sector will be done as a result of this document.

Finally, a comparison between the customers in the Age of Information and the Age of the Customer will be done to understand how they have evolved. An analysis of the changes undergone in different companies to meet the requirements of the new customers will be carried out. The differences between companies in the 20th century and nowadays will be drawn. The aim of this document is to state the best practices companies should focus on to be able to transform their businesses to meet the new customers' requirements.

1.4. Methodology

Moormann (2013) proposes a research agenda for customer centricity based in three main blocks: the customer, the enterprise and the environment. This research agenda will be followed along throughout this document. An overview of the customers and how they have changed will be done in first place. Secondly, the different possibilities companies have to transform and become customer centric will be detailed. Lastly, the retail sector will be analysed to be able to understand the environment in which companies of that sector play.

Firms must put their client in their core and build the company from them. To do this companies must understand and know their customers and what their needs are. In addition, they must know when the customers need change, they should therefore try to know the trigger points which will influence their customers and hence their company. An example of a trigger point could be having a baby, this event will change the consumer's necessities and firms must react and adapt or they will be substituted.

Once the firm has fully understood their customers they can start building their strategy and their processes to satisfy the client. In order to do this firms must build a business model where the customer is at the centre and processes are adjusted keeping in mind the consumer's needs. This isn't easy as it has been explained in the previous section. Companies should ask themselves how should they use their resources and technology to create customer processes and satisfy consumers. An additional difficulty appears as the number of studies carried out about this subject is really scarce. As technology advances and markets continue to evolution it is a hard job to find a repeatable strategy valid for all firms.

Finally, the link between the company and the rest of world must be taken into account. To understand what external factors affect the business a PESTEL analysis must be done. This will help the firm understand the environment in which they play and the rules they must follow. This

environment enables the company to know their customers, but as the environment is huge, technology must be used to understand how changes in the environment affect customers. The company must be prepared to change and develop when changes arise, for example regulation changes, and technology helps companies to mitigate the effects of the variations.

In order to be able to raise a customer centric business, the customer must always be placed at its core and the firm has to follow an outside in approach to build their processes, then their strategy and finally their business model. When studying the customers of a business to set up the core of a company, it is complicated to understand their needs as these change continuously (Locke, 1991). Moreover, a need may require more than one process to satisfy it, and some processes need more than one need to trigger it. This makes customer processes complex. Companies can focus on their basic needs (Maslow's Pyramid is a good approach to differentiate the consumers), the events that trigger changes in the customers life, customer processes and the community to which they are willing to belong, and the enterprises should create. Once the customer block has been correctly understood the companies can start their corporate strategy, their processes and then determine a valid business model. All this has been summarized in Figure 1.

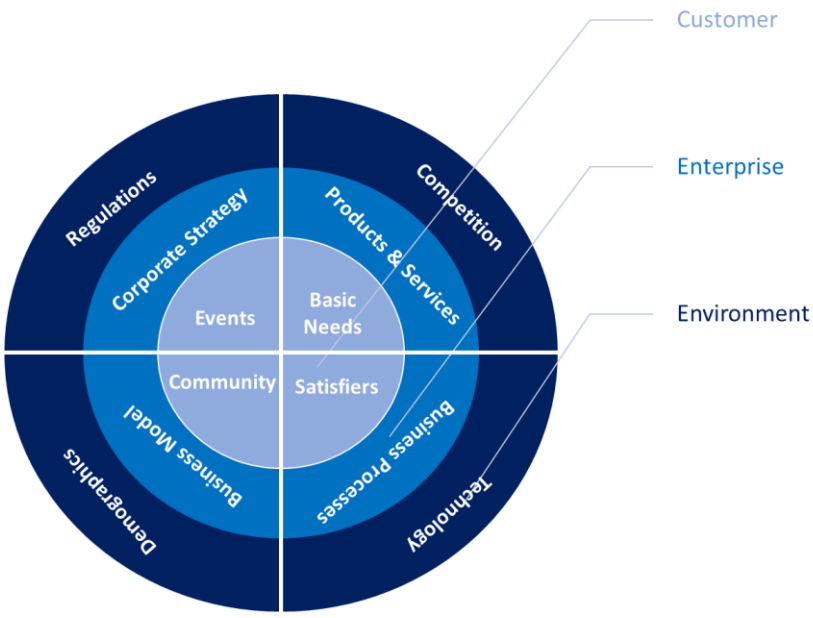

Figure 1: Customer Centric outside-in approach

The research agenda proposed by Moormann (2013) is useful as it allows the author to understand customer centricity as a process that includes all the stakeholders from a company that come into play when undergoing a digital transformation. That is the main reason for having chosen to follow this research path, to understand how are changes in the customer and the environment are changing the way companies do business. In the next section work hypotheses of the future business marketplace will be done, and along the document the assumptions will be verified.

1.5. Work hypotheses

The main goal of all companies is to earn money. In order to study the profitability of a company Michael E. Porter created a five forces analysis in 1980. It allows managers to study current and potential lines of business (Downes, 1997). This scheme has been widely used across many sectors but must be changed now that companies are becoming customer centric (Evans, 2014). Before starting the thesis some hypotheses on how these five forces are changing now that companies are transforming from product centric to customer centric will be done. Throughout the project the hypotheses will be verified, and the tools used to face this new environment will be studied.

Porter's five forces are divided into two groups: a category related to industry participants and another one related to vertical participants (suppliers and consumers). The first force measures the facility of entry of new firms into the market. This measurement is important as it shows the level of competition, which is inversely related to profitability (when competition increases, profitability decreases). Companies which have lower competition have a greater power to operate their own way, and therefore achieve higher profits.

The second force measures the probability of new entrants in the market. If it is easy for competitors to enter a new market this means that they will be able to eliminate the competitive advantage of the existing firms and this will increase competitiveness. As said before when competition increases, profitability decreases.

The third force of the Porter analysis is the threat of substitution. This force takes into account similar products or services which can replace the ones offered by the company that is being analysed. If there are many options, then competition will be high.

The fourth force is the bargaining power of the supplier. If the company has one supplier, it will have a lot of power and it will be able to increase the price of their product or service. If there are many competitors which need to buy a scare resource the supplier will also have a high bargaining power and will be able to increase the price. This implies a cost increase for the company that must be adjusted by either increasing the price of the product or service they offer or reducing their profit margins. Therefore, firms should try to have many suppliers to avoid giving them power. This can be done with existing technologies as supply chain management is easier.

Finally, the fifth force is the bargaining power of the customer. If a company sells their products or services to a small number of customers, they will have power and will be able to try to reduce the price. It is also affected by the ease of the customers to change from one firm to another. To avoid giving power to the customers the companies should try to have a wide customer base. Using actual technology, it is easy to have an updated data base with all the information needed.

This analysis is no longer valid as the rules of the game have changed. Competition has changed in the age of the customer. Therefore, there are new threats that have appeared and that must be taken into account. These threats are explained in the following paragraphs and will be verified throughout the next chapters of this document.

The entry barriers are starting to fall as information is starting to increase and it is easy for customers to search and find for the product that best meets their needs at a lower price. In addition, firms compete at a global scale which means that customers have a wider view of products and services offered. Hitherto, the main entry barrier where economies of scale, companies competed on costs and well-established firms with big economies of scale would have a huge competitive advantage. Nowadays this competitive advantage has disappeared as companies can outsource many of their processes and therefore reduce costs and risks. Furthermore, the range of clients the enterprises can focus on, is larger as the internet has enabled the possibility of cheap and effective communication.

Word of mouth has gained importance and is now able to destroy a company's reputation (Walsh et al., 2009). Companies have to invest in creating a good brand name (Berry, 2000), but as the whole society is now connected if a customer is not satisfied they can ruin all the efforts the companies have done. Likewise, during the age of technology companies were able to create a patent which would give them the profit need for several years. Today as the amount of information shared is bigger it is easy to copy products, obliging companies to change their strategies (Brem et al., 2016).

Nowadays there are many substitute products in the sectors, especially digital services and products which are replacing traditional companies. The main competitors for big companies are start-ups, which are focusing in just one product or service and are capable of undertaking it in a more efficient and rapid way. This means that small start-ups can compete with big companies in a small part of their value chain (Cecccagnoli et al., 2014). Companies are starting to change their business expansion from vertical integration to a horizontal one. This is due to the falling costs and to the decrease in the importance of economies of scale mentioned before. All this allows substitutes to appear easily and they put in danger companies which are not offering the services and products customers need.

Buyers have gained power in the new age of the customer. They have access to information for free and are more informed than ever when buying things (Ray, et al., 2005). Customers have more information about the products or services offered by a company than the company itself. Whenever a firm does not satisfy customer needs or has an issue with a customer, the whole world will know, and as there are many substitutes it is easy for clients to change of company. Consumers will continue to gain bargaining power during the next years due to advances in technology.

Suppliers as well as the customers are gaining power. Employees can now compare the different companies before choosing and companies that have outsourced processes have a wide range of suppliers to choose from. Firms are starting to search for people with great knowledge and which are able to learn quickly in order to evolve when the market changes. If employees are not satisfied with their jobs and are able to move leaving an empty space and taking the knowledge acquired to other firms.

Finally, the competitors are growing. All companies share information to attract consumers and this allows other companies to have information about their competitors' corporate strategy easily. Companies can change their strategies depending on the movements done by their competitors, for

example if a company such as Apple decides to launch a new mobile phone, competitors such as Samsung are able to react earlier and take action. All these hypotheses are summarized in Figure 2.

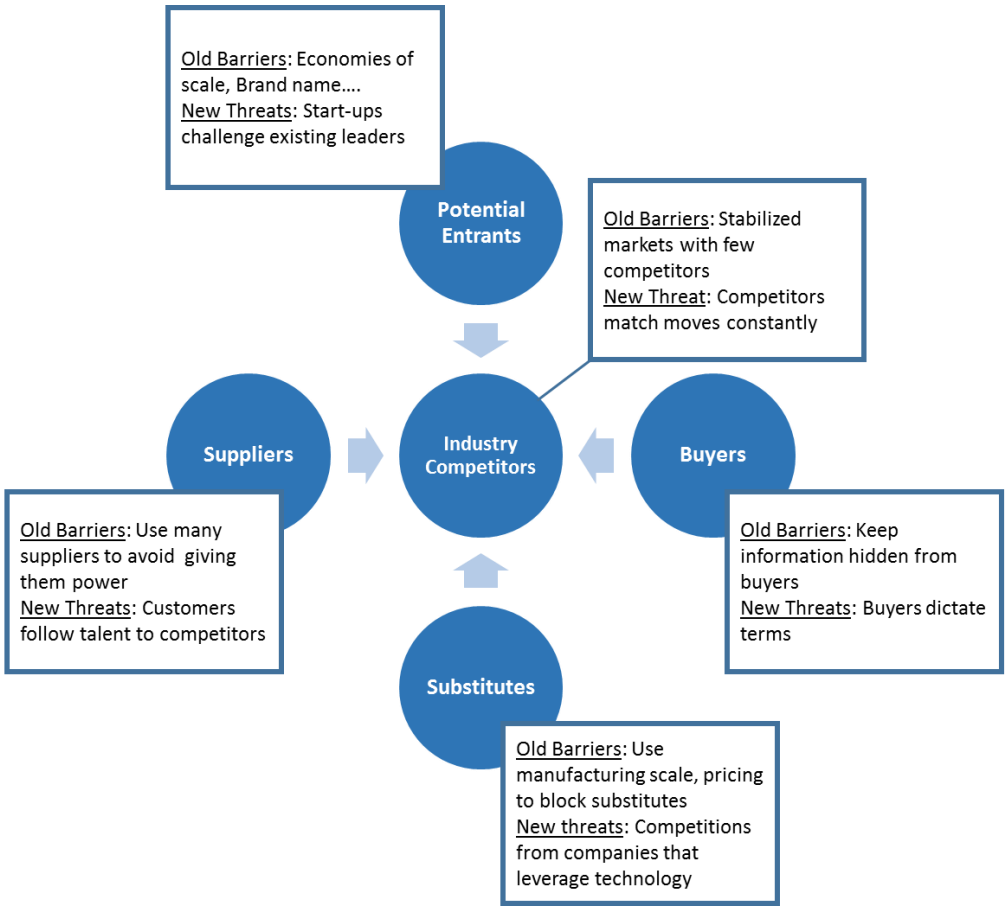

Figure 2: Work Hypotheses (adapted from Porter)

Throughout this document information to validate the hypotheses will be exposed and explained. Along with the validation of the new Five Forces diagram, the differences between the retail sector 20 years ago and the actual activities will be done. The main difference that will be studied is the need for the companies to change their focus, placing the client at the centre instead of their products. Furthermore, technologies enabling this change are of great important as it will be explained in the following chapters.

Chapter 2: Customer Centricity

Throughout this chapter a study of the concept of customer centricity and its main characteristics will be done. A definition of the term will be given as well as a summary of three of the most influential authors on this topic (Galbraith, Gulati and Fader). Below are the changes that have taken place in the markets and how the customers have evolved entering the age of the customer. Along with the "where to play" changes that have taken place in this new era, the need for an evolution of the business models will analysed.

In the next section we will describe the main advantages of being a customer centric company and the main trends that are taking place in the different sectors. In addition, the effects of changes in customer experience will be analysed. Finally, we will study the main challenges to be faced by companies, analyse whether technology is essential to overcome them and what changes companies must make to become customer centric.

2.1. Definition and foundations of customer centricity

There are many different definitions for customer centricity, but all of them have in common one thing: they describe companies which have customers in the centre of their activities (Shah, et al., 2006). The concept of customer centricity has already been studied in the last century by authors such as Galbraith, Gulati or Fader, which will be described in the following paragraphs.

Galbraith (1995) carried out a research to understand the changes that companies should do to become customer centric and therefore have a competitive advantage face to their competitors. The study aimed to describe the different changes companies had undertaken in the different sectors and compare them.

To develop his theories Galbraith uses the star model to do an organizational analysis (Figure 3). This model consists of a framework represented by a star in which each vertex represents the main policies that can be controlled by the management team and that may influence the performance of the company's employees.

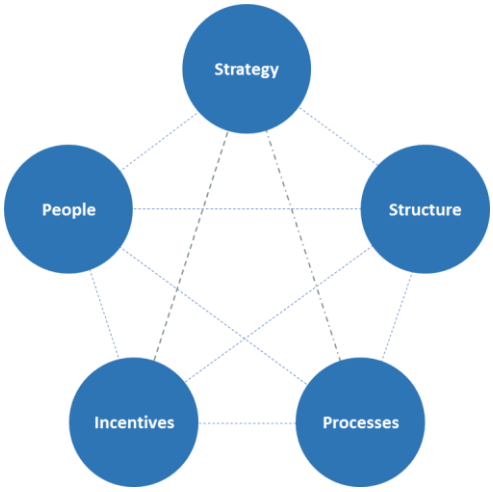

Figure 3: Organisational model (adapted from Galbraith)

Galbraith separated all the policies into five categories that correspond to the main tools that any leadership team should learn and use. If these tools are used correctly the decisions made will also be correct and will lead the organization towards a certain behaviour (Galbraith, 1995). The five categories are:

- Strategy: used to determine the direction of the firm, their objectives and how to achieve them.
- Structure: Determine the power of each person working for the company in order to set the power of the different employees and how their decisions can affect the whole organization.
- Processes: They show the information flow throughout the firm, from suppliers to customers.
- Employees: they can influence on the product or service offered by the company. They are essential to the company as their skills are needed to offer the product or service.
- Incentives: this are very important to keep employees motivated and therefore be able to achieve the objectives set.

A customer centric company is an organization where their capacities, structure, processes, employees and incentive methods are designed with focus on the client (PricewaterhouseCoopers, 2011). To maintain all the pieces together the company must have a well-defined strategy which puts the customer at their core. In order to do this, many actions can be carried out, for example, if a company wishes to define the quality performance indicators from a product they will first understand what the consumers understand by quality and then select the indicators. Another example is when the company is willing to measure the efficiency of each of the distribution channels they use, they will no longer analyse the percentage of sales of each channel, but they will make focus groups to understand the consumers' future needs. This type of actions put the customer at the centre and make companies have the ability to anticipate changes giving them a competitive advantage

In the following paragraphs the differences between a product-focused company and a customer centric one will be described. The strategy of a company presents main differences depending on the product or service they sell, but all product focused companies have in common that they try to give the client the best product they have (Popovich and Chen, 2003). In customer centric firm's this vision changes trying to satisfy the customers' needs in the best way possible (Amit and Han, 2017). The firms should not try to search for new products, but they should try to find a package of solutions that are personalized for each client (Galbraith, 1995). In order to create value, they will no longer try to search for new innovative products, new applications or new features, instead they will try to customize the solutions given to the customers to better satisfy their needs.

In a customer centric strategy, the focus is not the customer with the highest incomes but the client which will become loyal customers to the firm (Kim et al., 2003). This makes the portfolio of product loose importance with respect to the client portfolio. Finally, the pricing strategy may vary, changing from a market price which was setup mainly by the competitors as prices had to be low enough for a company to remain competitive, to a price given by the value added to each customer. Hence, the firms' price will vary depending on the client as the products or services offered vary

depending on the customer. Customers will therefore have a personalized product at a customised price (Li et al., 2014).

The structure of the organizations must be changed to become customer centric (Cummings and Worley, 2014). In order to put the client at the core and be able to build the company with an outside in approach, the different business units should not be separated depending on the product offered. Instead, firms should split the organization in client segments, with their trigger actions which will make them move from one category to another. For example, a category could be single women, and a trigger point could be having a baby or getting married (Salesforce, 2018). Companies must fully understand the needs of their customers to be able to satisfy them and avoid the customer changing to another company.

All companies must have defined their key processes to ensure that their services or products are good enough to satisfy their customers' needs (Hammer, 2015). Before entering the age of the customer, firms focused on the development of new products and on the processes that enabled the company to create the latest products. In this new era, firms must focus on the customers' needs and create customer processes. They should target the development of new solutions and the management of their client portfolio (Basak and Makarov, 2015).

Companies used to measure their performance and the performance of their employees using metrics such as the number of products sold, market share or the number of products available in the market. Employees would receive rewards if they were able to reach a certain number of sales or if they were able to reach a certain amount of profit. This made the employee push the products towards customers as they tried to sell products that the customer did not need. This type of metrics are not customer centric and they should be changed to ensure that the customer receives only what they need. Some of the new metrics that should be used are customer satisfaction, customer loyalty, or number of subscribers (Ulaga, 2018). This will make employees try to gain customers and ensure that they have no problems with the product or service, increasing the probabilities of making customers loyal to the firm.

Finally, people that are part of the company should change their standpoint, their culture and their perspective of sales. They should no longer ask themselves how many different uses they can give to a unique product, but what is the best combination of products for the customer. This will change the point of view of sales as the employees will position themselves in the customers' side. The firms' cultures should also change to encourage searching for new forms of satisfying the clients instead of searching for new product ideas. In order to do this the power should be given to the people that manage the relationship with customers other than the people that develop new products or services.

All the differences between a customer centric and a product centric firm can be summarized in Figure 4.

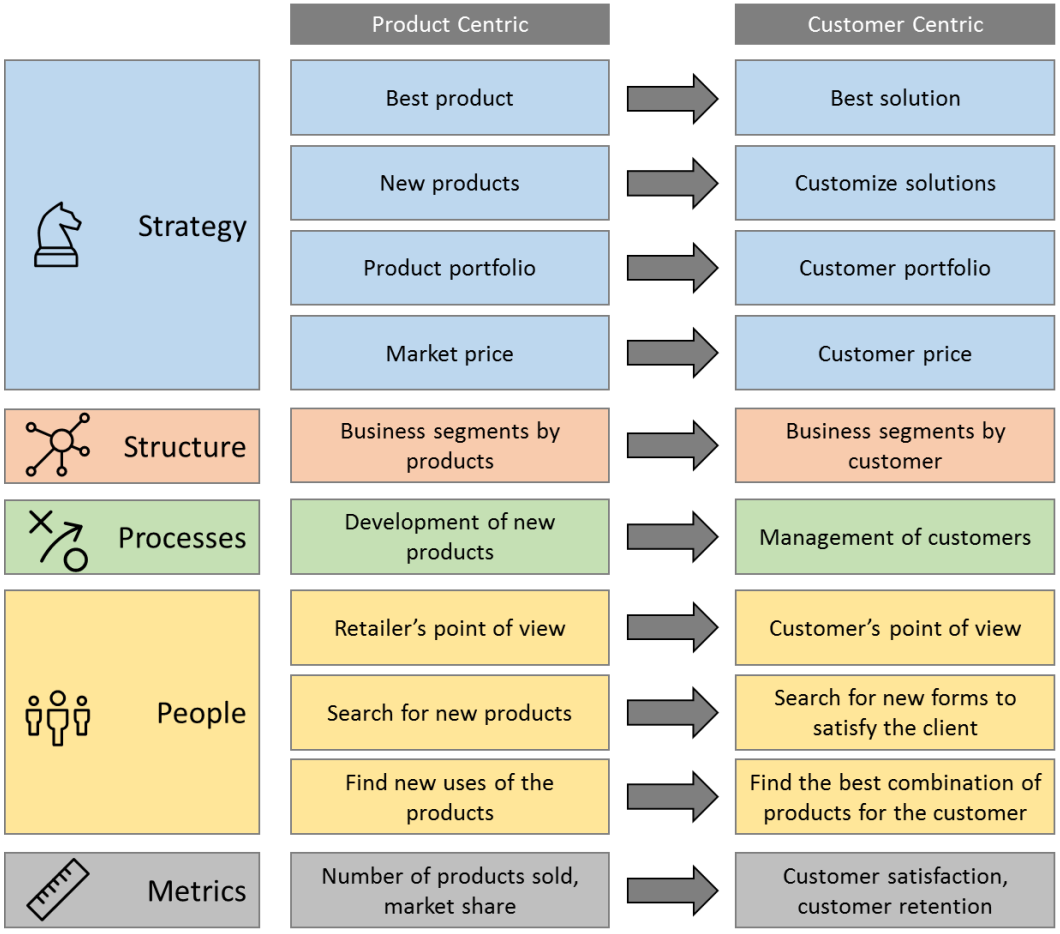

Figure 4: Customer Centric vs Product Centric business

The second author that has been a great influence in this subject and that has carried out researches in the customer centric theme is Ranjay Gulati. Gulati (2010) proposes another solution to align the whole organization around customers, giving a series of actions that companies can do to become more customer centric. The solution suggested is the integration of customers to the business.

Customers are no longer waiting for new products to come out to the market, they only want to satisfy their needs. The consumers have access to huge amount of information about the products and services the companies offer, and they are able to compare the ones offered by many different companies in a short period of time (Forrester, 2013).

The integration suggested by Gulati implies the collaboration between the different functional areas and the business units of the firm. Although this collaboration already existed to optimize the production, in this new age the collaboration is done for the company to understand what are the customers' needs and how do they change. The proposition is to align the products, technology, functional areas, business units and operations to attain the best solution focused on the customer in a flexible way (Gulati, 2010).

For Gulati there is a natural path which companies should walk to become customer-centric. This path is composed of four levels (Gulati, 2010). The first level is the most product-focused, it includes companies that focus on technology to produce their goods at a competitive price. In the second level firms that have done some research about the marketplace in which they operate. These enterprises have analysed the market in which they play and are starting to differentiate customers into different segments. This is a first step toward customer centricity but companies in this level are still pushing their product to consumers and have not understood customer needs.

The third level defined by Gulati compromises businesses that have done a shift in their organizational structure and their mindset. Companies in this level have understood that they must comprehend their customers' needs and that they will give them the most appropriate product or service they have. Some of the product silos start to become flexible making their business units cooperate to achieve their objectives. Breaking the silos implies that customers have no boundaries when buying and they can get personalized product packages.

In the last level firms are focused on producing what their consumers need rather than focusing on their products and services. Companies in this level have achieved a new mindset in which who or how the products are produced is no longer important. An example of an enterprise in this level is Apple, up to 80% of their phones are produced by third parties, but they get 50% of the phone's price as a profit. They are concerned about their customers and they leave the product to outsourced firms.

Changing the vision of the company and making all employees alert of it is really important. Many industries have failed to overcome these changes and are no longer profitable. One of the most illustrative examples is lettuce companies, which thought that just by asking if their products are tasty they would have happy customers. Bagged-salad companies, on the other hand, analysed consumers and found out that nowadays people have less time to cook and that cleaning and cutting the lettuce are time consuming activities. They therefore created cleaned cut lettuces and sold them. This was a huge success and they now have most of the lettuce market share.

In order to help companies adapt to these new changes Gulati (2010) defines five levers (Figure 5). The first four are the ones that allow the companies to increase their level. The fifth one, connections, enables the company to erase the product silos and have a customer centric company.

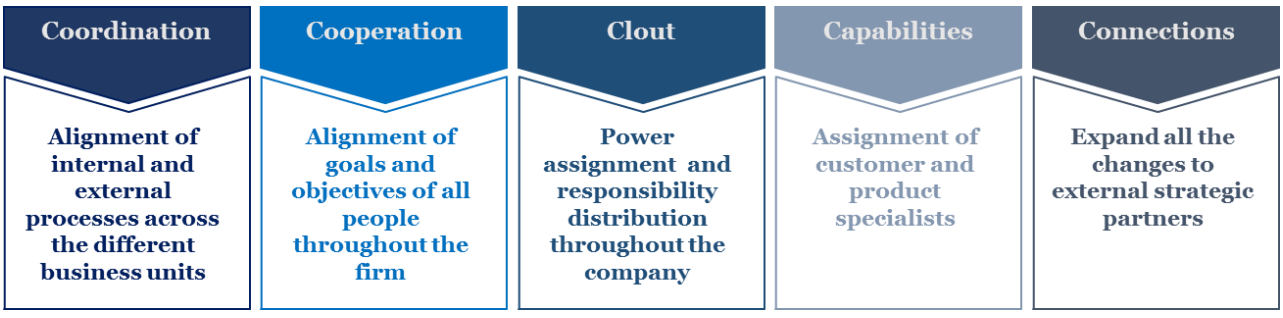

Figure 5: Levers to become customer-centric (adapted from Gulati)

The main conclusion that can be drawn of Gulati's researches is that only by integrating all processes and people both internal and externally a company will be able to become customer-focused. These changes will allow the firms to exploit their individual competences and generate products and services with a high added value.

The third author that has been studied is Peter Fader. Fader (2012) puts special emphasis in distinguishing two terms that are frequently mixed up: customer-friendly and customer-centricity. Customer-friendly are all the companies that offer a good service and that pay attention to customers, ensuring there are no problems during the use of the product or service. Customer centricity includes customer-friendly, but this is just a part of customer centricity. Being a customer centric business means that all clients are treated differently, offering personalized products and services to meet their needs. Although both terms are akin customer friendly does not distinguish between each client.

Fader states that organizations must determine the different clients they have and focus on the ones that add value to the company, this is the ones that will be profitable for the company. This does not mean that the other customers are not treated well. In order to distinguish between the different consumers, the Customer Lifetime Value (CLV) can be used. The process used to calculate the CLV of a customer appears in Figure 6. It is a piece of information that enables companies to know how much they can invest in marketing for a client taking into account the amount of revenues they will give back (Bravo, 2016).

Figure 6: Customer Lifetime Value

If the company has a solid information infrastructure it has the opportunity to obtain a higher profitability per client. Firms must also consider the historical data from the products or services sold and the interactions between the firm and the customers through all the channels. All this information gives the enterprises details of the individual consumptions, which are essential to estimate the profitability of the consumers. Crossing all this data with statistical models will allow the firm to determine their objective customers (Fader, 2012).

The conclusion of the research and further theory created by Fader is that the first requirement for a company to be customer-focused, is to have the capacity to understand their clients in enough detail to be able to differentiate a valuable one from the rest. The company will therefore be able to offer special attention to those which will give higher returns.

2.2. The Age of the Customer

We are now entering in a new age, the age of the customer, and companies are starting to leave the age of information (Blasingame, 2017). The age of information is succumbing to the age of the customer, as customers resist restrictions of the former age and embrace the empowerment of the

new (Dibeehi, 2014). During the transition, sellers are operating in parallel universes, but not for long. Loft (2011) has stated that the era of the information is now obsolete, and the world has entered the era of the customer (Figure 7).

Throughout history companies have been adapting to the different changes, from the industrial revolution where manufacturing was the main objective, to the Age of the customer, where customers should be the core of any business. Online and offline retailing are starting to fusion, having an 85% of the customers claiming a unified experience through both channels (Wirtz, 2006). However only a third of them are obtaining one.

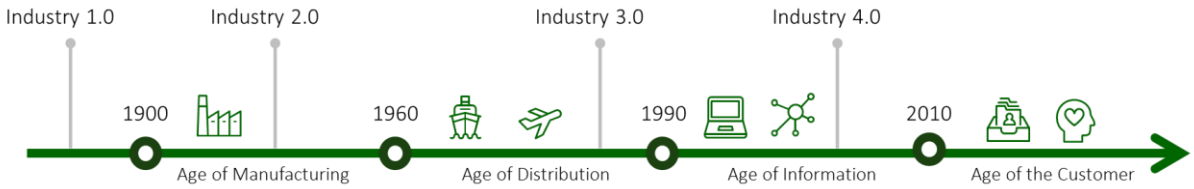

Figure 7: Industry evolution

The markets have gone through three different eras and since 2012 they have entered the age of the customer (Forrester, 2017). The first period was the age of manufacturing where having a factory was the main objective as production costs where immensely lowered. Companies that possessed a factory had a huge competitive advantage and were leaders in the market. During this era firms such as Boeing and Ford where able to build their factories and conquer their respective markets. Having a low customization of their products enabled them to have high margins and hence the ability to continue investing in technology to become more productive (Lasi, 2014).

During the 1960's the age of manufacturing lead to the age of distribution as trade barriers started to fall and globalization appeared. Companies started to move out of the cities to save costs and therefore transportation gained importance as products had to be brought to the customers. Along with globalization, an improvement in communications and transportation networks allowed companies to start producing in Asia at lower prices. This is the reason for which having a good communication network was essential during the age of transportation. Companies such as Toyota, Procter & Gamble or Walmart were really successful in this era.

In the age of information, firms had to be able to manage all the information that they created. As most of them had their production sites far away from their customers, only the enterprises that were able to management efficiently their supply chains were capable of being profitable. In addition, the first online businesses appeared, and a new technology market was created, giving many people the opportunity to start their own businesses. Some examples of companies that adapted to the situation fairly well are Amazon and Google. They invested huge amounts of money in technology and they became leaders of their markets.

Finally, in 2010 the age of the customer started to appear replacing the age of technology. In this era the consumers have achieve the power over information and are now capable of demanding a better product or service to companies. During this age big companies have already amortized their

investments of the previous age. This means that technology is no longer a competitive advantage, so firms must find a new one. The new competitive advantage of this times is understanding and satisfying the customers' needs and only firms that get to know their consumers well will be able to survive (Jazdi, 2014). Companies doing a good job are Facebook or Best Buy(Sparrow et al., 2015).

Best Buy is one of the best examples of adaptation to the new era and understanding customers (Baird, 2015). The company carried out a study of what their consumers bought depending on the age and gender. They found out that most women bought a package of products whereas men only bought the product they were looking for. They discovered that their shops had a layout for men, as products were placed by segments and a specialist of each segment could be found. Women had to go through the whole shop to get the products they needed which decreased their satisfaction. The firm decided to change the layout of their products putting products that were bought together near to each other and having their employees trained so they were able to help all clients without sending them to ask someone else. Customers increased their satisfaction and Best Buy's revenues increased (Gulati, 2010).

The main difference between the age of the seller and the age of the customer is the information clients have. As it can be seen in the diagram below, now it is the customers whom controls the product information (segments coloured in blue). This is due to the ease with which anyone can find information with the help of internet. Along with this information, the User Generated Content (UGC) has appeared. Customers know share information with others giving a great importance to the word of mouth.

The sellers used to control the product information and the product or service during the Age of the Seller, but in this new age the customers have gained the control of the product information, and the product or service itself have lost importance. This can be seen in Figure 8:

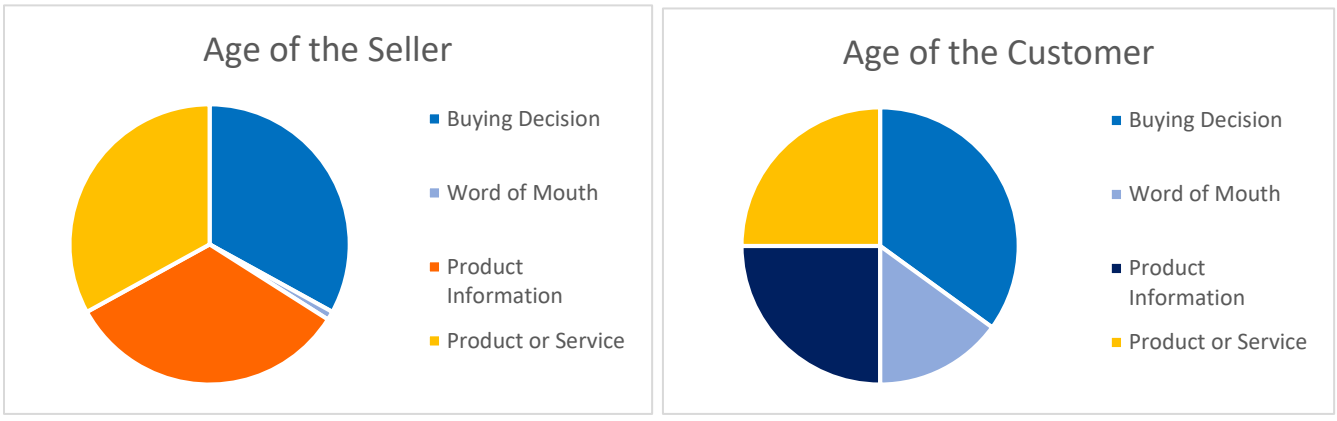

Figure 8: Differences between the Seller and the Customer Age

Sometimes, even the product quadrant is somehow controlled by the customers. For example, when buying a holiday trip, it will be the customer who will choose and modify the product. This

is now possible because of technology and the new business models that many companies are implementing.

Technology-empowered customers now know more than companies do about their products and services, the pricing, and the reputation of each product (Rifkin, 2014). As it can be seen in Figure 9, technology has tipped the balance in favour of the customer.

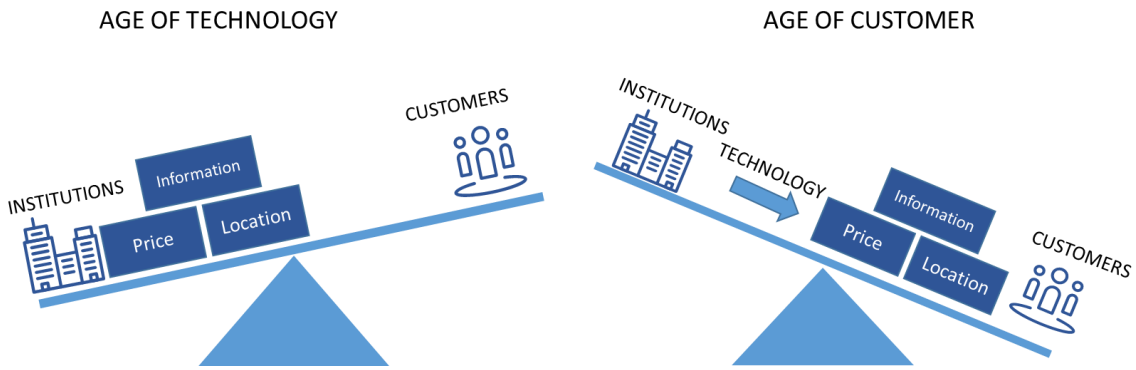

Figure 9: Effect of technology on the Age of the Customer

Customers nowadays have the power to change the businesses, and if companies themselves do not change customers can easily switch to another company. This is the reason for which enterprises must start to become customer-focused (Bear, 2015). Companies should start to offer a consistent experience to their customers, and ask themselves "What more can I give them?" This move from a traditional business to a customer centric one will be needed to ensure the survival of many corporations in the new customer age. Soliciting and acting on customer feedback not only contributes to identifying their preferences, it also helps customers feel valued (PricewaterhouseCoopers, 2013).

Companies must start to use one of their most valuable assets: customer loyalty (Saeidi et al., 2015). As customer loyalty cannot be copied this gives the company a big competitive advantage (Ivanov and Mayorova, 2015). But there are other advantages to being a customer centric company such as an increase in sales productivity or changing to a more cost-efficient strategy (Moormann and Palvölgyi, 2013). In the retail sector, earning can rise up to 20-25% just by focusing their efforts on the right customer (Bain & Company, 2017).

Enterprises should try to focus on customer experience and should try to make the customer the core of their business. Senior leaders and staff alike need to examine the business from the customer viewpoint to maximize the customer experience (PricewaterhouseCoopers, 2013). Companies must go beyond customer service in order to create a memorable impact on every customer. "Every contact we have with a customer influences whether or not they'll came back. We have to be great every time or we'll lose them" (Stirtz, 2008). Up to two-thirds of customers have said to change from one company to another due to poor customer service (Accenture, 2015).

A customer centric organisation makes the customer the focus of all aspects of the business from strategy to culture, to business process and metrics (PricewaterhouseCoopers, 2013).

As to better understand what companies are doing to grasp this new age of the customer some examples have been studied:

- American express measures performance by what the customer thinks after every interaction, not by internal measures
- Nordstrom empowers frontline employees to put customer needs first
- Google gives engineers 20% of their time to work on projects of their choice to drive innovation
- CharlesSCHWAB allows customers to access its service via multiple channels to increase customer convenience
- TD Bank regularly uses mystery shoppers to monitor branch status and staff service attitudes
- FedEx conducted "customer dissatisfaction" research to revamp business model focusing on what customers want
- Marriott used cross-functional teams to develop new process/technology for improved customer understanding

Along with these examples, many other companies have started to include customer-centric initiatives and will be analysed and described in the following chapters.

2.3. New business models

New technology trends are deeply changing the ecosystem in which companies compete: consumers are leading mass technology adoption for enhanced experiences and enterprise are forced to adopt new business models (Adner and Kapoor, 2016). It is therefore important to understand how companies across different sector must change their current business model to meet customer centricity. Companies must leverage technology trends to become agile, enable innovation, create operating efficiency, enter new markets, increase customer loyalty and gain ground against competitors (PricewaterhouseCoopers, 2016).

Business models give information to prove how companies create value and deliver it to their customers (Teece, 2009). It also provides data on the costs and revenues of the firm and on how the business is profitable (Amit and Zott, 2001). A business model is not only a financial model of the firm, but a conceptual model which makes hypothesis about consumers and their behaviour, and how it will affect the company (Chesbrough and Rosenbloom, 2002). It is important to understand how these models are changing and what approach should companies take to be profitable in the Age of the Customers.

Up to now business models were inside-out as companies tried to be cost efficient when creating their products or offering their services (Sheth, 2000). Throughout the last century business models have evolved. Some of the most important business model are described in this section.

2.3.1. Lean Business Models

Lean production has its origins with Taylor and Ford. It detects and removes all forms of waste from the value chain (Carlborg et al., 2014). All non-value-added activities are considered waste; thus, waste includes: overproduction, waiting time, transporting time, processing time, inventory, movement, defects and even talent. These wastes add cost or time to the manufacturing process. Lean principles can be used in all sectors.

Lean systems are composed of many methods: pull systems, simplify operations, single piece flow, reduced batch systems, reduces inventory and reduced machine setup time (Krajewski et al., 2015). Pull systems produce when the demand pulls, it forces cooperation between all the parts of the value chain. By simplifying operations, the lead time can be reduced and reducing distances between processes will reduce transporting time and movement. Using a single piece flow, visual controls of the pieces can be done to reduce defects and processing incorrect pieces as they are detected before. Small lots occupy less space and a smaller capital investment as to be done, it enables to earlier detection of quality issues and creates a dependant chain of processes that will reduce inventory. Finally using quick setups using the Single-Minute Exchange of Dies (SMED) principles allows reducing the processing time.

As to achieve this, many tools have been created, for example kanban systems, Just-In-Time (JIT), Kaizen, Poka Yoke, Value Stream Mapping (VSM)… Kanbans are cards which indicate standard quantity of production. They can be used to authorise production, to authorise movement (withdrawal Kanban), to ask for material, to send material to the customer or to hold items (Kanban square). Just-In-Time systems are pull systems that have an equal takt and lead time and that produce to meet demand. Kaizen is a philosophy of continuous improvement, this means that all processes throughout the value chain must be revised and optimized. Poka-yoke is a way of creating things in a way that they are easy to use and cannot be used incorrectly, this helps reduce defects. Finally, Value Stream Mapping (VSM) is a tool which analyses process flows and detects waste so that it can be reduced.

The main advantages of lean systems include reducing inventory and therefore cost as the space needed to store inventory is reduced; improved quality as defects are discovered earlier and hence the defect parts are not processed; increased capacity as all the systems are optimized; increased productivity as defects are reduced and therefore the utilization rate of all the machines are increased and costs reduced; it reduces the gap between the delivery and the order time.

Although these types of systems reduce costs, and this is a competitive advantage, it is an inside-out approach as it is based in the processes and not in the customers.

2.3.2. Business models on the web

Rappa (2006) defines business model has the way companies have, to earn money by showing the value created throughout their product or service. There are many business models, from a simple product sale where the revenues will be higher than the production costs, to complex activities they give value to a service. Companies can implement different business model for each business unit, companies should understand the strategy they are implementing as each one has a different implementation (Carayannis et al., 2015).

Rappa (2010) carried out a research about the new businesses that started to arise on the web. This was of great importance as nowadays the online businesses are growing. Rappa divided the business models on the web into 9 different categories:

- Brokerage: they connect sellers with buyers in a market place and help with the transactions. They establish certain conditions with the buyers and then search for the product. Some examples of companies with this type of business model are: Amazon, eBay or Paypal.
- Advertising: It is a web site that provides information about the products and services a company offers mixed with adverts which may appear in the way of banners. This type of business model is very useful when there are many visitors to the web page. Examples of companies that use this business model are Yahoo or Google.
- Infomediary: they help buyers or sellers when purchasing a product or service by collecting information and analysing it. Examples of this business models are Nielsen or Coolsavings.
- Merchant: It includes retailers of goods and services that sell through the internet, through catalogues, in retails and companies that sell digital products on the web. Examples are Amazon or iTunes.
- Manufacturer: this business model is the also known as the direct model. The manufactures benefit from the web to reach the highest number of clients possible. An exemplification of this is Dell Computer.
- Affiliate: Buyers can refer a product or service and get advantages by doing it. If the buyer does not do it, the company does not incur in an additional cost. Companies which trade with banners are included in this category. Companies that can be found in this category are Barnes and Noble or Amazon.
- Community: Companies can create communities of users which will have to pay in order to get premium services. Some companies offer the possibility to voluntarily contribute. Open source business models, open content or social networking services can be found in this category. Therefore, some of the most known companies with this type of business model are Flickr, Red Hat or Wikipedia.
- Subscription: This business models charge a fee to the users, so they can get access to content. Companies usually mix free content and premium content to encourage the users to buy. Some examples are Netflix or Classmates.
- Utility: This model charges their users depending on the service used. For example, some internet providers charge their customer on the number of minutes they are connected to the service. Some companies such as internet airport charge their users once they have had the chance to test the service. A company that is included in this category is Slashdot that allows consumer to purchase the number of pages of a document they want.

As it can be observed Rappa did not create a new business model, but he categorized the existing ones to allow a comprehensive taxonomy. None of the above categories are centred on the customer, but on the way the companies monetize their platforms or on the best form to sell their products or services. Nowadays these kind of business models are becoming obsolete and need to change to meet the customer's needs (outside-in approach).

2.3.3. Business Model Canvas

Osterwalder and Pigneur created the Business Model Canvas (BMC) which is a simple tool that helps define business models. The BMC sorts out in a logical way the operational model in which companies create value.

A BCM has to be dynamic and periodically revisable as the conclusions to which the firm has come up to today may not be valid or accurate enough in the future (Joyce and Paquin, 2016). Changes may occur due to changes in the business environment or to internal reasons inherent to the company. This results in BMC being a valid methodology for any type of company regardless of its maturity state or its business sector

The BMC consists of 9 modules: customer segmentation, value proposition, channels, customer relationship. Revenue streams, key resources, key activities, key partners and cost structure. All the blocks are related to each other and they explain the way the company operates in order to generate income and to make the business profitable. As to complete the BMC we should identify: which problems we will help the client solve; how we solve them; what benefits will the resolution of these problems bring to the company.

1. Customer segments: identify who the client is, who should the company target with their product and whose problems are going to be solved. Who are we bringing value to. We will follow a segmentation procedure to point our strategy towards the group of clients labelled as a theoretical target because of its characteristics
2. Value proposition: define the value that has been created for the segment. This proposition has to be differential and has to give the company a competitive advantage that will make them be complemented with a good management that will increase the efficiency and competitiveness of the company
3. Channels: the way in which the enterprise establishes contact with the client. The channel that will take them to the client will differ depending on each of the segments. It will represent the business when it faces their client. It will have an impact upon the margin of the product or service, the volume of sales and will ultimately affect the profitability of the business
4. Customer relationship: define the kind of relation the firm will have with the client, which resources will be used to establish, maintain and strengthen this relation. The type of relation will have to be coherent with the segment. It will be related with customer acquisition, customer retention and boosting sales
5. Key resources: resources necessary to materialize the value proposition, human resources, financial resources, equipment, technology…
6. Revenue streams: how and from where will the income come from: product sales, from lending, renting or leasing, from royalties, advertising… The business can therefore analyse the margin they will get from all the different sources of income in order to take the right decisions. The company will also analyse how much is the client ready to pay for our product

7. Key activities: kind of activities that will have to be implemented for the designed model to start working, keep flowing and be fully operational. It will then provide a detailed overview of the processes of the company as well as the company's plan (value chain)
8. Key partners: identify who are the key agents that the company must have to interact with in order to increase the company's performance. They can represent large groups such as strategic providers, a certain investor, a specific distributor, an adequate partner or the public administration. They can be divided into: strategic alliance between non-competitors, joint venture to develop new business, and buyer supplier relationship to assure reliable supplies
9. Cost structure: identify the most relevant costs in which the company will incur. Key costs the company has an influence upon and those that will have an influence over the company's results. Some of the costs that can be distinguished are: fixed costs, variable costs, economies of scale and economies of scope.

Once the BMC is done the firm has to work on the company's plan, implementation and launching of the business. There are some blocks focused on the customer, but the most important block is the value proposition. This means that this method is still focusing on the value the company offers to the customers instead of the customers' needs. Companies should try to adjust to their consumers' necessities and change their business model.

2.3.4. Business models based on technology

As customer requirements and expectations change companies should start moving towards a customer focused business model. As to do this they can rely on innovation and technology (Baker, 2002). Business models should start morphing and evolve with the markets. As to do this companies should try to have an innovative business model, although having one does not guarantee survival in the market. Having a business model that is not easy to replicate will give the firm a competitive advantage in a longer period of time as competitors will take longer to copy (Teece, 2010).

Lippman and Rumelt (1982) thought that the key factors to have a business model complicated to replicate were having a high level of opacity and using systems and assets that are not replicable. Having a difficult to replicate business model will give firms higher returns at least until their competitors are able to duplicate their business models (Teece, 2013). Enterprises modifying their business models should evaluate them against the actual market in which the firm plays (Mitchell and Clocks, 1991).

Innovation is used by companies to either raise their added value to their product or service (for example Apple), or to cut down their costs and therefore create a competitive advantage (for example Dell). Companies possessing an innovative business model do not always have an advantage facing others, up to 70% of changes in companies fail due to incorrect management and the resistance to change of the organization.

In order to create an innovative business model Gassmann proposes four levels:

1. Initiation
2. Ideation

3. Integration
4. Implementation

During the initiation phase the firms should evaluate the current business model. Companies should ask themselves, who their target customer is, what do they offer to them, how to they add value to the product or service they offer and how do they transform their product into revenues. The second phase aligns with the idea of Mitchell and Clocks (1991), to compare the company's business model with the one from the competitors and with ones from companies that may offer products in the same way. An example of this is the razor and blade business model (Homann et al., 2016). It was created by Gillette who started selling their razors at a low price but selling their blades at a high price. This business model was then used by firms such as Nespresso, who sells coffee machines at a low price but charge a high price for the coffee capsules (Aversa and Haefliger, 2017).

Most companies usually copy other business models, so Gassmann (2014) divided them into 55 patterns. This facilitates companies to find a business model that fits their requirements. Once the second phase has finished and the firm has an idea of the new business model they would like to implement they must check the consistency of it. Finally, in the implementation phase iterative cycles must be done to ensure the new changes are well implemented. The company will design a business model, build a pilot, test the pilot and then return to the first phase and make the changes needed.

The mains conclusions drawn from Gassmann's theories is that innovation should be used when designing a business model, but it must be accompanied by technology and a god strategy in order to create a competitive advantage. Using innovation should help firms develop their business model towards a customer focused one. This will help companies find the best product to meet customer needs and hence improve their revenues.

The main problem with these business models is that they are not adequate for the actual markets. Today's markets have changed, customers are starting to have diversifying requirements and a bigger bargaining power. In addition, the non-stop changes in technology are continuously changing the markets, intensifying competition and increasing the cost pressure (Sheth, Sisodia and Sharma, 2000). Thus, companies should change their business model to an outside-in model where the company is focused on the customer needs (Gulati, 2015). In order to change the business models, existing technologies must be used, and business models must develop along with customer needs and technology (Teece, 2013).

2.4. A characterization of the new customers

Nowadays the consumers do not follow the same path as they did before when buying a product or service (Accenture, 2015). The new customers have access to more information and have easier ways to compare the different products and services (Lemon and Verhoef, 2016). Customer can therefore be separated into different categories (Accenture, 2015):

- Traditional customers rely on the traditional interactions and try to avoid digital experiences, and even they will leave a digital trace.

- Experimental clients try to change the path in a certain occasion and they are able to discover the differences in their experiences.
- Transitional customers they often use digital journeys to buy their products but there are some occasions where they use traditional channels.
- Finally, digital consumers try to do all their purchases online, and the mobile access is the most important channel.

As the number of digital customers grow, companies must ensure that they are prepared for this movement towards technology. The consumers have changed their path from a linear structure and have become nonstop customers as they are continuously informed. This change can be seen in Figure 10.

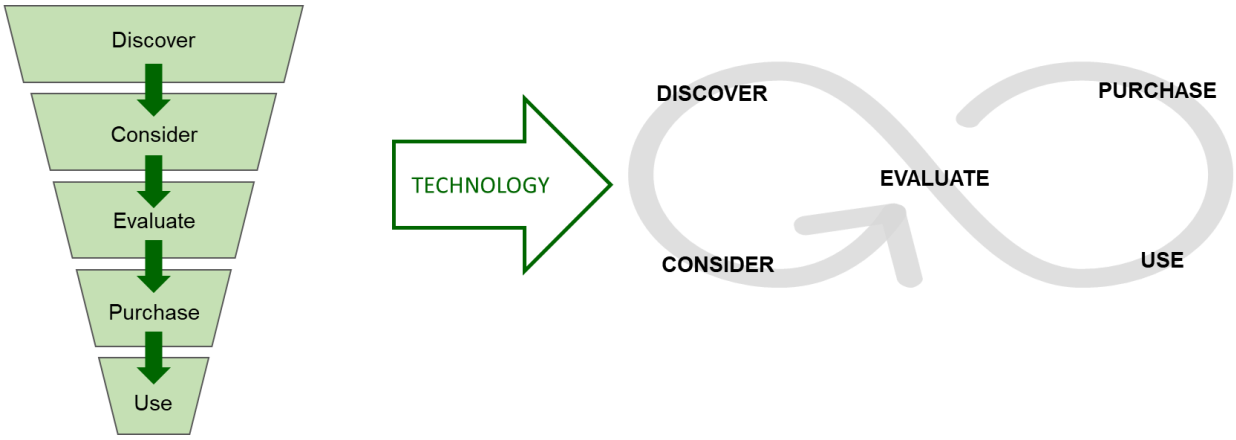

Figure 10: Evolution of the customers (adapted from Accenture 2015)

As it can be observed customers are widening the channels and obliging companies to become multichannel businesses. The funnel structure is disappearing as interactions between the different levels are becoming more frequent. This gives room to the circle structure, where the consumers enter a never—ending loop. Since the beginning of the age of the customer, the circles have been growing as new channels appear, and they will continue to expand as new technologies arise.

Multichannel is becoming crucial for all companies in the different sectors (Stojković et al., 2016). In this new customer age clients manage more information than the companies and compare the products and services they buy. Five years ago, 78% of clients compared different brands and products online, nowadays 88% of them does this exercise before purchasing. Around 66% of the population compare different companies offering the same product in order to choose the best one (Accenture, 2015).

Omnichannel business try to offer customers the ability to shop when, how and where the customer wants (Stojković et al., 2016). These firms have all the relevant products and services in one "place" avoiding the movement of the customer through their different stores. Multi-channel businesses offer consumers competitive prices on high demand items through more efficient fulfilment channels (Fürst et al., 2017). The main objective of omnichannel companies is to open

new revenue streams including adding more marketplace items, open their catalogue to more partners, and retain customers through shopper services.

Omnichannel companies improve customer satisfaction by having the right products, at the right price, and delivered through the right fulfilment channel. In addition, they decrease out of stocks due to a broader fulfilment network by making every store a mini-DC. Furthermore, these firms have a deeper data science around shopper demand and product supply to improve gross margins. Moreover, key vendors view omnichannel expansion execution as the most valuable to enable their business plans. In conclusion, companies offering multi-channel customer experience are achieving a competitive advantage specially when they offer several channels during the whole customer journey, from the first contact to the aftersales activities as it can be seen in Figure 11.

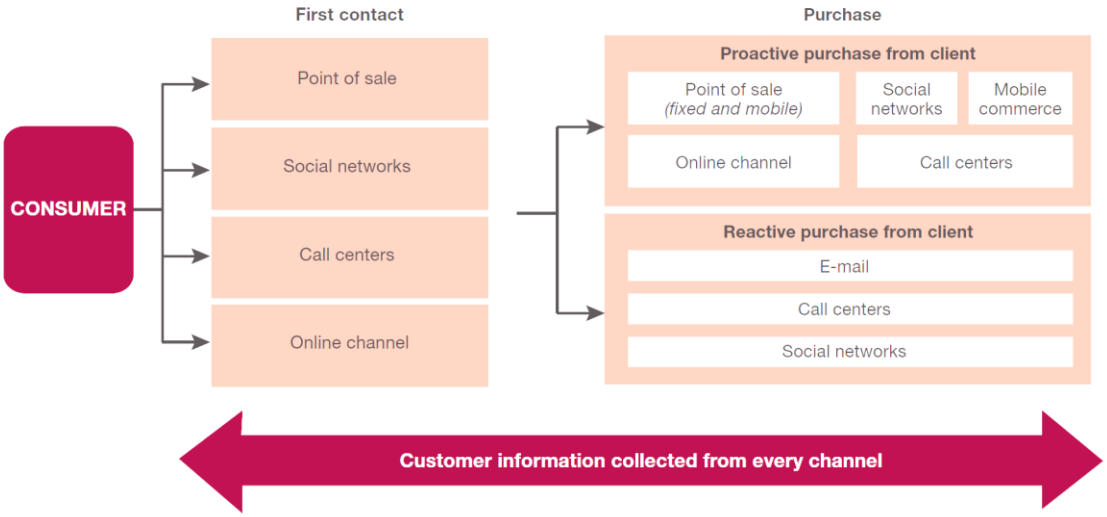

Figure 11: Omnichannel activities

Some of the main channels through which companies are in contact and offer their services to consumers are shown in Figure 12.

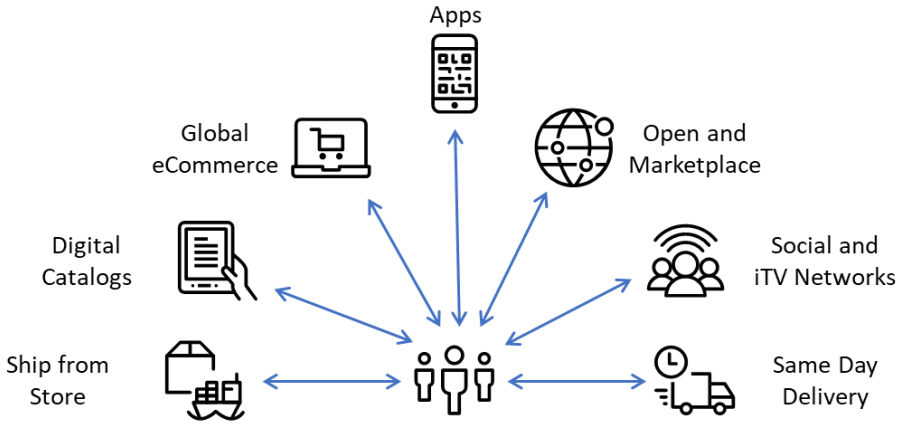

Figure 12: Main contact channels

An omnichannel strategy can be done in almost all of the sectors, some of the examples of companies that have already undertaken multichannel strategies in different sector are described in the following paragraphs (PricewaterhouseCoopers, 2013):

Restaurants: Mobile tablet menus used by customers or wait staff send orders directly to the kitchen. Microsoft Surface Touch Tables allow the happy hour crowd to order drinks, play games and pay

Healthcare: 15 hospitals teamed up to use iTriage mobile and online waiting clocks and text alerts, to tell patients who has the shortest ER wait time

Financial Service: PayPal: No phone, no card, no NFC needed. Just key in your phone number and a PIN to pay directly from your PayPal account

Transportation: American Airlines: AA handed out Galaxy Note tablets to 17,000 flight attendants for passenger data, flight connections. Quantas, AA, Delta, Virgin America and Air France offer tablets for passengers with, for example, in flight TV screening

Communications: XFINITY Home: Comcast and Verizon jumped into the home security arena with home monitoring systems with video on your mobile/tablet. Unlock your door for repairmen from your mobile phone, turn off lights, or lower your thermostat, see your back porch camera

Automotive: Ford Fleet Telematics installed in fleet vehicles produce reports which provide service alerts, identify breaches in service agreements, potential operational cost reductions in fuel and mileage, access to accurate information about hours worked, increased productivity through improved vehicle utilization

Consulting: To showcase PwC capabilities, iPads are replacing pursuit placemats—which were always a struggle to bring to meetings without rolling or folding. In addition, Partners have been armed with iPads and security-trained staff are now able to use iPad via MobileIron.

As mentioned before, customers are changing hence their customer journey is evolving too. A customer journey is the trip a customer follows from the moment they think about acquiring a good or service until they buy it (Edelman and Singer, 2015). Customer journeys exist for all type of products and services and through all de channels (online and offline). In order to understand the different customer journeys a study have been done for a Spanish retail company undergoing changes to become more customer centric. There are three types of customers when going shopping: the online customer, the offline customer and the mixed customer (uses both online and offline channels).

In order to fully understand the different customer journeys a study of them has been done. In Table 1 an example of an offline, an online and a mixed customer journey can be seen. The three are examples of a customer shopping at a super market. The mixed customer journey is an example of a supermarket which has Beacons to guide the customer in the shop through a screen placed in the shopping cart.

Table 1: Customer Journeys

Customer Journey Offline	Customer Journey Online	Mixed Customer Journey - Beacons
I need a product	I need a product	I need a product
I do the shopping list	I see if I need to go to the shop	I see if I need to go to the shop
I compare prices	I do the shopping list	I do the shopping list
I compare products	I compare online/offline shopping	I compare online/offline shopping
I compare the quality of the products	I compare the different supermarkets	I compare the different supermarkets
I look at the distance to the shop	I look at the shop's website	I look if there is a parking
I look if there is a parking	I search for the online shop	I compare for the opening hours
I compare for the opening hours	I compare shipping costs	I compare the different supermarkets
I decide which supermarket to go	I compare the shipping hours	I look at the shop's website
I look t see if they can send the purchase home	I read other user's comments	I search for the online shop
I compare the prices of the shipping of the purchase	I look for the refund options	I compare shipping costs
I compare the shipping hours	I decide the channel	I compare the shipping hours
I decide which channel to use	I decide the supermarket	I read other user's comments
I decide which shop to go	I look for the product I need in the research bar	I look for the refund options
I go to the shop	I look for through products	I decide the channel
I walk long the shop	I look for the discounts	I decide the supermarket
I compare products	I compare brands	I go to the supermarket
I select the products	I compare prices	I park the car
I select the cash register	I compare the quality	I pick a shopping cart
Put the shopping into the bags	I choose the product	I walk along the shop
I give my customer card	I read its characteristics	I use the screen to search for the products
I pay for the purchase	I choose the size	I follow the GPS indications
I receive discounts at the shop	I choose the number of items	I find the product
I receive catalogue at home	I have a look at similar products	I read the product's information
I receive discounts by email	I compare the shopping cart with previous purchases	I compare brands
I receive discounts by SMS	I review the shopping list	I compare prices
I consume the product	I make sure that all the products are the correct ones	I compare the quality of the product
	I introduce my user name and password	I choose the product
	I choose the shipping day	I choose the size
	I introduce the shipping information	I choose the number of products
	I introduce the loyalty card number	I look for complementary products
	I use discounts	I review the shopping list
	I choose the payment mean	I choose the payment mean
	I value the possibility of paying at a fixed term	I choose the cash register

Customer Journey Offline	Customer Journey Online	Mixed Customer Journey - Beacons
	I complete the credit card information	I wait for the queue
	I receive an SMS confirmation	I place the products in the belt
	I pay for the purchase	I value the shipping costs
	I receive the ticket	I value the possibility of paying at a fixed term
	I receive discounts	I put the products in the bags
	I receive newsletters	I give my customer card
	I receive discounts by email	I pay for the purchase
	I receive discounts by SMS	I receive discounts at the shop
	I receive the products	I receive the ticket
	I review the products sent	I place the bags in the car
	I organise the products	I leave the shopping cart
	I consume the product	I receive newsletters
	I value the online service	I receive discounts by email
		I receive discounts by SMS
		I consume the product
		I value the online service

It can be observed in the three customer journeys that some of the steps taken by each type of consumer are the same. Even though some steps are equal they all differ at some point, which means that each customer must be treated differently. Nowadays most customers are multichannel and move from online to offline easily. 72% of consumers prefer to use multiple channels to contact a brand (Sun, 2016). Enterprises becoming more customer centric and fully understanding the customer journey each of their clients follow will get a big competitive advantage.

As explained before, one of the main components of customer centric business models is customer service. A survey showed that 86% of companies are willing to increase the money destined to customer service as to improve it (Oracle, 2011). 89% of customers have said they have changed to another firm due to poor customer service (Oracle, 2011). The survey carried out by Harris Interactive showed that 50% of customer service agents do not correctly answer the questions posed by consumers. And nearly four fifths of customers that contact the customer service of firms are ignored (Oracle, 2011). A survey carried out by Gartner showed that almost 90% of the directors would use customer service as a competitive advantage by 2017.

But customer service it not the only fear, 90% of the companies say that customer individualisation is a key aspect for success. This fact reflects that knowing the customer and trying to satisfy their needs increases the probability of getting the customer to buy. Some firms have already seen that this customization is need through the different channels. A study executed by Mc Kinsey (2009) shows that multichannel clients are four times more profitable than customers that buy through only one channel. This is why enterprises are allowing consumers to customize their accounts and communications, as reflected in an Adobe analysis, two thirds of companies had personalized preferences for their customers. But they do not only allow to set their preferences in their

accounts, but also in the communications they receive. 90% of firms permit their client to choose the messages they are willing to receive, and half of the companies allow them to choose the frequency of the messages.

In conclusion, digital consumers are expecting more, there expectations are being shaped by experiences outside of the industry, where content, interactions and features may be much richer and more compelling. Technology has enabled them to trust peers therefore brand loyalty is more and more influenced by peer conversations and other social media interactions; those who fail to participate risk being side-lined. Easy access to research and data will expose efforts to mislead and enable comparison to competitors therefore transparency and authenticity are required. Undifferentiated products and services, lack of loyalty, easy access to alternatives and low barriers to defection mandate extra effort to retain your customers. Vehicles for communicating experiences with your brand, both good and bad, are ubiquitous and free, and your customers are not shy about voicing them.

2.5. Benefits of being customer centric

Although becoming customer centric may incur in high investment and a huge effort there are many advantages the company will be able to benefit from. In this section the main ones will be described.

Companies with a customer-focused approach are 60% more profitable than product-focused companies (Venturebeat, 2016). This percentage will continue to grow as the age of the customer expands worldwide (eConsultancy, 2017). In order to be more profitable these firms are understanding their customers and are using the correct technology to comprehend the information collected and transform it into customer centric decisions. But not all companies are being able to correctly use the information, up to 61% of Chief Marketing Officers of different sectors has said they are not using the information to its highest potential and there are still many changes to be done (CMO Council, 2013).

Companies that centre their efforts in their clients must keep in contact with them which makes the consumer feel closer to the business. This approach will favour the creation of a new link between the customers and the company, increasing the probability of having loyal consumers. As customers' needs must be fully understood, the firm will be able to use their resources in an optimal way, and consumers will receive a better product or service increasing their satisfaction. An interview shows that customers that have had a good customer experience when buying a product or service will 140% more the next time they buy (Kriss, 2014). It is really important for a business to have happy and satisfied customers as customer retention will be increased. This will benefit the firm as it costs five times more to capture a new customer than to maintain an existing one.

Customer Experience is the sum of memories and impressions formed by all interactions, real and virtual, with the organization, the product, the brand, employees and customer touch points across the customer lifecycle. Companies that do not offer a good quality customer experience will have to face losses as it can be seen in Figure 13. The Financial Service sector comes first in losses due to poor customer experience ($44billion), nearly double the average ($23billion).

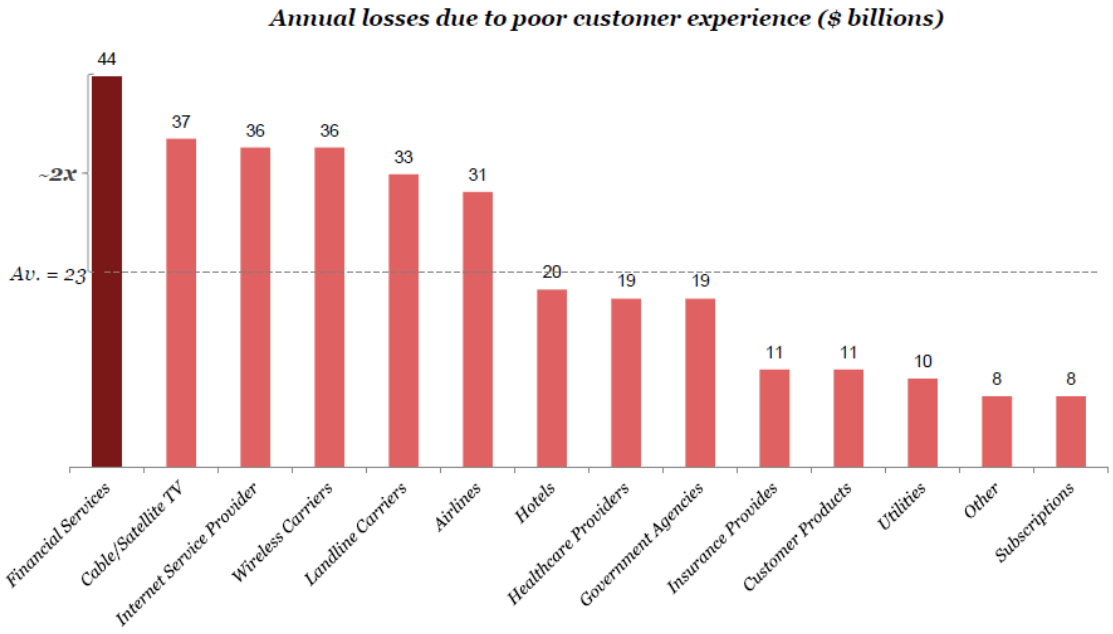

Figure 13: Annual losses due to poor customer experience (adapted from PwC)

In addition, customers are treated individually which means that it is easier to have quality interactions between the company and their clients giving them better selling experience. This is going to promote a positive word of mouth that will benefit the firm as a good brand image will be created. A study showed that a customer who has had a bad experience will tell it on social networks or to their friends and family with a 95% of probability (American Express, 2014). Furthermore, customers will be analysed through the different channels, offering them a multichannel service that will better satisfy their needs (PricewaterhouseCoopers, 2016).

To undergo the transformations needed for the company to become customer centric, a detailed analysis of the company's processes is needed which will help understand how everything in the firm works and identify possible errors or improvements. Likewise, the enterprise will be able to detect non-added value processes that can be changed to increase the profitability of the firm. Knowing the customers will ensure that the investments and changes done are going to be profitable. The companies will be able to reduce their costs and wastes (2.3.1. Lean Business Models). Finally, it is important to mention that the firm will be more sustainable as the investments in new technology are usually eco-friendlier and help reduce waste.

As aforementioned, a big investment must be done to shift a company from a product centric business model to a customer centric one (Stoppel and Roth, 2017). A fraction of this investment will be dedicated to technology this will ensure that the firm has a technological structure that supports the evolution of the company. As the firms hava a complete understanding of all the players and the resources it will be able to foresee growth opportunities (Manral and Harrigan, 2017). Besides having a good knowledge of the company, having a complete understanding of the firm will help find problems that may arise after changes are done.

Finally, it should be noted that the employees with have more power in the firm and more knowledge as they will receive training in order to adapt to the new business (van Oosterom et al., 2016). Therefore, the trust and responsibilities given to them will be higher and they will feel more confident and will be able to reduce the stress. As employees are the visible part of a company they are of great importance to have excellent customer experiences.

To sum up, the most important consequence of being a customer centric business is that the firm will gain a competitive advantage which is really hard to copy giving them higher profitability. In Figure 14 all these ideas are summarized.

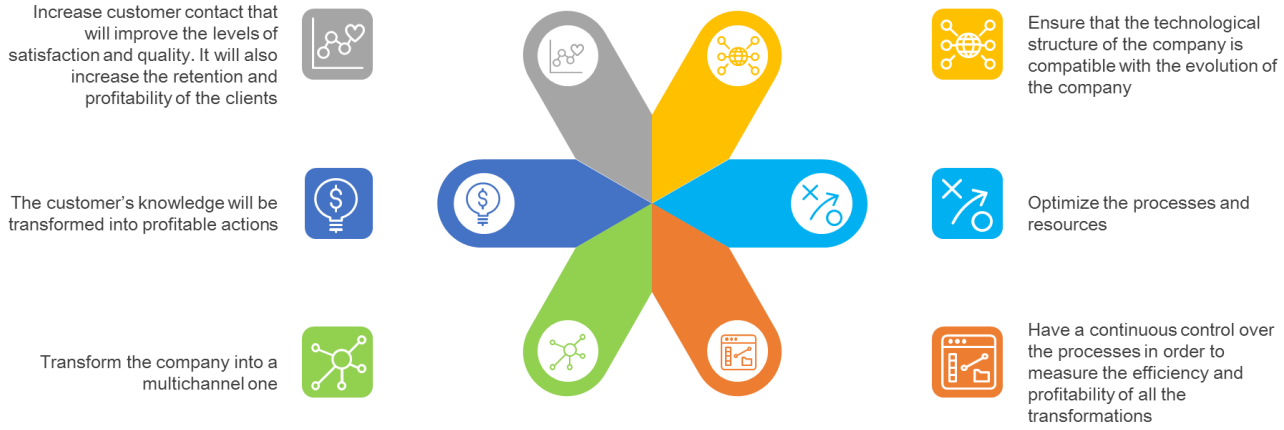

Figure 14: Benefits of being a customer-centric company

2.6. Characterization of customer centricity

The mayor trends that can be identified in the customer centricity world will be described in this section based on a study done by BBVA and a Gartner analysis. In addition, megatrends described by consulting firms will be analysed. New technology trends are deeply changing the ecosystem in which companies compete: consumers are leading mass technology adoption for enhanced experiences and enterprises are forced to adopt new business models.

The most relevant movement is the one of information that has gone from the company to the customers levered by technology. Up to 70% of US online adults have a smartphone and up to 43% have a tablet (Forrester, 2015). This has given the consumers the power and they can therefore demand a better customer experience. As clients control the selling process companies must be prepared to manage all their customers in a personalized way.

Not only are customers using technology, but businesses are also latching on to the highly addictive medium for real-time social and business to consumer discourse (Kasemsap, 2016). Businesses are using Twitter as a means of marketing, enhancing customer interaction, placating irate customers or even internal messaging to improve customer service. Social networking tools like Twitter, enable the dissemination of information at the speed of thought (Swani et al., 2014). Businesses are increasingly bolstering their voice of the customer and marketing efforts to monitor

customer feedback and garner competitive intelligence. The computer company Dell announced that their presence on Twitter accounted for $3M increase in sales (Dell, 2016).

Companies are using social media to present brand value propositions, shape brand opinions and capture consumer engagement in a socially relevant context. 75% of the global internet population visit social networks (Nielsen, 2009). Social media allows brands to target specific groups or individual consumers and more easily track conversion. Between April 2009 and May 2010, social networking use among internet users ages 50-64 grew by 88%--from 25% to 47%. And use among those ages 65 and older grew 100%--from 13% to 26% (Jump start, 2010). Social media engagement reduces costs, improves the customer engagement and increases opportunities for socially driven promotion within consumers' social groups. Companies will integrate social feedback into their product development and decision-making process rather than only using social media as a means to communicate their message to the world (Varotto et al., 2016).

Citi group uses monitoring tools to analyse the customer interactions in social networks (Citi, 2018). Delta has created a Facebook page where users can book tickets on the site through an app developed by Alvenda. Progressive has developed a formal social media strategy different for each channel (e.g. use Twitter to handle queries and for catastrophe response) (Delta, 2018). National Instruments has a wiki-based platform to answer customer problems, generate new ideas, and discuss product improvements; community members answer 46% of all support questions (Wang et al., 2017).

E-gifting through social media using location-based services has gained popularity (Badole et al., 2017), a person who has "checked in" at a restaurant receives his favourite dish because his friend purchased that for him through Facebook. Mc Donald's has also used e-gifting in some of their most recent campaigns, for example offering free coffees on Mondays through their Facebook page. Firms will integrate social media more fully into their strategy and explore means of using social media across the value chain. The mobile, as a point of convergence, will facilitate increased social usage.

Compact, tablet PCs are filling the gap between Smartphones and Laptops, creating a new avenue for consumers to engage with brands through the simplified access to the web and media content. Businesses are leveraging this rapidly growing segment to offer customers unique, immersive content experiences that take advantage of tablets‟ large touchscreens and integrated wireless internet capabilities. The richer interactive tablet experience creates unique opportunities for brands to engage more affluent and digitally savvy consumers in a playful and entertaining interaction (Smilansky, 2017).

Future uses of tablet-based computing could include:

- Interactive Sales Brochure: At the recent Philly International Auto Show, many of the auto company reps were equipped with customized iPads that replaced the traditional car brochure. Video clips of the vehicles in action could be viewed on demand, along with specs and availability at local dealerships. Best of all, this research happened as customers were hands-on with the vehicles, not at an "information booth" or desk.

- Customer Analytics Engine: Retail companies like IKEA could use iPads as the primary sales device (i.e. customer browses catalogue, indicates what products they "like", makes selections, and finalizes order/payment as they walk around and shop in the store). Using the browsing history data, companies could then run analytics to determine which of their products is generating the most interest/traffic, and which could potentially be phased out. This way, companies do not have to wait for insight from final sales figures to make inventory decisions.

Another trend that has been identified by all the consulting firms, is that customers are becoming multichannel. Smartphones have increased sales, and companies that do not have a multichannel structure are starting to have customer retention problems (Bain & Company, 2017). In 2016 in the US, more than 30% of sales will use their mobile phone during the purchase process, obliging companies to have an omnichannel strategy. Consumers must have continuous access to information and must be able to purchase products and services at any moment. In additions as customers are more informed due to the existing technology, they are asking for higher level customer experience and companies must be able to justify their prices and the value they add to a product.

The gap between place and space converges as companies start using mobile proximity and sensor technologies to create new user experiences. Through the use of barcodes and QR codes (Quick Response), companies have managed to transform traditionally static content (signs, print ads, billboards) into interactive multimedia experiences

Companies are able to embed information into scan-able codes that give users access to websites (including social media pages), videos, and contact information. Besides integrating traditional and digital marketing campaigns, companies can measure the number of scans to further quantify the effectiveness of their digital and non-digital marketing. Microsoft Tags (a proprietary code scanning technology for businesses) has printed 2 billion codes since January 2009. Amazon's iPhone app allows users to scan the barcode on merchandise and see if the product is available for sale on Amazon.com. This allows the user to do quick price comparisons with Amazon regardless of where the shopping is being done.

Along with knowledge about the product or service, customers are starting to ask for speed. A clear example of this in Spain, is the rivalry between Amazon and El Corte Inglés which are able to deliver some of their products in 2 hours. Companies with a weak communication and transport network are being left behind.

The recession has businesses reacting to consumer demands for sustainability and greater sharing of producer surplus; trends like 'frugal chic' and 'go green' have surged as a result. Frugal Chic means discount-retailers are bridging the "perception" gap between them and their high-end counterparts, by transforming low cost shopping into an "experience". McDonald's plans to spend $11.2 B upgrading to become more "Chic" across 5,500 of its 14,000 restaurants, approximately $100,000 per store (Forrester, 2013). Firms that are "going green" like IBM have discovered that going green enhances their brand positioning, while bringing down costs. This gives them a sustainable competitive advantage. GE aims to double annual revenue to $20B from environmental

friendly products (PwC, 2011). According to the Aberdeen Group's survey of over 4,600 companies:

- 37% are developing green products
- 35% believe green products offer greater competitive product differentiation
- 28% report that their customers demand products that are more eco-friendly

Furthermore, buyers are requesting for a community approach from the companies. During the last years, the use of collaborative platforms has significantly boosted, according to study (PwC, 2015) the collaborative economy will have a global value of more than 300.000 million euros in 2025. These companies have a sustainable image that is capable of attracting a high level of consumers. Consumers can participate in a community and this approach is of great importance as loyal customers are more profitable for companies. Wells Fargo created a virtual online world where consumers can explore islands and hidden secrets, make friends, and at the same time, learn smart money management; achieved double-digit growth in 2nd year, average age is 23.

Augmented Reality and interactive interfaces are enhancing information visualization and enabling more immersive interactive experiences for customers and brands (Olsson et al., 2013). Augmented Reality is in its early stages of development with many current applications considered "Lite AR" – providing an information layer over the physical world (Rauschnabel, 2015). AR has the potential to enhance the customer experience by simplifying information presentation and brand engagement. Emerging user interfaces such as Microsoft's XBox Kinect are poised to revolutionize the delivery of interactive content to consumers. Global revenues from AR applications were $1.5M in 2010; Juniper predicts global revenues from augmented reality applications and services to approach $1.5B by 2015. Layar is a mobile platform for developing software that uses AR technology (Liao and Humphreys, 2015). Layar displays digital information called "layers" in a user's field of vision through their mobile device's camera. The platform has been used to develop third party applications including games, history browsers (allowing users to view historical building at a location) and retail locators (including stores and restaurants with their reviews).

IKEA has created an application in which using a mobile device's camera, an image of the IKEA furnishing selected can then be stitched into a snapshot of the customer's own four walls (IKEA, 2018). Tissot launched a marketing campaign where users who take part are able to "try on" the range of Tissot watches by holding up their wrist to the camera and seeing the watch appear on their wrist; they can even customize the watches to suit their needs. Augmented reality applications will scale new heights (Billinghurst, 2015). As an example, insurers today have iPhone applications that allow users to take pictures of the accident site and exchange contact information with the counterparty. With the presence of technology in the phones like GPS, compass, accelerometer, camera and wireless capabilities, in the future, the app could have enhanced features like recognizing the car model, show prior damage reported directly on the image of the car, the ability to mark damaged parts of the car to get repair quotes and to find the closest repair facility.

Near Field Communication technology allows devices in close proximity to create a fast, temporary, highly secure connection to transfer information. NFC is the base technology underpinning the recent efforts to help mobile payments go mainstream (Fisher and Guha, 2016). Many analysts have billed the technology as the future replacement of credit cards. NFC is still an emerging trend and does not have a standardized definition or technology standard, yet, but poses to become a credible alternative to payments and secured transactions. BMW is implementing NFC technology into its new car keys (BMW, 2018). The keys currently are able to store vehicle information, make payments, and be used as a hotel room key.

Game mechanics are being employed into the consumer marketing realm to engage consumer interest in brands and products. The same mechanics that hooked gamers, principles from Cognitive Science, are being applied to keep consumers engaged with brands. Applying Behavioural Economics principles in a game-like motif allows brands to increase consumer engagement, build customer loyalty and increase sales conversion, with limited economic incentives. Ever since "gamifying" physical fitness with Nike+ in 2008, Nike sold over 1.3 M Nike+ units, engaging their customers and increasing customer loyalty (PricewaterhouseCoopers, 2011). JP Morgan Chase offers a slot-machine style reward when users pay for items at any merchant with their debit cards, where Chase may pick up the tab for some of their purchases.

Finally, the last trend identified by a research carried out by PricewaterhouseCoopers (2016) is the empowerment of employees. They are the gears of all firms and the visible side of them. Employees can now move from company to company easily, and they are valued for their knowledge. This means that they can ask for the working conditions they are willing to have and have a higher bargaining power. Companies must have satisfied employees not only to be able to retain them but also to ensure that they do their best and give an excellent customer experience.

2.7. The impact of customer focus on a customer experience

Understanding and providing what customers need creates loyal customers and strong advocates for an organization's brand (Ascarza et al., 2018). It promotes overall internal alignment and coordination which has a positive impact on revenue and helps to drives down cost. Customer experience can therefore be defined as understanding how an organization interacts with its customers and the feelings and actions that it drives in them (Lemon and Verhoef, 2016). It seeks to outline how effective, efficient and consistent each interaction is, and to design distinctive and memorable experiences that create a real competitive difference.

There are four main aspects that influence customer experience:

1. People: Employees of a company are the providers of customer experience. Firms should hire people that love their jobs and that will do the best for their clients providing them of a brilliant customer experience. Having happy employees will make the company have happy customers.

"To achieve consistently terrific customer service, you must hire wonderful people who believe in your company's goals, habitually do better than the norm and who love their jobs; make sure that their ideas and opinions and heard and respected; then give them the freedom to help and solve problems for your customers. Rather than providing rules or scripts, you should ask them to treat

the customer as they themselves would like to be treated – which is surely the highest standard". (Richard Brandson, CEO of Virgin Group)

2. Culture: Employees are the face of the company and are in charge of providing a good service. Companies in which employees are valued will have employees who will make customers feel important for the business. A way to ensure that the company provides a good customer service is to reward employees when customer satisfaction is good. This means that having a company culture where employees are valued and given power, will make customers feel the same way, and may therefore become loyal customers.

"Good customer service beings at the top. If your senior people don't get it, even the strongest links further down the line can become compromised". (Richard Branson CEO of Virgin Group).

3. Process: the way a company approaches clients will make the difference, and along with the company's employees the processes are the main part of customer experience. Good process will ensure that customers are willing to come back as they had a good experience the first time.

"When you are trying to make an important decision, and you're sort of divided on the issue, ask yourself: if the customer were here, what would he/she say?" (Dharmesh Shah, CTO of Huspot).

4. Technology: Technology is changing people's habits and mindsets and how companies market their products and interact with their customers. It is changing how employees collaborate for customer success and satisfaction which enables serving customers better and providing superior experiences to them. Every business can introduce technology in many forms and in nearly all customer process to create a difference.

"You've got to start with the customer experience and work back towards the technology- not the other way around" (Steve Jobs)

As mentioned in the previous sections, a customer centric company understands the types of clients they have, the market where they play and how the needs of their customers differ (Sparrow et al., 2015). These companies design and offer the right services, products and experiences to the right customers, ensuring that the customer experience is consistent across channels. To do this they put emphasis on cross functional collaboration within the company. Firms that have customers at the centre are collaborative organisations where top down and bottom up decisions are aligned. Customer needs and wants to drive the organisation. Customer and employee feedback is sought on a real time basis, driving continuous improvements to provide distinct and memorable experiences for customers.

In order to create a customer-centric organisation PricewaterhouseCoopers (2013) proposes four key steps Figure 15:

1. Develop a mission and vision focused on customers, ensuring top executives and staff believe in it and advocate the vision. All parts of the organisation should be aligned with the vision and strategic initiatives focused on customer needs and preferences should be created. An example of this is Southwest airlines, who has frontline employees that

contribute to yearly business planning and operational budgeting as they are experts in customer needs. They have also created a customer contact strategy with a multichannel approach to address how customers want to engage. Finally, southwest has eliminated many airline "luxuries" (assigned seating, snacks…) to support the ultimate mission of being a low-cost airline.

Another example of a company that has implemented a customer-centric strategy is The Home Depot. They target three customer segments, which align to a three-tiered customer service model (self-service, assisted service and full service). Home Depot has created the pro segment, the Do It Yourself segment and the Do It For Me one. This has helped the company satisfy their customers' needs in quick and easy way, increasing sales.

2. Foresting a customer-centric culture, examining the business from the customer point of view to understand the firm's pain points. Companies in this phase have set customer-centric objectives and incentives for all staff and regularly review customer feedback and satisfaction data with staff. They also solicit ideas from staff on how to better serve customers. A case of a company in this phase is USAA. The firm's employees undergo a 10-week "boot camp" to help them understand their military customers' perspectives. USAA employees model their behaviour after six cultural pillars called "My Commitment to Service" that help them focus on the company mission and customer service. Furthermore, top executives listen to customer calls weekly to connect with their needs and concerns.
3. Companies must gather customer intelligence. As to do this they must proactively and regularly solicit feedback and develop a process by which customers can give feedback (reputational rating systems, customer surveys, social media…). Organisations in this phase should keep customers informed of the impact of their feedback and look beyond current needs and anticipate future requests. A commercial example is the initiatives undertaken by Starbucks. Mystrabucksidea.com, Facebook and Twitter provide social media platforms for customer feedback. Over 100,000 ideas have been submitted via their ideas website, and over 200 of those ideas have been adopted. In order to get their customers to complete surveys they offer free beverages to customers that have filled out their surveys.
4. Companies in this last phase are analysing customer metrics and foster a culture of continuous improvement. They are focused on metrics that help understand the day to day customer interactions and customer experience. These companies measure success of strategic initiatives for accountability and to validate the direction headed, avoiding metrics that detract from customer experience. An example is Zappos, whose primary metric is the number of "wow" moments, and is aligned to Zappos mission, which is "to provide the best customer service possible-the WOW philosophy". Other metrics focus on customer interaction and potential for return visits. Moreover, call centre reps are measured by total call time and percentage of time in customer-facing interactions and not in time per call or number of calls.

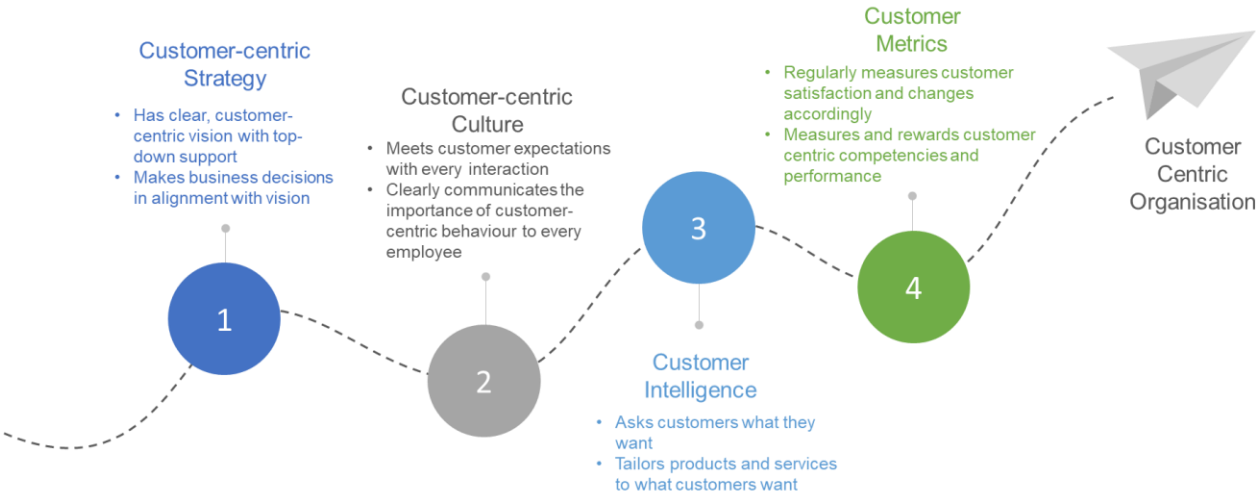

Figure 15: Step to become customer-centric

A company that has undergone the whole process is Amazon. Their mission is "to be Earth's most customer-centric company". They have then focused on impressing the customer rather than beating the competition. In addition, they exceed expectations with continuous service improvements (for example Kindle Lending Library). When going through the third phase Amazon has managed to respond to customer feedback and eliminate customer pain points. They take innovative risks using feedback to determine next generation customer needs. Finally, they established almost 80% of performance metrics related to customer objective.

It can be see that customers must be placed at the core of the business for them to survive to this new customer age. Companies must invest in technology to help them support these new customers and their needs. And although more than 60% of enterprises say to have a customer centric strategy, most of them should be reviewed and optimized to ensure an excellent customer experience (Adobe).

2.8. Importance of technology in customer centricity

In the first sections of this chapter a description of what does a customer centric company look like and its characteristics has been given. One of the key aspects of this type of firm is that they put their customers at their core and give an excellent customer experience (Shah et al., 2006). The main reason for a consumer to change of company is due to a bad customer experience when buying or using the product or service offered. By 2016, 89% of the firms will be competing with similar products or services, and therefore the competition will be lead in customer experience (Gartner, 2014).

Nowadays customer expectations have boosted as they wait for companies to know everything about themselves and their needs. They are willing to receive a customized service at an exact moment. In addition, will are expecting companies to be multichannel, and having a continuous service even though they change from channel to channel. The only way forward is to invest in new technologies that make the handling of all this information possible only with technology the enterprises will be able to offer the selling experience that customers are asking for. Some

examples of how companies in different sectors used technology to leverage their transformation can be seen in Figure 16.

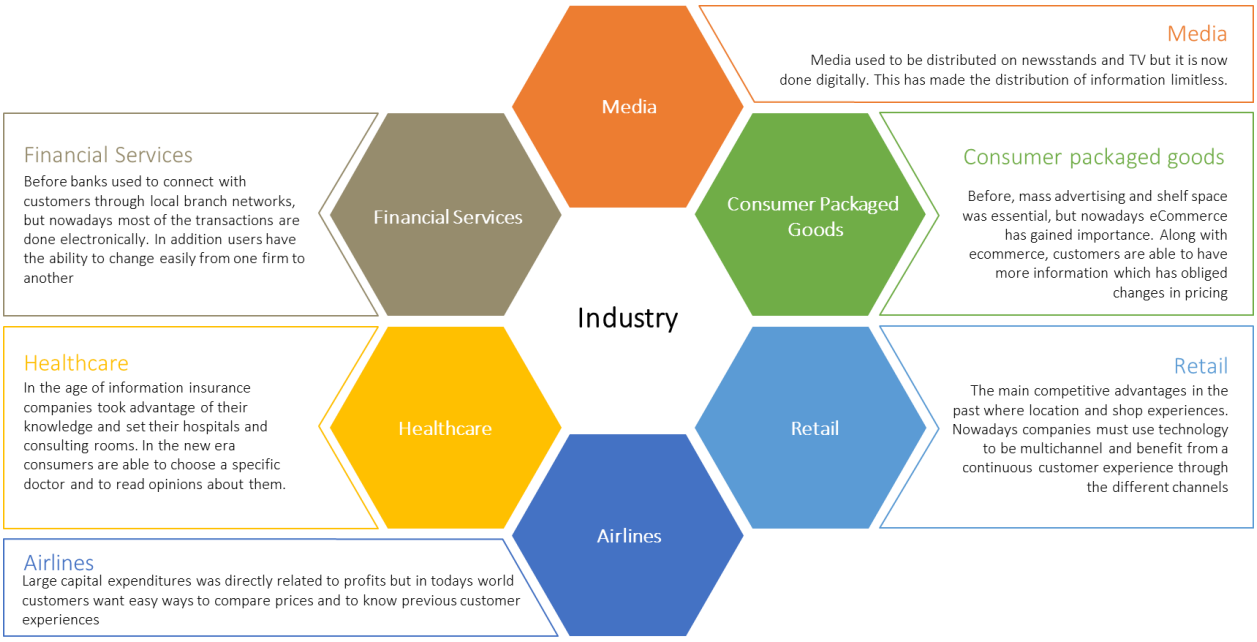

Figure 16: Customer centricity in different sectors

Technology has been identified as fundamental to offer a high-quality customer experience by leading analyst. Technologies such of cloud, mobile or social technologies must be mastered to survive in the competitive market in which companies offer their products and services (Zeithaml et al., 2002). Data analytics and Internet of Thing (IoT) are required to acquire, categorize and make use of all the information collected by companies. Furthermore, companies that have already technological structures and use technology in a daily basis, will need to scale up to ensure a correct customer satisfaction (IBM, 2017).

Any transformation will rely on a core technology implementation. This could be a single system or the overhaul of a number of legacy system within the clients' organisation. The following graph (Figure 17) shows the increase in revenues of the software used by companies to transforms their strategy and focus on clients.

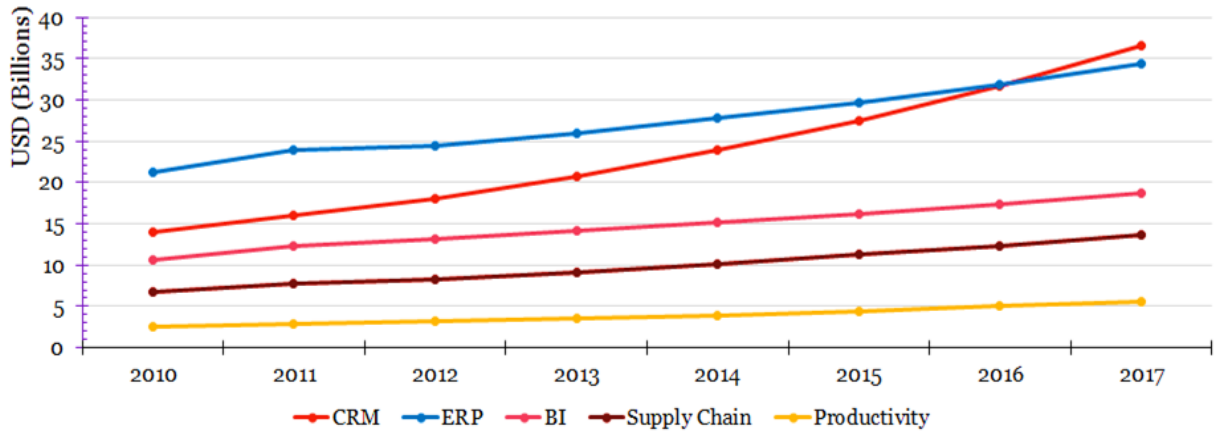

Figure 17: Software revenues (adapted from Gartner)

There are four broad areas that must be covered: marketing, sales, service and integration. Marketing softwares support companies that are growing their brand and help find new customers. Sales softwares help firms sell faster and smarter to new and existing customers. Service softwares enable companies to provide customer support everywhere, anytime, across every channel. And finally, integration softwares help connecting systems across the organisation to facilitate collaboration and reduce inefficiencies.

In a study carried out by IDC FutureScape (2016) the importance of having a multichannel business, which offers a high customer experience through the internet, is mentioned. It is also stated that around 70% of the biggest companies will have innovation teams created. Another interesting estimation is the firms' revenues growth of up to 150% of all technology-based products. And these changes will be managed with technology, especially artificial intelligence (AI) and machine learning.

2.9. Challenges and changes that companies have to face

All the changes explained throughout the introduction might seem obvious, and main companies think that they only need to invest in technology as to become customer centric. But there are some challenges that must be over gone to achieve this objective (Gummesson, 2008). The main problems that companies face are culture, structure, processes and metrics. All this four must be changed to turn into a customer focused company.

All the facts shown in the document support the need for companies to undergo changes to become more customer centric. This can be reflected in the results of a study were 63% of CEOs says that undergoing changes to become more customer centric was between their top three priorities (PricewaterhouseCoopers). 90% of them said they are changing their processes and strategies to improve customer retention and loyalty (Adobe). In order to do this 12% of marketers created functional teams to ensure customers' expectations were met. The problem comes to companies that have no technological structure to integrate customer information to their business (up to 70% of companies).

Culture is very resistant to changes, people need to understand why they must do things and changing the organization's culture to become customer centric is not easy to explain. Deshpandé,

Farley and Webster (1993) carried out a research to understand who the culture of a firm where linked to the profitability of it. They contrasted 4 different businesses with distinct degree of emphasis on consumers and draw up the conclusion that customer focused business where the most profitable.

Customer centric business have two main pillars which are that understanding the customer can only be achieved by living with them, and that customer loyalty gives companies a long term competitive advantage (Shah, 2006). This fact can be backed up by a research carried out by Saleh (2014) where it has been found out that attracting a new customer is five times more expensive than to keep an existing one. In order to attain this cultural change all employees must be communicated on the change and the senior managers must be an example for everyone else.

The second problem that companies face is the organizational structure that must be changed to become customer-focused. Firms focused on products are usually divided in business units depending on the product they sell. Customer centric companies must change this to create different customer segments which must have different interactions with the firm (Shah et al., 2006). As to accomplish this objective the marketing department must be extended, and a customer manager must be designated in the firm. Companies are starting to include a Chief Marketing Officer, in 2004 only 50% of the Fortune 1000 companies had one, and only about twelve of these companies had a Chief Customer Officer (Buss, 2003).

The third challenge that firms must face are processes because companies are created from an inside-out perspective and are therefore product focused. The main processes of a company are the strategy statement creation, the value proposition, the channel establishment, the creation of the information-management processes and the creation of the metrics. In a customer centric firm, the strategy is composed of a business strategy and a customer strategy. The value proposition is divided into two parts, one for the value chain and another for the value deliver to the customer. Customer focused companies are multichannel, which means they reach the customer through different methods. The information processes are mainly based in analytics which allow a faster and larger acquisition and analysis of data. Finally, the metrics used to measure performance are based on customer retention rather than profit or sales (Payne and Frow, 2005).

The changes in processes in the companies must be oriented to offer the customer the correct product or service. Therefore, firms have to try to divide their customer segments in as small groups as possible to achieve a customized service (Day, 2003). A study carried out by Jayachandran et al. revealed that investing in technology does not increase customer relationships, but it offers the company the opportunity to change their processes and hence become more customer centric.

Finally, the transformation throughout the firm must be analysed to ensure the correct changes have been done. To evaluate the effect of the changes in the company different performance indicators can be utilized (PricewaterhouseCoopers, 2018). For example, customer satisfaction, which can be measured with different methods such as:

- Customer Satisfaction Score (CSAT): ranges satisfaction from 1 to 10

- Net Promoter Score (NPS): measures the likeliness of a customer referring the product or service to someone
- Customer Effort Score (CES): measures the effort taken by the customer to have an issue solved, usually measured between 1 and 7.

Another measurement that must be done is customer equity (Blattberg and Deighton, 1996). This concept measures the future revenue generated by the consumers of the company, the sum of all the value the company will realize from their customers. This measurement will help the company take decisions on where to invest or when to undergo a reduction on the price (Gupta, Lehmann and Stuart, 2004).

There are many things that companies have to change in order to face this new environment. Enterprises must be able to overcome the challenges explained in this section. In order to do so, changes that firms can implement in their businesses to become more customer centric will be analysed in the next section.

The changes that must be done in organizations to become customer centric are not easy to define as each company has a different situation. Some of the main points that are common to most of the firms which are undergoing transformations to become customer centric where studied by Shah et al. in 2006. As to understand the changes some obstacles where firstly identified:

- Deficient or non-existing leadership
- Cultural pressures
- No clear management
- Lack of urgency
- Loss of information due to bad technological structure

The first changes that has been identified is leadership commitment. This implies the management team knowing the new values the company wants to have and showing them to their subordinates. If the management team does not agree with the changes all the members of their team will not do it either. Some of the most known companies, such as Apple or Medtronics, that put in place a policy which obliges all the member of the firm to be at least once per year at a customer service table to understand their needs or at a surgical procedure for Medtronics (Kaihla, 2006). Employees will gain a new perspective while listening to their consumers and it can afterwards be applied when reviewing the company's strategy.

Another change that must be carried out in a company willing to become customer centric is its organization (Sheth et al., 2000). Traditional companies have a vertical organization (hierarchical) which difficult the flow of information between the different levels. That is the reason for which Day (1999) suggests a hybrid structure for customer centric firms. In this type of structure some of the units such as marketing or human resources will be coordinated in a horizontal way. Meanwhile some of the business units are kept with a vertical structure to ensure the correct resource allocation.

Along with the organizational structure, companies should make processes horizontal (Sheth et al., 2000). In addition to this change, a database is needed to ensure that information is not lost, and

the firms gives a good customer knowledge. Having a global database is also needed to provide a homogenous service through the different channels through which the product or service is offered (Galbraith, 2011). It is also essential for the employees to be able to have all the information of the customers, both the new ones and the ones that have already bought something from the firm. Although having a database implies big investments, it is needed to collect and treat all the information from the consumers and companies that do not have one will not seek to understand their clients and become customer centric.

In order to follow an outside in approach the firm cannot push the product or service towards de customer (Freeman, 1983). Customer centric companies have to change the way they measure the profitability as the metrics used in the product focused companies usually oblige the employees to sell products. Undergoing changes in the metrics used to measure performance will help keep the company under control and ensure that the changes being done are the correct ones. Along with metrics the incentive systems in the companies should be adjusted to reward the employees which create loyal customers and who give good customer service (Albert et al., 2004).

The last change that must be included in all the transformations is a change in the attitude of all the components of the firm. Employees must be willing to learn and change whenever things are not going well (Bose, 2002). As it can be seen changing from a product-focused to a customer centric business model is not easy, each firm has to do particular changes that adapt to their current situation and the position they want to be in.

79% of CEOs believe that innovation will drive efficiencies and create a competitive advantage. Yet incremental innovations can only become revenue and profit generators when companies are effective at linking up new ideas with customer needs. To really drive true customer engagement will mean addressing cultural and organisational factors for some, fresh thinking on how to encourage customer loyalty, and for others, the use of technology to enable channel optimisation. The 3 critical dimensions are cost reduction, revenue enhancement and customer differentiation.

The different companies are able to focus where they must make changes and investments in technology so that their customers are satisfied when buying their products or services. As explained above, technology plays an important role in this transformation and that is why it is important to study the technologies proposed by large technology companies such as IBM, Microsoft, Oracle ... In the next section we will study the existing technologies that can help the different companies to become more customer centric.

Chapter 3: Technologies enabling customer-centricity

In this chapter a research of the most significant technologies that have arisen in the new industry 4.0 will be studied. These technologies will help companies undergo the transformation described in the previous chapter in order to become customer centric. Some of the technologies that will be studied are Internet of Things (IoT), cloud computing, cybersecurity, big data or customer relationship management. These are some of the main technologies that have already been implemented in companies of different sectors and that have made firms change from a product centric business model to a customer centric one.

Along with the technologies, the technological companies that offer this type of solutions will be studied. Firstly, big technological companies such as Microsoft, Oracle, Salesforce or IBM who are offering most of the above-mentioned technologies.

3.1. Introduction

As it has already been mentioned, technology is a key pillar for customer centric transformations. In this new age of the customer, companies must invest in technologies which will enable them to know their consumers better and offer them the product or service they are expecting. Most companies nowadays are investing in building a technological structure that will help them meet their clients' needs. A study carried out by IBM (2013) shows that CEOs the biggest fear is their companies' technology, and they are therefore looking forward to doing investments in technology. Figure 18 shows the results of the study carried out by IBM. CEOs of different companies ranked the importance of 9 different aspects, being 1 the least important threat and 9 the most important threat.

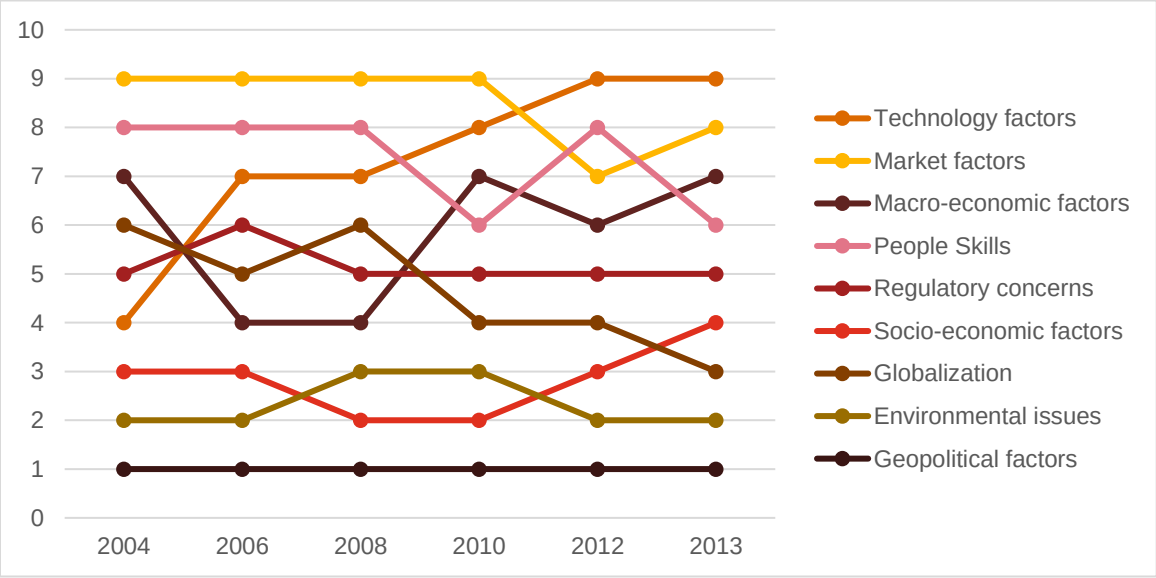

Figure 18: Evolution of important aspects in a company

It is remarkable that in less than 10 years the technology has gone from position 4 to 9, which means a great challenge also for partners and service companies that sell the technological

solutions. Executives understand that technological factors are so important because they are the enablers of greater external and internal collaboration. External since it is about the company with the client whom wants to be treated as an individual, and internal, between employees and executives to accelerate innovation.

The above graph shows the importance of doing a research of the different technologies available in the industry 4.0. As the number of technologies is huge, the study will be limited to the most important and influential ones. In order to select the technologies described in this document, experts from PricewaterhouseCoopers have been asked and different papers and studies have been read. Zhou, Yim and Tse (2015) state that the key technologies for this new era are mobile internet, IoT, cloud computing, big data and advanced innovation. Accenture (2018) focuses the works on cloud computing, artificial intelligence, analytics, IoT and sensor and actor networks. IDC Futurescape (2017) predicted that on 2018 the most important technologies will be cloud computing, artificial intelligence and machine learning, robotics and IoT.

3.2. Business 4.0

Hitherto companies have used technologies to reduce their costs and optimise their processes, but the new technology has enabled a change. Traditional customers are changing their way on buying and are entering a never-ending loop. In order to meet consumers' expectations companies should change the manner in which they use existing technology. Akin to customer journey, the technology should be used in a never-ending loop. In this document the new technological structure that is proposed to meet new needs and become customer centric is composed by Internet of Things, Cloud Computing, Big Data and Advanced Analytics and Customer Relationship Management (Figure 19).

These technologies will be used to understand the purchaser and satisfy their needs during a long period of time. Internet of Things will be used to capture information about the client, their needs and their history which will help the company predict future movements. In addition, IoT will be used in production sites to give information not only to the firm but also to the customer. For example, the organization can give detailed information to their customers about the production of their order. All the information captured by IoT systems needs to be stored in a secure and private place, as to do this cloud computing systems will be utilised.

Notwithstanding that the actual technology allows the collection of huge amounts of information, not all of the information is useful for the company. Furthermore, the information captured may not be meaningful or could not be exact, and therefore big data and advanced analytics come to play. This technology helps to understand data and extract important information and trends from it. The main objective is to reduce the information captured to a volume that humans can manage and can use to make decisions. Heretofore, the technologies explained do not put the client in the centre of the company, regarding this need some technologies have sprang out. The most know technology is Customer Relationship Management, which allows companies to store the information for each client and predict future moves.

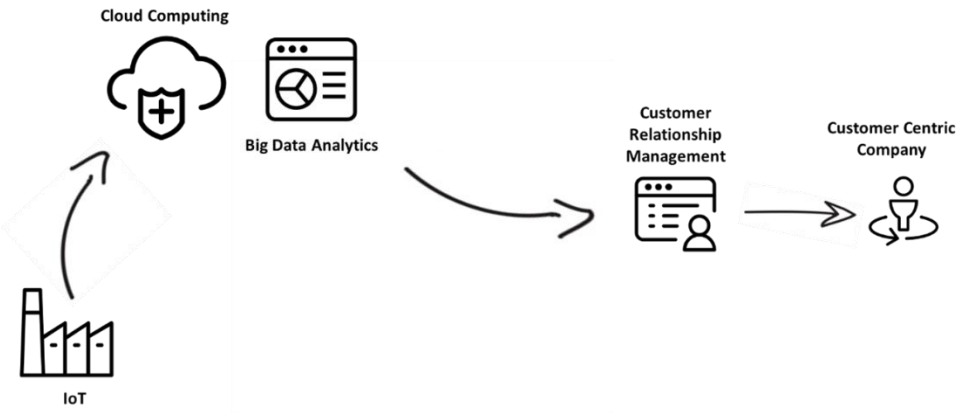

Figure 19: Technologies that enhance customer centricity

The volume of information decreases throughout the different technologies. The data captured by IoT systems is huge and usually a cleansing is done before storing it in the cloud (Aggarwal et al., 2013). Big data analytics chooses the relevant information that is going to analyse, which means that although all the information stored will be analysed, it will do this in small blocks of information (Gandomi and Haider, 2015). Information that is sent to the customer relationship management system has already been analysed, which means that irrelevant information has been removed. Finally, the customer relationship management creates an ecosystem where humans can see and use the information (Stefanou et al., 2003). This allows the firms to understand their customers and modify their processes to put them in the centre.

The different technologies that have been mentioned (Figure 19) will be detailed in the following sections in order to understand how they work, what benefits do they give to both companies and customers, the most important issues that must be bore in mind when implementing them, and some of the applications that they have. Moreover, the technological companies which offer the products will be analysed and some of the most relevant solutions will be described.

3.3. Internet of Things (IoT)

3.3.1. An overview of IoT

The concept “Internet of Things” was first used in 1999 by Kevin Ashton to name a network of devices connected to the Internet (Mingjun et al., 2012). Different sensors that are usually attached to objects, do the connection between the object and the Internet. The first step towards IoT was RFID (Radio Frequency Identification) tags, which use radio waves to transfer data from tags (usually attached to different devices) to a reader. RFID provides complete visibility of the product location, reduces inventory costs and continuously monitors inventory. IoT is an extension of RFID systems (Rose et al., 2015) as the devices connected to these networks must be intelligent and must use an internet protocol to communicate the data to the network (Bilal, 2015). The devices connected to the network constitute an extension of the company (Steenstrup, 2013).

As technology evolves and its price falls, individuals are starting to use it in their everyday lives. Consumers are demanding for more technology and for an environment that is 100% interoperable with their devices. As explained before (CHAPTER 2) customers have changed the way they

interact with companies, and new digital customers must not be treated as the traditional ones (Accenture, 2015). Companies must take this new opportunity and exploit it to get the best results possible. By investing in IoT they will be able to give customers the connected environment there are looking for and they will be able to understand their clients in real-time (Lee et al., 2015). Firms must now change their processes and start to adapt to the new industry 4.0.

However, the IoT is not a new concept, back in 1990, Romkey created a toaster that was connected to the Internet and users were able to turn on and off the device and control the degree to which the bread was toasted. Some years later, four students invented a coke machine connected to the Internet. They were able to see if the machine had coke without being in front of it. This meant a new revolution from which companies could benefit. New technologies have given firms new opportunities: control the number of employees working, the inventory in different stores, customer movements and needs, and it can be used in factories to find bottlenecks that decrease production rates.

A change in the connection and the devices used to connect to the Internet has occurred over the last years. In 2009 the main device used to connect to the Internet were personal computers, and there were 2.5 billion objects connected. Gartner estimates that the number of connected devices will grow up to 30 billion by 2020. All these connected devices sum up to 40% of the Internet traffic but will rise up to 70% by 2019 (Cisco, 2014). This implies a total of 1.9 trillion dollars in 2020, which will benefit almost every sector, from healthcare to transportation.

3.3.2. Technologies enabling IoT

As is has been mentioned IoT is a network of objects connected to the internet that use sensors to transmit data that will afterwards be analysed and used (Gartner, 2013). In order to do this, many technologies must work together so that the information collected can be useful.

- Connection has gained speed and decreased its prices making nearly anything connectable. This gives companies the opportunity to invest in this type of technology (Callado et al., 2009).
- Cloud computing is needed to store data collected by the devices and enables the analysis with big data (Armbrust et al., 2010).
- Once the data is collected it must be studied, as to do this, advanced in data analytics is essential. The boost of computing power and the state-of-the-art algorithms have helped the Internet of Things to attain its huge capacity of data analysis (Russom, 2011)
- The adoption of IP is another of the major enablers of IoT as it gives a globally known platform and tools that can be easily used (Forman, 2015).
- In addition, the dwindling costs of technologies, and the nanotechnology have made it possible to connect all kind of devices (Birol and Keppler, 2000).

All these technologies have helped with the creation of the Internet of Things. As this technology is very generic the implementation of IoT solutions can be done in nearly any kind of company. New activities appear in each sector as IoT is adapted to the companies' needs. The IoT has no limit of application, all sectors are creating new ways in which they can be used. The main common point between of the applications is trying to know the consumers habits and needs. Companies

will be able to know and predict their customer needs and therefore offer them a better solution. Some examples of IoT applications can be:

- Wearables: objects that are placed in the human body and allow the user to control their health (heart beat rate, temperature, blood pressure…), or help them when exercise, for examples watches. Another use of this type of device can be Google's or Snapchat's glasses that allow the user to be connected to the internet through them.
- IoT has also been implemented in homes, giving the user the opportunity to reduce the cost of their electrical devices' consumption or increasing their security. Some examples are Phillips' light control, Nest's thermostat or Apples Homekit, which includes an intelligent lock. All these devices permit users to control their homes without being there.
- Companies in which customers engage in commerce can use IoT to optimize inventory and to have a direct contact with their clients. An example is beacons, which can be installed in the shop and when a customer get near receives an offer. They can also help customers find more information about the product they want to buy for example scanning a bar code.
- Factories can use IoT to store their products in a smart shelf and send a signal whenever the levels of a product are low. They can also integrate their RFID systems into a global system for all the company that will give them complete control of all the products and their location in the factory. Companies such as Honeywell or Cisco are providing solutions of this kind.
- Smart cities are becoming a real option thank to IoT, smart parking, smart lighting, smart roads or waste management are some examples. But IoT can be used for many other things, such as traffic monitoring of vehicles and pedestrians in order to avoid traffic congestions or at a first stage to detect possible incorrect traffic light schedules.
- Vehicles can benefit from the Internet of Things using crash response systems or car problem diagnosis. These cars are able to provide the driver with information about the car whenever things go wrong and offer them a solution. For example, whenever the petrol level is low, the car will provide the driver with the petrol stations to which he can go and offer him discounts.

There are many other applications in other sectors which use Internet of Things to help consumers or user achieve a better experience.

3.3.3. A characterization of IoT

The Internet of Things is composed of three layers (Figure 20): perception, network and application (Ngu, 2017). The perception layer is the bottom one, it is where all the data is collected by the sensors from the environment in which they work. The information captured will vary its format depending on the devices used to get the information. All information must be transformed into digital data before in can go to the next layer (Silva, Khan and Han, 2017). The network layer is considered as the brain of IoT, it serves as a connection between the two other layers, allowing humans to interact with data (Suo, Wan, Zou and Liu, 2012). This layer is capable of using machine learning algorithms to predict information in important procedures.

Finally, the application layer gives the user personalised services to utilise the data (Suo, Wan, Zou and Liu, 2012). Some authors do a subdivision of this layer into three: business layer,

application layer and service management. The service management helps processing information in order to give the user the information they are asking for. The application layer is the interface through which the user can request information collected in the lower layers. The business layer represents the information that has been captured and processed from the application layer.

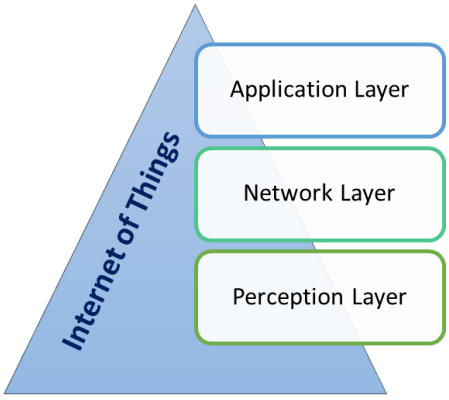

Figure 20: Layers of Internet of Things

The Figure 20 shows the different layers of IoT explained before. Some researchers talk about a layer situated between the perception layer and the network layer (Farooq et al., 2015). The function of this layer is considered as a support layer that enables the storage of information using cloud computing and intelligent computing (Zhao and Ge, 2013).

3.3.4. A characterisation of communication in IoT

As it has been defined, the Internet of Things is a network of connected devices. In order to have a connection or interaction between the different devices they must be able to communicate (Gubbi et al., 2013). In the Internet of Things there are 3 different types of communication: device-to-device, device-to-cloud and device-to-gateway (Internet Architecture Board, 2015). The first type of communication is done by two devices directly, they can be connected between them by Bluetooth or Z-Wave. This type of connection is used in home applications because they used small packages of data to communicate between them (Samuel, 2016). For example, lightbulbs that can be switched on/off with a light sensor, thermostats that are connected to thermometers…

In device-to-cloud communications, the devices have a direct interaction with a cloud service. They usually do this through wired Ethernet or Wi-Fi. This communication model is mainly used with devices that need to analyse the data they capture. For example, the Learning Thermostat by Nest Labs, it captures data thanks to different sensor and sends information to a cloud database (Hernandez et al., 2014). Here information is analysed and used to reduce the electricity consumption for example switching of the heating when nobody is at home. The information captured by these devices can be used by machine learning algorithms easily, which expands the original features of the device giving customers added value.

Finally, the device-to-gateway model implies a new layer between the devices and the cloud database which is an application-layer gateway (ALG). This application software gives security to the whole system and permits the translation of all the information to the same protocol. This

model allows the use of devices that were not created to work together as they do not use the same protocol.

In addition to these communications models used in IoT, there is a communication structure called back-end data-sharing model that allows the user to mix the data captured by the sensors with external data (Uckelmann et al., 2011). It also gives the opportunity to share the data captured with third parties. A case where this kind of communication model can be useful is in a factory where the energy consumption wants to be analysed and therefore the data from all the devices is need and some external information must be used (Shrouf et al., 2014). This back-end data-sharing model gives the opportunity to mix the information obtained by all the different sensors.

The main considerations when building an IoT communication model is interoperability (Vermesan et al., 2011). Devices must be able to interact between them as to obtain more valuable information. Having efficient communication enables new products and services to appear (Yang et al., 2011). To sum up, technologies will continue to evolve, and communication models must change to take advantage of them.

3.3.5. An overview of the challenges of IoT

The most important issue when handling IoT devices is security, people must have the confidence that the things they are doing are safe and that they will not have any problems with the devices.

The main challenges that the Internet of Things must overcome are data confidentiality, privacy and trust (Suo et al., 2012). The Internet of Things is based on the trust of users as they are the cornerstone, if people do not have trust on technologies they will not use them. Although the security requirements vary from device to device, the goals set by (Lin et al., 2017) for IoT can be applied to all applications. These objectives are confidentiality integrity and availability. In order to achieve these goals an ensure data confidentiality, identity systems and prevention of aggregation techniques can be used.

Most of the users do not feel comfortable when using applications that do not treat their information in a private way. Nowadays many companies buy data to others and most of the times users are not aware of it (Singer and Merrill, 2015). IoT must ensure that it is compliant with the regulations of each country and that it provides privacy throughout all their devices. Finally, trust is the base of all interactions, whenever the user does not have confidence in the systems and application they will stop using them (Lin et al., 2017).

Technologies in the Internet of Things systems must assure security and interoperability to boost the applications of it. Companies will be able to benefit from this technology as they will be able to know their clients better, in some cases they will receive information about their needs in a continuous flow. This will allow companies to focus their business models towards their customers and align their processes and strategies to meet their consumers' needs. Internet of Things is a technology that has been recently created and that has not reached its full potential. It will continue to change and help companies become more customer centric (Xia et al., 2012).

3.3.6. An overview of technological solutions

As it has been mentioned, there are many different applications of the Internet of Things and big technological companies are creating different solution that will help companies get to know their clients. In the following paragraphs some of the most influencing technological companies' solutions will be described. The firms that will be studied are Cisco, Honeywell and Amazon, who have been the main pioneers in the Internet of Things.

Cisco

Cisco provides an IoT platform which can be implemented in any company regardless the degree of integration of Internet of Things in the firm. In addition to this control centre it offers a wide variety of products for companies that want to integrate IoT and have no systems in place. The main products that Cisco offers are (Figure 21):

- Industrial Routers which ensure communications in a quick and reliable way. The routers are built to withstand harsh environments and integrate security systems.
- IoT gateways
- Industrial switching
- Industrial wireless
- Low-power, wide-area wireless
- Embedded routers and switches

The control centre for IoT offered by Cisco can be used to control all the devices connected to the IoT network. Cisco is one of the leaders in IoT solutions and offers a wide range of products that can work together to create a secure IoT network. The control centre is placed between the device layer and the backend systems giving companies higher flexibility as many different devices can be connected to it.

This solution allows companies to have real time control and view of all the devices, which helps them detect any problem. This information gives the firm the possibility to carry out a detailed analysis of each component giving them the possibility to study the trends and patterns. This may be especially useful to detect problems or bottlenecks in the production line. In addition, the new Cisco's centre enables companies to have information about the utilization of each device or machine, which can be of special interest for the firm as they can change the processes to reduce production time.

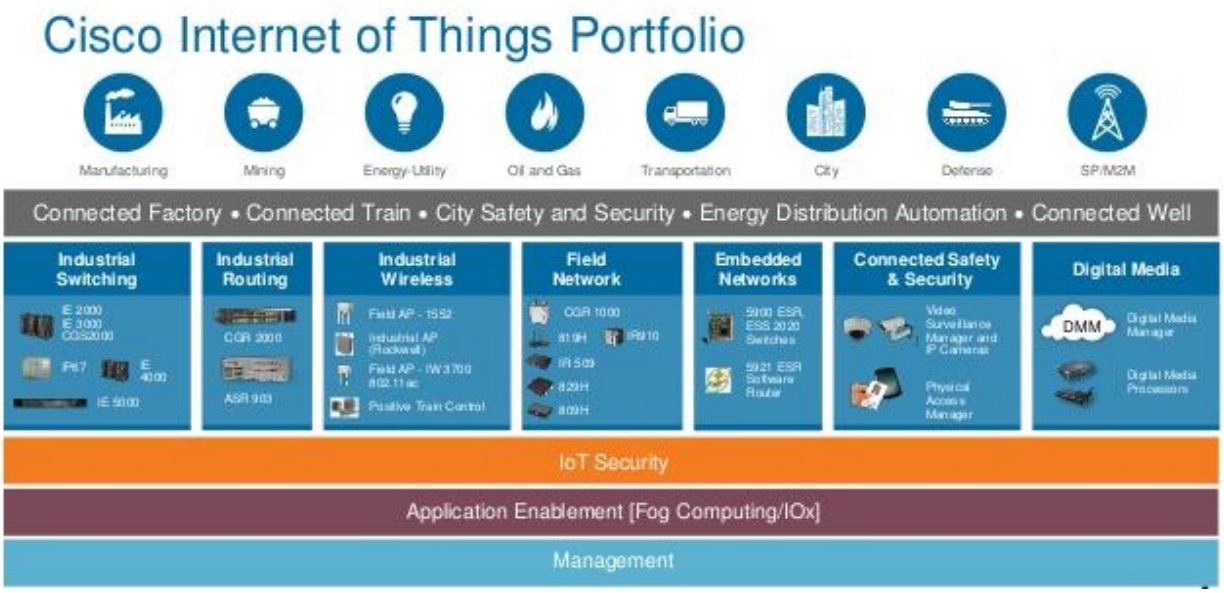

Figure 21: Cisco IoT platform

Cisco's solution for IoT supports companies looking forward to reducing their costs. Thanks to the automate day to day connectivity management task the manual processes are reduced and therefore costs are also decreased. Moreover, having a real time control of the production plant and the stakeholders of the company allows the factory to reduce costs as materials orders can be done in optimal quantity packages. Furthermore, unpredictable costs are wiped out because the company is able to predict machine breakdowns and take action before it occurs.

As one of the main challenges IoT has to face is security, Cisco has invested in creating a secure platform. This way they are able to prevent unauthorised access, avoiding information breaches for the company using the platform, and giving the final user (either another business or individual consumers) a safe environment. Companies using Cisco's Control Centre will benefit from higher quality service and therefore higher customer satisfaction and probably higher customer retention. In addition, the IoT platform is compliant with regulations worldwide although it will have to keep up with new regulations that will be set in future years.

Having a 24-hour control over the company helps users to detect problems at early stages, and permits employees have a clear and transparent vision of the company. A study of the resources available or bottlenecks can be easily done thanks to the continuous capture of information by the system. For firms such as Nest Labs, whose revenues depend on customer service, Cisco's control centre allows them to solve any problems by analysing the main causes: hardware, software or connectivity. As the time taken to solve problems decreases, customer satisfaction will increase. Furthermore, the IoT platform permits the company to observe historical data, with which they can see patterns to detect problems or processes that can be optimised. Finally, it is important for this type pf platform to have an easy scalability because technologies continue to change at a very fast rate. It has helped firms reduce the time to market as it has an easy implementation.

Some of the main success cases of Cisco's Control Centre 7.0 are connected cars, smart watering systems, smart vending machines… The most innovative system up to date is the smart watering system, which allows the user to know the amount of water used and helps detect leaks in the system. The company that installed IoT in their watering systems changed from a product focus strategy to a customer centric one. They were able to reduce water wastage in 80% and employee costs in 75%. This is an example of how innovation and technology can be incorporated in any sector.

Amazon

Another company which has invested in IoT is Amazon. Amazon does not only offer an IoT platform, but also some products more consumer oriented instead of factory oriented. One of its most revolutionary IoT products is the AWS IoT button. It is a programmable button that uses Wi-Fi to connect to the network. Furthermore, it allows connection with other products and solutions offered by Amazon that allow the user to customize each button. The interoperability of all Amazon IoT solutions facilitates the setup and use for the customer.

Figure 22: AWS IoT Buttons

The AWS IoT Button (Figure 22) has as many utilities as codes can be created, each user can code the button in order to do the desired activity. For example, Amazon's button can be used to open the car's door, call someone, control electrical household devices in a remote way, or combined with Amazon's key activity, retail, to order a product.

In addition, it enables companies to start using this technology in a quick and scalable way. Some of the firms using AWS IoT buttons are improving customer experience. Companies will also benefit from the large amount of data that can be captured from their clients, which will help the enterprise satisfy their consumer's needs correctly. Some examples of companies that are using Amazon's technology to improve customer experience are: Netflix, who is using the AWS IoT button as a remote control, Philips, that allows their customers to switch on and off their lightbulbs (Philips HUE), or Airbnb that is starting to install this technology to register the entry and exit of their hosts. Another example of who Amazon IoT is being used for temperature control appear in Figure 23:

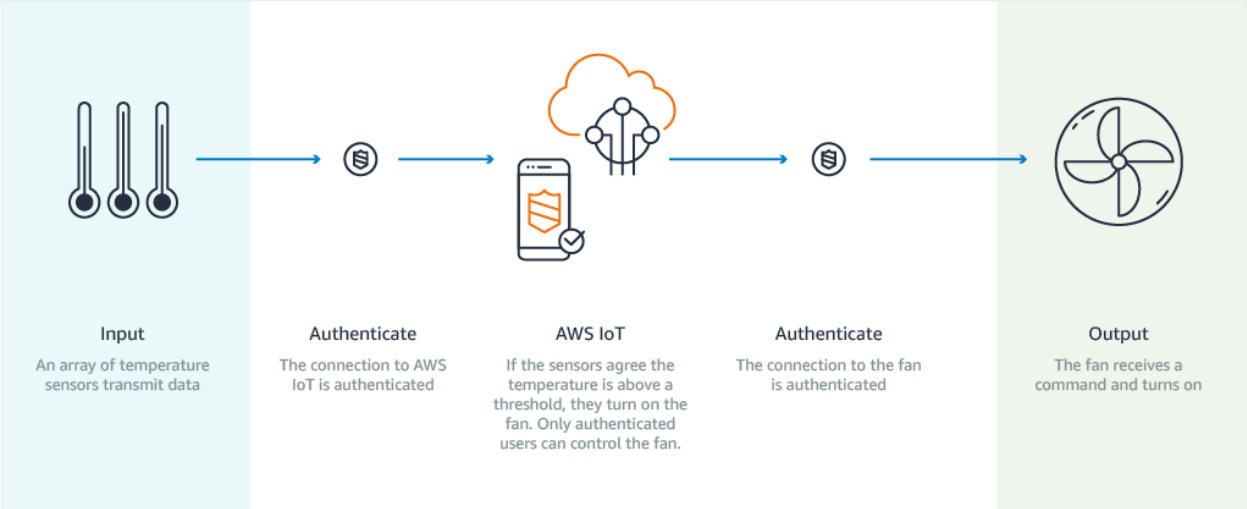

Figure 23: Amazon IoT example

Besides, Amazon offers a secure platform to which the AWS IoT Buttons can connect: AWS IoT Core. This platform is responsible for collecting all the information when the button is pressed. It offers a tool kit with which the user can configure actions that occur each time the button is pressed. An example is the company Ariel, which has configured an AWS IoT button so that when the user runs out of detergent he just needs to press the button and Amazon will send the detergent throughout the day. It also includes a system by which SMS messages are sent (Amazon SNS) when the button is pressed, or Amazon DynamoDB that allows the users to count the number of times the button is pulsed and implement simple rules to perform actions when reaching a certain number of clicks. Ultimately, it allows users to create the code they want to implement on the buttons, making them completely customizable.

Honeywell

Honeywell has developed a new concept of Internet of Things, the Industrial Internet of Things (IIoT) (Figure 24). This concept is used to define objects which contain embedded sensor that can communicate with a network. They are focused on industry scale and help the company's business infrastructure working smoothly. An example of a place where IIoT can be used is offshore oil rigs. As it is a risky activity for employees to do the maintenance of the structure, the company owner of the oil rig can install different sensors throughout the structure of the oil rig. If there are cracks that start to appear in the structure the sensors are capable of detecting it and sending a message. In the near future a robot could be installed in the oil rig and it will repair the crack without the need of human intervention.

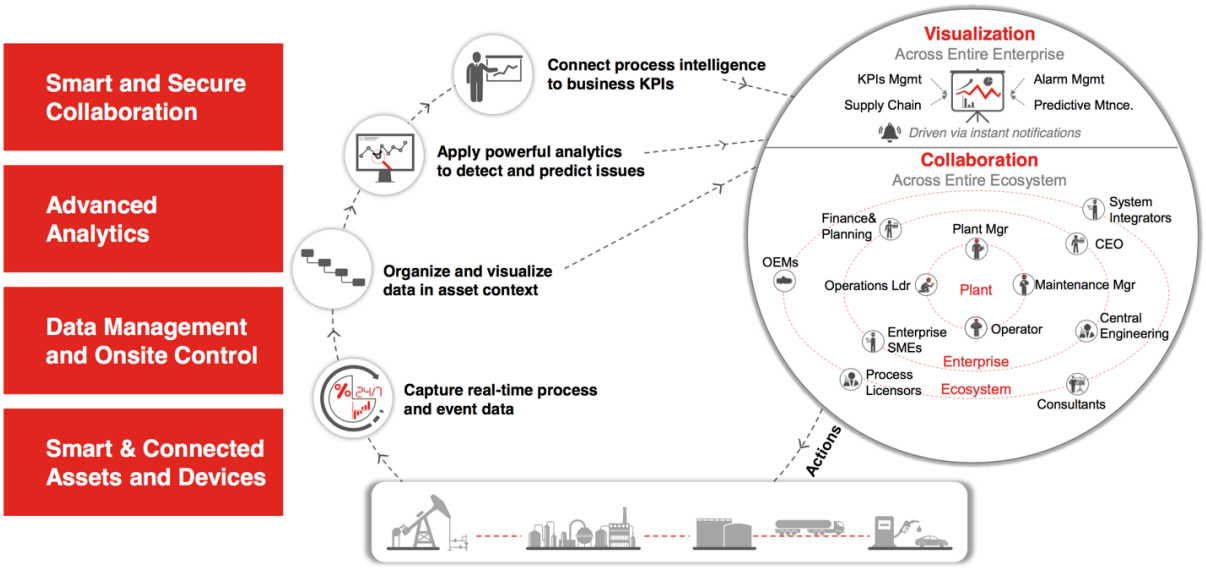

Figure 24: Honeywell Industrial Internet of Things

As it can be seen in the example, safety is one of the main benefits of IIoT, not only for the employee but also for the consumers as human errors are avoided. The firms can also benefit from a huge quantity of data that can be captured and used to monitor and control all the processes of the factory. These processes can also be optimized with IIoT systems, which are able to identify the bottlenecks and help improve utilization and productivity in the factory. Having a 24h control over the manufacturing plant permits, a live monitoring of regulatory reporting, ensuring that the company is being compliant and helping identify changes in regulation, and helping the firms adapt to these kinds of changes.

What really adds value to the IIoT is the amount of information collected, but companies must be able to make this information useful to use it. A widely used application for this type of technology is the control of suppliers and their optimization. For example, a logistics company can have their trucks geolocated and control the routes they take to avoid traffic jams. The company can also change the trucks they have bought by rented trucks of different sizes and thus be able to rent a truck of the needed size at the necessary time, reducing inventory cost and optimizing shipments to reduce the consumption of gasoline and greenhouse gases. This improves the use of assets and reduces the costs for the company, which in addition will be able to have their products faster in their stores.

Having so many devices connected to the Internet and producing data implies having a uniform communication protocol to avoid having to transform all the information into the system's communication protocol. Another challenge is the security of the network. As many of the data captured by IIoT systems provide information about a company's processes, if this data is accessible to competitors it could make the company lose their competitive advantage. Furthermore, the devices used by the firm must be able to act autonomously taking into account the information other sensors capture. An example of a company that has overtook all these

challenges is a retail firm that has managed to reduce their transportation costs utilizing IIoT. The company has a large number of suppliers, so they placed sensors on the different parts they bought. The pieces of the different suppliers communicated with the same protocol, being able to communicate among them and offering useful information to the manufacturer. If they do not use the same protocol, the manufacturer will need to invest more money to get the parts of both suppliers to communicate with the factory and with each other. Thanks to this system, some of the orders were made automatically when the sensors of the factory detected that the inventory levels were low. The factory optimized the inventory and reduced costs.

Honeywell offers IIoT leading solutions for factories in all levels of Internet of Things integration. They have created many different types of sensors which enables the factories to have continuous information about their machines and processes. The sensors provided by Honeywell have a wide range of utilities: pH sensors, conductivity sensors, temperature, pressure or gas flow can be measured. Honeywell is now creating sector specific sensors such as an oxygen concentration sensor or a sensor to measure the purity of hydrogen. In addition, they provide a wireless network to connect all the devices to a cloud computing system which will help store all the captured information in a safe place.

Industrial Internet of Things is changing the rules of the game in this new industry 4.0. Cyber Physical assets are starting to become essential for companies to understand their customers and help them offer the best product or service. The amount of information captured by IIoT systems give factories the ability to control and optimize their processes, chose the most important investment in which they should incur, optimize the number of products they should produce, make optimal quantity to order to avoid inventory costs… In order to help companies, integrate this technology Honeywell offers a wide range of products to help factories become smart factories, giving them a competitive advantage and helping firms provide higher quality products and a better customer experience.

3.4. Big Data

Nowadays two different trends can be identified that make todays era, the big data era. The first one is the digitalization of almost everything which means that all sort of devices that surround us are creating data continuously (Kilpeläinen and Tyrväinen, 2004). The second are the technologies and advanced analytics methods that companies use to extract the important information, patterns or trends of the captured data in a quick and precise way (Schroeck et al., 2012).

Companies can therefore benefit from all the new information they are able to have, as it can help them make a decision to meet their objectives (Apte et al. 2003). Although big data must walk along with advance analytics to create valuable information, both parts will be studied separately to understand to importance of both. Advances analytics can provide many information about the company and the customers, which can give the firm a competitive advantage, as they are able to better satisfy customer needs (Barton and Court, 2012). But, advanced analytics is of no use if the information is not captured or if the information is of bad quality. This is the main reason for studying big data in first place.

3.4.1. Definition of Big Data

Big data was first used in the mid-1990s, during the age of the information companies were able to capture and manage a lot of information but in Silicon Graphics Inc, they knew that there was a limit to the amount of information technologies of the moment could handle (Diebold, 2012). The term big data was therefore created to describe the volume of data that could not be processed in an efficient way with the technology available (Kaisler, 2013). Other authors describe big data as the quantity of data beyond the storage, management and efficient process limits (Gandomi, 2014). Gartner (2017) describes big data as high volume, velocity and variety information that need cost effective processing and that can be used to help make decisions.

Up to 63% of CEOs worldwide state that the capture and further analysis of information is being transformed into a competitive advantage for their companies (PricewaterhouseCoopers, 2015). As it can be observed there are many definitions for big data and it is a concept that will evolve in future years (Xiaofeng and Xiang, 2013). Managers appreciate the value of data when making everyday business and strategic decisions. The data is no longer something that supports a decision, but it has become a fundamental component when making that decision (McAfee et al., 2012).

3.4.2. A characterization of Big Data

Not all information can be considered big data, some of the most influential authors in the theme have suggested three dimensions to describe big data (Laney, 2001). On the other hand, different technological companies, leaders in big data has broaden these three dimensions to six. The three main dimensions, also known as the three V's, are: volume, velocity and variety (Chen, Chiang, and Storey, 2012; Kwon, Lee, and Shin, 2014).

Volume applies to the quantity of data. Nowadays it is reported in terabytes and petabytes but as technology evolves the size of big data will increase to exabytes. Datasets of over one terabyte were considered to be big data in 2012 (Schroeck et al., 2012). One petabyte corresponds to 1024 terabytes. 16 million Facebook photographs are equivalent to one terabyte (Beaver, 2010). Different types of data have different sizes and technologies evolve and enable bigger volumes of data to be processed in shorter time. This means that what can be considered big data today, may not be big data in the future (Sobel and Vaigel, 2010)

There are different types of data: unstructured, semi-structured and structure. The variety of the data refers to different types that can be found in a dataset. 5% of all data is structured, this means that it can be found in a spreadsheet (Cukier, 2010). Some examples of unstructured data are images, videos or audios, and textual language can be considered semi-structured data. One of the main challenges of this era is to create new technologies capable of analysing all types of information in the shortest possible time. As expected, internal data is the most developed and best understood data of companies (Chen et al., 2014). This information has been collected, integrated in the system, structured and standardized to have heterogeneous data.

The third V refers to velocity, which is the rate of data generation and the time taken to analyse and take actions based on the information (Géczy, 2014). Due to inventions such as smartphones or RFID the number of data collected has exponentially increased. The problem that arises is that

technologies are not yet capable of analysing and give important information for executives to make decisions on a daily basis (Cukier, 2010).

In addition to these three V's some companies have included other dimension of big data:

- IBM included veracity which refers to the unreliability of some source of data
- SAS added variability to the list. Variability refers to the changes in the quantity of data that is captured. As the flow rates vary, the system set in place must be capable to adjust and ensure that all captured data is analysed before becoming out of date. In addition, systems must be capable to management information from different sources and of different type, this has been defined as complexity by SAS
- Oracle incorporated value, as not all information is useful, being able to reject non-added value information will help the company achieve better results and optimize their big data analytics tools.

It is important to remark that the different dimensions are dependent of each other, and that they will continue to evolve along with technology.

3.4.3. Definition of Advanced analytics

In the previous paragraphs the importance of capturing high quality data has been explained, but a detailed study should be done to understand how companies can benefit from the information they collect. The data captured in the different processes is of no use if it is not correctly analysed and conclusions are not drawn from it. These conclusions can be either important information of the customers, information about a process in the factory, trends and patterns… and will be used by the managers of the firms to make consequent decisions (Gandomi and Haider, 2014).

The process used to extract insights from the collected information can be divided into five steps (Labrinidis and Jagadish, 2012). These stages are: acquisition and recording; extraction, cleaning and annotation; integration, aggregation and representation; modelling and analysis; and interpretation. They can be grouped into two categories: Data management and analytics. The first categories in concern with the capture and further storage of the information. It takes also into account to preparation of the information by deleting information that is not useful, connecting information that is related, analysing outlier… The second category involves analysing and acquiring information from the captured data. Figure 25 shows the different steps and categories.

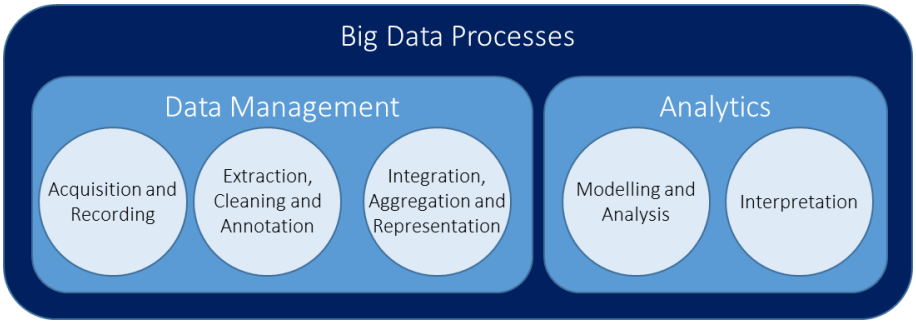

Figure 25: Big Data Processes

As it has been previous explained, the new competitive advantage that companies are looking for is to use information in an efficient way that enables them to better satisfy customer needs (Schroeck & Schokley, 2012). Firms that have the ability to capture and analyse data in a short time period will be able to make decisions which are addressed to their customers and will meet their expectations. Enterprises in the new age of the customer should be capable of not only analysing the data they collect, but also combine it with past experiences, from both their activity and their customers, and the future trends and patterns to obtain a competitive advantage (Apte et al., 2003).

This competitive advantage will be reflected in an increase of cross-sell revenue as companies will be able to offer their customers a package of solutions and not just a single product or service (Barton and Court, 2012). Along with the increase in revenues, a decrease in the cost as the processes will be optimised and all changes done in the firm will be done to improve customer experience, which ensures that they will add value to the product or service offered. Furthermore, a reduction in fraudulent behaviour will be achieved as all actions from the stakeholders of the company will be captured and analysed (LaValle et al., 2011). Finally, enterprises will be able to offer better marketing campaigns as they will understand their customers' needs and how these necessities change, allowing them to change their business to better satisfy their customers' needs.

3.4.4. Definition of advanced analytics

Likewise, big data, advanced analytics does not have an exact definition, but instead its meaning evolves with technology and when new types of data appear. Some authors have defined advanced analytics as a group of tools which are used to capture data, break down the information and try to foresee trends or patterns which will help in decision making (Bose, 2008). One of the most know techniques of advanced analytics is statistical analysis which used to predict trends in a group of data. In addition, data mining and data integration are also used to exploit the maximum potential of collected information (Berry and Linoff, 1997).

When the dataset is not complete, fuzzy logic can be applied to complete the information. Neural networks are used to forecast decisions, and predictive analytics can complement neural networks by foreseeing the different outcomes (Wu et al., 2006). All these techniques have appeared during the last years and new ones will come into sight in future years.

Advanced analytics gives value to big data collected and stored in a firm by allowing the company to understand their situation and take action. It is mainly used in transactions, events, emails, social networks and sensors. It enables companies to integrate all the information, although most companies have started with internal data and are now expanding to include external data also. A company that has managed to increase their revenues through big data and advanced analytics is Automercados Plaza (Vieira and Xena, 2012). It is a Venezuelan family chain of shops that has integrated the information of all the company through advanced analytics. Their revenues have increased 30% due to a better inventory management and a better and faster adaptability to changes in the market.

As to understand how companies like Automercados Plaza have boosted their revenues with big data and advances analytics, some of the main techniques used by these systems will be detailed.

3.4.5. An overview of Big Data analytics techniques

Text analytics

The extraction of information from textual data is known as text analytics or text mining. Some examples of text data are emails, blogs, responses to surveys, documents or news. Thanks to text analytics companies are able to have a summary of all the text information they have. These reviews help managers make decisions that are evidence based, increasing the probabilities of being successful. Machine learning, computational linguistics and statistical analysis are used to transform the information and complete it. An application that has become widely used is stock market prediction, different financial news can be analysed to foresee future trends (Chung, 2014).

Text mining is composed by several methods that can be used individually or collectively to analyse the textual data. The four methods that are more spread out are information extraction, text summarization, question answering and sentiment analysis. The first one is used to create structured data from unstructured, which is easier to analyse and use. For example, it can be used to have the name, dosage and frequency of a medicine a patient has to take, from the prescription from the doctor (Jiang, 2012). Text summarization is used to create summaries from one or many documents, leaving only the key information. The third method mentioned is question answering, in which answers are given to question done in natural language. Examples are Apple's Siri or IBM's Watson. Finally, opinion mining or sentiment analysis can interpret people's opinions. This method has become of great importance during the last years, as the Internet is allowing people to rating and comment all services and products (Liu, 2012). The main application areas are marketing, finance and social sciences.

Audio analytics

Audio data in unstructured and is therefore more complicated to extract useful information from it. Companies that have a call centre are using audio analytics to analyse the different calls of each customer (Gandomi and Haider, 2015). Firms are able to understand how their customers like to be treated and train their employees at call centres to try and give a better customer experience. A research carried out by Hirschberg, Hjalmarsson, and Elhadad (2010) showed that audio analytics could be used to detect some mental diseases such and depression or schizophrenia. This shows that these technologies can be used in many different sector and not only to improve a company's revenues.

Video analytics

Videos are starting to invade the Internet thanks to platforms such as YouTube or Instagram. Video Content Analysis (VCA) is the technology used to extract useful information from videos. There are different applications such as automated security or marketing and operations management (Hakeem et al., 2012). Some enterprises are using videos to get to know their clients (Spiess et al., 2014). By installing cameras in their establishments there are able to estimate customer's age, gender, ethnicity… or they are able to count the number of consumers in the shop and analyse peak hours. Another use for video analytics is to study real time queues, supermarkets are able to open and close payment lines when queues are too long. Finally, one of the most innovative applications is analysing movement patterns, this will give the company information about where

customer spend more time and they can rearrange the shop to put promotions or important products in the places where customers spend more time.

Social media analytics

The rise of social media in the last decades has supposed a new challenge for many companies. These platforms have given customers the power to create and exchange information about any subject. Users can produce both structured and unstructured data that is useful for companies as they are able to get updated information (Stieglitz et al., 2014). Firms do not only exploit the information generated by their customers but also the interactions between them. There are therefore two types of methods needed to fully analyse the data created in networks: Content-based and structure based (Lawrence et al., 2010). The first one extract useful knowledge from post user load on social networks. The second analyses the interactions between different users and between users and the company. The main advantage of exploiting information that is generated in social media is that it is up to date, and therefore it can be used in a short period of time (Fan and Gordon, 2014). It also allows following and controlling the effect of a firm's action. Ultimately, it gives companies the opportunity to quickly act and make changes if they have committed an error.

Predictive analytics

Predictive analytics is used when datasets do not contain all the need information or to predict future trends (Siegel, 2016). It is based on statistical methods that use historical and current data and are applied to almost every sector. For example, possible failures can be detected in advanced and repairs can be done beforehand, or future customer movements can be guessed analysing their posts on social media (Nyce and CPCU, 2007). Predictive analysis employs historical data and trends to forecast the future trends using linear regressions or machine learning algorithms.

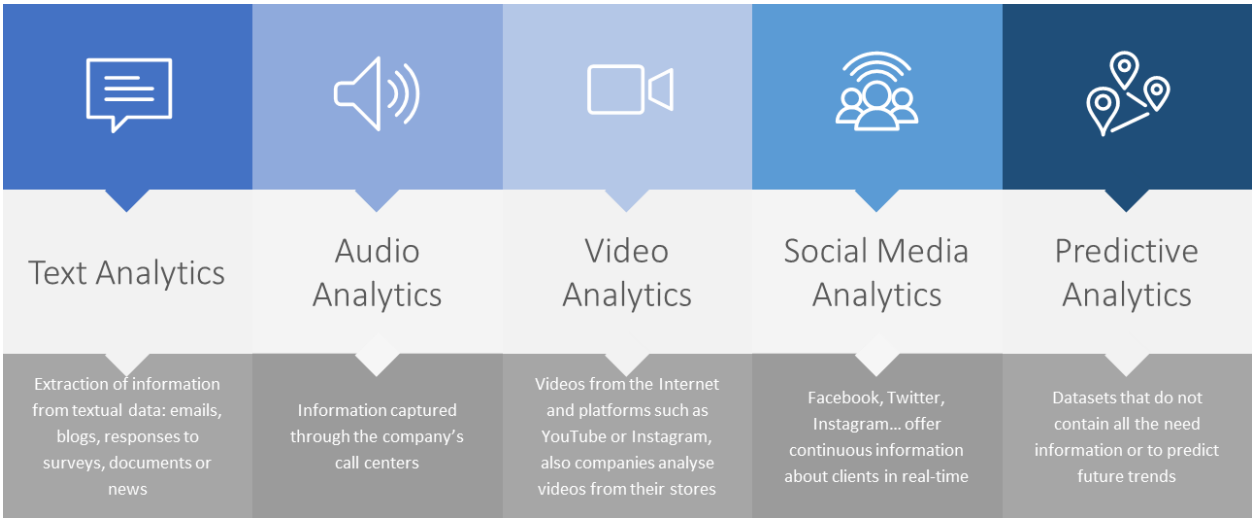

Figure 26: Big Data Analytics techniques

The different types of analytics can be seen in Figure 26. In the previous paragraphs, the main advanced analytics techniques have been described. As technology evolves these methods will need to change to adjust to the new requirements. In addition, the quantity of data captured will be increase and companies must be able to analyse all the captured data. They will therefore need to have bigger storage systems and faster advanced analytics to continue being competitive.

3.4.6. Benefits of Big Data

A company that has installed big data and advanced analytics systems has a competitive advantage over companies that have not done so. They are able to understand and predict the behaviour of customers giving the company the possibility to better meet their needs (Sagiroglu and Sinanc, 2013). If customer need change they will be able to know it faster and therefore they will be the first to try and satisfy them. Offering a good experience to the customers of the company will increase the percentage of customer retention, reducing the company's costs (LaValle et al., 2011).

In addition, this type of technology helps companies to understand themselves since in order to integrate big data analytics into the company, a detailed study of the structure and the information captured must be done (Brown et al., 2011). Thanks to this analysis, workers will be able to detect problems, pain points or inefficient processes throughout the production line that can be improved. The optimization of the processes will bring a reduction of costs and time that can benefit both the company and customers.

Big data and advanced analytics allows finding new ways to interact with the client (McAfee et al., 2012). Furthermore, it allows to use old data to feed algorithms of machine learning which are able to predict the future actions that customers will carry out. Moreover, it permits creating an alert system so that changes in customer information can be used by the company to improve their product or service. In addition, it enables a better segmentation of the clients and therefore the firm can carry out more personalized actions for each consumer.

Another of the main benefits of companies that use big data and advanced analytics is that they can make decisions more quickly and accurately (Chen et al., 2012). Many companies are able to capture information, but their analysis systems are not fast enough to make decisions at the right time. A clear example of a way in which a company can benefit for the technology is in the redesign of products. If the product offered by the company is not adequate or does not satisfy the objective number of people, companies with a high level of technological integration will be able to detect the problem. The company will be able to redesign the product so that it adapts to the needs of the customers and meets its sales objectives.

Finally, it should be noted that companies improve the accessibility and fluidity of information within the company. By sharing information from different areas, employees can access information quickly and work with it. This also allows companies to use the information captured in another place, which is essential for large companies that have several locations, or that produce in other countries. Being able to control a factory from another country can give the company a great advantage.

3.4.7. Integration process of Big Data

Companies have started to do different investments to integrate big data and advanced analytics, as they need to understand their customers to keep in the market. A survey carried out by IBM showed that there are four different stage when undergoing changes to integrate big data analytics in a firm. The four phases are: education, exploration, interaction and execution.

- Education: in this first stage the enterprises start to get informed about what is big data analytics and how does it work. They get to know the main advantages and the possible

uses of this technology in their companies. They study the effects of integrating big data to their processes and how it can help them to earn higher revenues and to get them to know their customers better. The persons in charge for acquiring the knowledge and informing the management team are the employees. Usually at this stage the chief officers have not done any research or numbers of big data.

- Exploration: During this phase, the companies start to develop their roadmap to incorporate big data and advanced analytics in their business. In order to achieve positive results and good understanding of the project that is going to be used to integrate big data, the team in charge should chose a measurable study case. By using a real case of the firm, the higher executives will be able to see the benefit and start to get interested in big data.
- Interaction: in this stage the real value of having big data analytics in the company is shown. During the interaction phase firms must assess the technologies they already have and their resources. Firms must ensure that they have the correct technologies to support the amount of data they will receive. Companies that do not have the technological infrastructure to absorb the volume of information they will capture, must invest in new technology before going on to the next phase.
- Execution: Enterprises in this phase have already verified that the technology systems are suitable for the volume of information they capture and can now start exploiting the information.

Most of the companies that carried out IBM's survey where in the first phases as it can be shown in Figure 27.

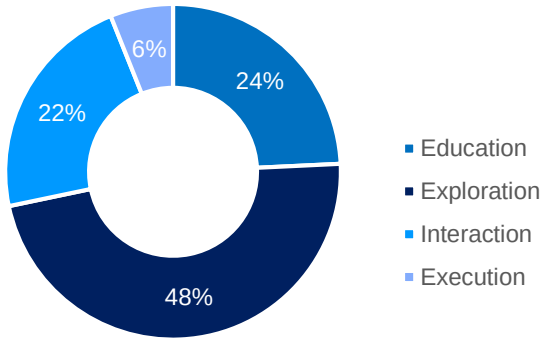

Figure 27: Number of companies in each phase of the integration

It can be seen that most of the companies are still in the exploration phase. Technologies are evolving, and companies must try to analyse the advantage they could give to their processes and start interacting. Only 8% of the companies surveyed consider to be in the execution phase. Although this number might seem low, technologies such as big data have just appeared and the percentage of companies implementing them will increase during the future years.

3.4.8. An overview of the challenges of Big Data

One of the main issue that appears through the different stage mentioned in the above section is that not all the company is involved in the different steps. This causes communication problems between the different parties and doesn't allow a continuous walk along the different stages. The CIOs are the ones that must ensure a fluent communication between managers and those of lower level to get through the different phases in a fluid way. In the last phase, senior managers are the ones who should be involved, making sure that investments are made in the appropriate technology (IBM, 2012). All this can be seen in Figure 28.

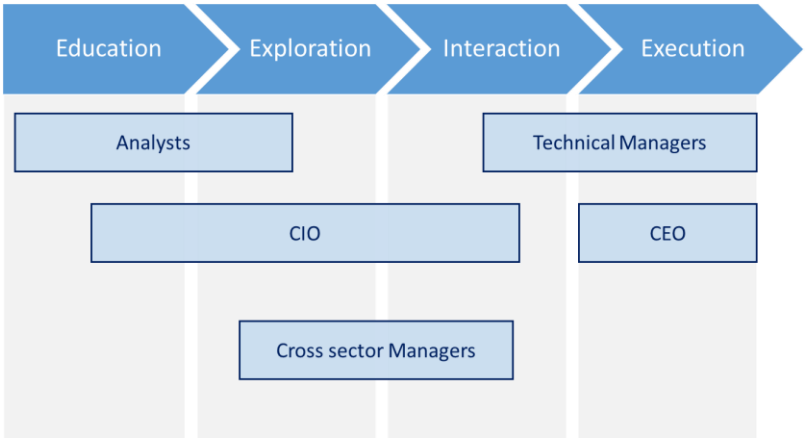

Figure 28: Directors of each implementation phase

In addition, to the possible communication problems between the different actors in the integration of big data, there are other problems that have occurred in different companies. The first problem with which companies will have to fight is how to understand and use big data. This problem occurs in the first phase and until the analysts of the company have not understood how they will use this new technology in the company they will not be able to choose the technology and the systems that they will implement. Moreover, this problem may persist in the second phase of integration since they must choose a business case and without having understood the possible uses of this technology it is a complicated task. Once the scope of the big data uses is understood, the analysts must work together with the CIO to choose the best business case for the implementation of the system. As mentioned before, an attractive business case from which conclusions and advantages can be drawn clearly and concisely, should be selected.

In the final stages of integration, special attention must be paid to the technical and analytical skills of the teams. In addition, to ensure that the results are correct, quality data must be used, or the results may not be as expected. Getting a good and fluent communication between the different people in charge of each phase will allow everyone to be aware of the business case that is going to be analysed and the necessary data. But the problems do not only have to do with the integration of the systems in the company. There are other factors to which attention should be paid in big data.

The quantity of data has exploded each time humans have invented a new way of storage. However, no new storages have been recently created, which has put a limit to big data. Moreover, data is being created by everyone and everything, this is a huge change as before it was created by scientists and professionals. This has made the volume of information boost in the last decade, obliging companies to have more powerful technologies. There are two solutions: process the data in place and transmit only the resulting information; perform triage on the data and transmit only that data which is critical to downstream analysis. New technologies are now focusing in extending the processing capability of computers to enable the effective processing of exabytes. This new technology will need to have parallel processing and new analytics algorithms.

Due to the large amount of information that can be captured today, it is not practical to analyse it all. A filtering should be done to see what information may be of interest and avoid wasting the machines' capacity analysing information that is on no use. Furthermore, more attention should be paid to anomalous data and data which is outside the limits, which could indicate that there are problems in some process. The main problem of external data used by the company is to make sure that it comes from reliable sources. External sources are usually necessary to obtain information about clients. It is necessary to find a balance between external and internal information in order to get to a solution that allows the company to make correct decisions (Stonebreaker and Hong, 2012).

The data input process is much easier than the data output one. This is due to the large amount of information that must be analysed (Jacobs, 2009). The input processes can be handled with the actual technologies, but the tools available to add value to the information captured and stored take too much time to extract conclusions from the data. As the data is perishable, the conclusions from the information may be drawn after having made a decision.

Being able to set the quantity of data that is going to be captured and ensuring that the information that will be captured is of high quality of a big issue. It is not simple for enterprises to choose which data is relevant and which can be discarded. In order to set the limits, the company should have enough data to ensure that the dataset enables the analytics methods to give accurate estimations. Finally, if the dataset has good quality information and has a size which enables good estimations, how should the managers of the firm use it to make decisions is another issue that has emerged in most firms using big data.

Another variable that needs to me taken into account and if not may cause problems in the future, is the scalability of the technologies used. Although there are limits to technology, they are usually far away from the quantity of information most companies use. When investing in big data the future of the company should be taken into account as expansions in the business must be done in the big data technology that the company has at the same time.

Finally, there are security and compliance issues that have not been solved yet. Individuals are not always willing to give their personal information to companies as they do not feel safe doing this. In addition, governments are passing new laws to ensure that companies do not have too much data about their customers. A solution that has been created to avoid companies knowing their

clients is to randomize the information they capture. It has not been fully developed ad companies are still researching for new methods and techniques to avoid privacy issues.

3.4.9. An overview of technological solutions

IBM Watson

IBM proposes several products so that companies can get the most out of their information. It offers a portfolio of big data and advanced analytics solutions that customers can contract as a SaaS. Among the solutions offered by IBM, there is a predictive analytics software, a database service that ensures uninterrupted access to the information stored, or the IBM Watson that allows its users to analyse all the information through different channels: social media, emails, call centres... Although IBM offers many solutions in this section, we are going to focus on the IBM Watson.

IBM Watson offers its users a simple way to analyse all their information and show patterns that are relevant for the company. In addition, it offers a service in the cloud to store all the information and reports that are created. In this section we will explain the advanced analytics part, since the main solutions in the cloud are explained in the previous section.

IBM Watson appeared in the market in 2015, and offers different versions among others a free version, a personal, and a professional one. IBM Watson uses advanced analytics to understand the information that the company has captured. IBM had already launched these types of products such as the IBM SPSS and therefore IBM Watson has benefited from this experience and uses this technology that has already proven to be very useful in statistics.

IBM Watson Analytics is one of the IBM Watson applications that allows users to visualize data and perform predictive analysis. Its main use is to find patterns in the data of the company and to be able to understand quickly all the information that has been captured. IBM Watson Analytics allows businesses to explore information, reveal relationships between data, check correlations and develop future situations. Watson Analytics uses advanced statistics software that allows predicting actions according to the different scenarios that the user wants to check. Thus, the company that uses it will be able to check in advance if its next movement is going to have the expected results or if on the contrary it should be rescheduled and changed.

IBM Watson Analytics does not use machine learning, it is simply based on the information it already has in order to discover the factors that are most likely to influence the results. Furthermore, it offers data visualization templates so that the user can understand the analysis graphically. An example of an analysis performed by IBM Watson Analytics appears in Figure 29.

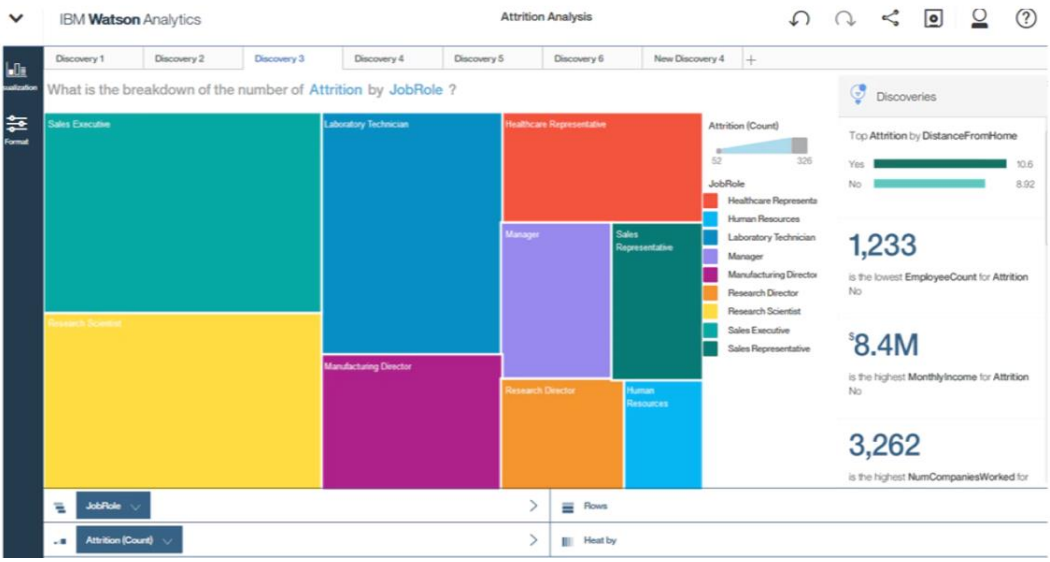

Figure 29: IBM Watson analysis

By using IBM Watson Analytics, companies do not need to understand big data or advanced analytics, thanks to automated predictive analytics, the company can explore what is generating results. In addition, Watson Analytics allows a dialogue in natural language to discover new knowledge that is in the company's data. It is important to highlight that the information obtained through Watson Analytics can be viewed from anywhere and by any member of the company.

Another feature offered by IBM Watson is Analytics for Social Media, which can use analytical technology to understand the data in different social networks. In this way, the company can obtain a comprehensive view of consumers, the market and competitors in an updated manner. Understanding consumer changes is a fundamental part of any business. Through Watson Analytics for Social Media companies can understand the needs of consumers and thus be able to offer them the best product.

As explained above, the analysis of social networks has become an essential part of any business. Watson Analytics for Social Media automatically creates data visualizations through which the company can reveal valuable information. The user can identify a topic and obtain all the relevant results that exist in social networks. In addition, it allows comparing different trends that are occurring in the market to obtain new knowledge about its competitors. Watson Analytics for Social Media allows the company to obtain current issues that are being discussed in social networks, as can be seen in Figure 30.

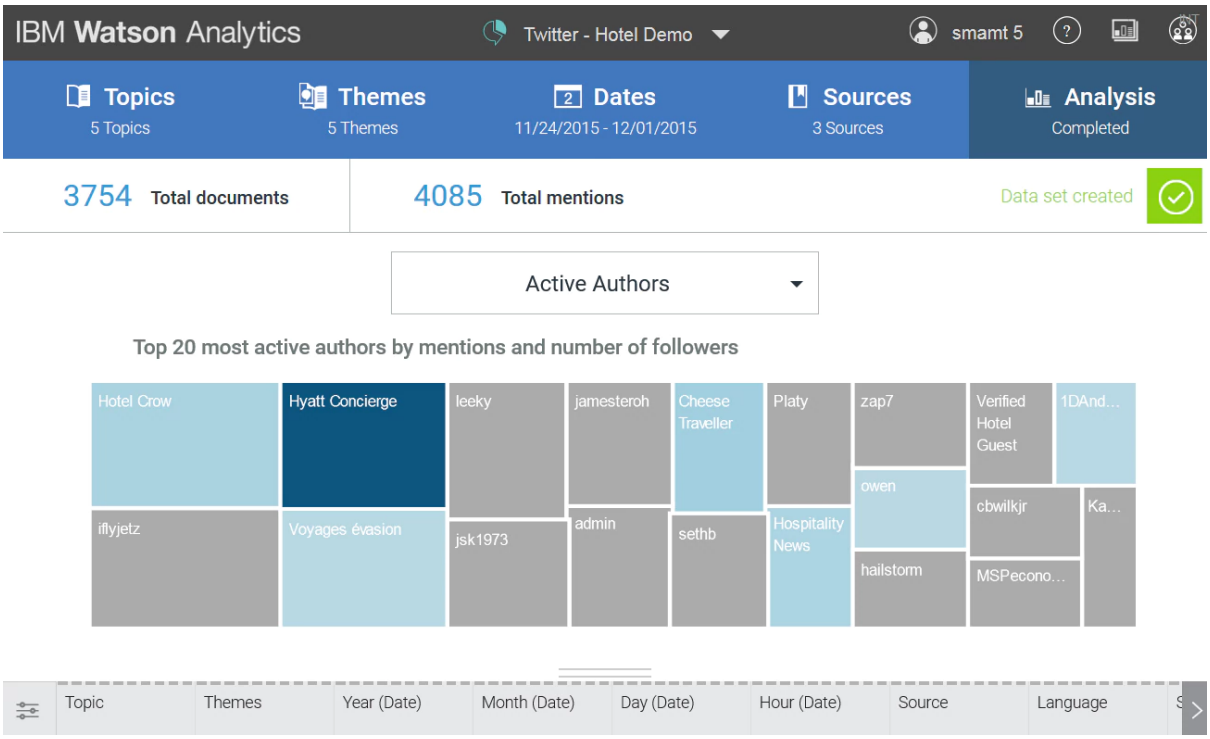

Figure 30: IBM Waston Analytics

In addition, Watson Analytics for Social Media allows the firm to identify comments by classifying them as positive, negative or neutral. In this way companies can see the opinion of customers about a certain product. Businesses can also use this IBM solution to compare the opinions of different customers about a product or service. The main advantage of all the products offered by IBM is that they can be used together. Therefore, a user can analyse social networks and at the same time observe the results when changing your business. IBM offers many other services that can be used together and pay according to their use. There are many companies that are already taking advantage of this advanced analytics solution to be able to better understand the market in which they play and their customers.

An example of an IBM Watson success story is Turkcell, a mobile phone operator in Turkey, which needed to improve customer retention. For this Turkcell decided to use IBM Watson Analytics to be able to analyse all the contracts documents of their clients and thus be able to understand the preferences of each one of them. One of the main problems of Turkcell is that it stores sensitive data that has many regulations behind it, so it cannot be stored in a public database. Through the use of the different tools proposed by IBM, the company has been able to store all its data in a consistent way since it has been given the same format to all of it. This way, it can be ensured that the data is being kept according to regulatory measures and can also be analysed more easily. Thanks to Watson Analytics, Turkcell has been able to improve marketing as they have been able to better understand the communication preferences of their customers and thus create a marketing system that allows each person to be treated differently.

Google Analytics

Another company that has developed big data and advanced analytics tools is Google. The technological giant has created Google Analytics, a web analytics tool that allows its users to know all the information on their website. A company can obtain easy-to-understand reports on the different users and their behaviour on the company's website. This enables the firm to measure traffic during a marketing campaign or the time spent by each connected user. All the information collected by Google Analytics is shown to the company in a simple way so that the user is able to see the trends of their consumers. Google Analytics offers analysis tools that allow companies to analyse their content, social networks, conversions or even the different advertising campaigns of the company.

By analysing the content of a web page, the company can understand how customers move on the website. Businesses are able to know the time clients spend in the web page, or the number of searches they need to do to find the information they need. In addition, Google analytics allows companies to analyse the speed of the website to ensure that customers do not encounter a slow page that can negatively influence the company. It also allows the company to know the route that visitors make on their page, they can analyse where they click, and which brochures are downloaded.

Google Analytics has a tool for analysing data from social networks (Figure 31). Through this tool a company can measure the impact it is having on social networks. This way the company can comprehend the social networks their users prefer to focus their attention on social networks more visitors pass through to get to their webpage. It also lets the firm know the information shared by visitors and through your social network they do it. The data obtained through social networks after being analysed by Google Analytics provide a comprehensive view of its content and the community of users of the company. In the following figure you can see an infographic of a social network analysis done by google analytics.

Figure 31: Google Analytics

Google Analytics also has an advertising analysis tool through which companies can learn the effects that their marketing campaigns are having on their results. Companies that know information about their marketing campaigns may direct them to each segment of customers in different ways. This will allow to increase the conversion ratio and reach more customers. In addition, it enables the company to analyse the advertising information through each channel and see how the different channels work together. So, Google Analytics allows the company to know which advertising channels work best and which are less effective in order to improve them. Google analytics also allows the firm to evaluate the different marketing campaigns that are carried out to see which ones are profitable. This tool allows the company to track the data in real time and also allows them to track offline campaigns that direct their users to the company's website.

Like the rest of the solutions offered by the different technological companies, Google Analytics allows the interaction of the different tools in a consistent way. It also offers a storage in the cloud that enables users to access their information from anywhere.

The company Amari has used Google Analytics to improve its results in the hotel network. Amari hotels It is a Thai hotel company in Asia and the Middle East. They needed to understand the effect that marketing had through the different channels in order to optimize it. That is why they decided to use Google Analytics to analyse all the marketing channels they were using. For this they used the Multi-Channel Funnels tool, which allows them to know through which channels their customers were interacting in the last 30 days before making the purchase.

Amari Hotels could understand how visitors arrived to book through the different channels. They discovered that more than half of the users visited the website more than once before making a reservation. That is why they decided to change the website in order to give the information that most visitors needed on the main page. Thanks to this change they could see a 44% increase in

their reserves. They also increased the amount of advertising that was offered to customers who had already visited the page once to give them information about their search and possible reservations. So, they managed to increase the number of reservations by 11% during the first month.

3.5. Cloud computing

Cloud computing is estimated to grow from 67b$ in 2015 up to 162b$ in 2020 (Columbus, 2017). This is a reflect of the importance of this type of technology, from which many companies at benefiting. Around three quarters of CFO's have stated that cloud computing will have one of the most measurable impacts on their firms. Companies all around the world are using cloud computing to create a globally-based integration of their services (Gartner,2017). This is the reason for which cloud computing will be studied in this document.

In order to understand cloud computing, a definition and the main characteristics will be given. Then the different possibilities of cloud companies can use will be described to understand the pros and cons of each type of cloud. Afterwards, the architecture of cloud computing and the different options companies have when using this type of technology depending on their knowledge of the environment and of the technology already installed, will be analysed. Finally, the main issues and challenges cloud computing is facing will be depicted, and the main technological solutions offered by companies will be studied.

3.5.1. Definition of Cloud Computing

Akin to other terms used in this document, there is no single definition for cloud computing; it is an umbrella term that is continuously changing as technology evolves. Hitherto, various authors have defined cloud computing, but this definition will be modified in the following years (Rimal and Choi, 2009). Cloud computing is a new term that started to get known on the late 2007, as it offers an IT architecture and infrastructure which is highly flexible and from which many companies are able to benefit (Wang et al., 2008). Cloud computing includes a number of applications that are offered as a service to customers, and the hardware (data centres) which are indispensable for the offering company to be able to provide a cloud computing service (Armbrust et al., 2010).

Bhardwaj, Jain and Jain (2010) define cloud computing as the sharing of computing resources, including compute servers, whose capacity is offered to the public at a flexible pay as you use tariff. Similarly, Wang and Von Laszewski (2010) refer to cloud computing as a group of services that form a computing platform which is provided in a scalable manner, giving the consumer the possibility to customize the service, making the platform accessible in an easy way and at a low price.

Cloud computing have been a natural evolution of IT services used to control and manage data in an automated way (Wei et al., 2009). This technology has been enabled by virtualization technologies and helps balancing workload offering the possibility to pay only for the services used. Finally, the National Institute of Standards and Technology (NIST) (2009) defines cloud computing as a group of computing resources (networks, data centres, memory, storage,

applications, routers and servers, services…) which are shared, giving clients the possibility to change their service when needed in a simple manner.

As It can be seen, there is no single definition for cloud computing as there are no limits for the term. Every author sets different boundaries and considers different services when describing cloud computing. Notwithstanding, all definitions have some common points which are the main characteristics for cloud computing services nowadays. These characteristics are described in the following paragraphs.

3.5.2. A characterization of Cloud Computing

Companies willing to use cloud computing services need no upfront investment as they are using another company's resources and will only need to pay for the services they will utilize (Zhang, 2010). This gives small companies the opportunity to easily start and increase their capacity when they grow and more IT resources are needed (Armbrust, 2010).

Cloud computing offers companies the possibility to rapidly allocate and de-allocate resources, this means that companies will only pay for the services used reducing the operation costs (Zhang, 2010). Giving companies the possibility to pay for the resources used enables a better utilization of the IT resources, saving energy and dwindling the cost for both the company offering the cloud service and the company using the resources (Armbrust, 2010). Furthermore, cloud computing offers customers the possibility to allocate costs, moving capital expenditure to operation expenditures (Bhardwaj, 2010).

Cloud computing offers the possibility to quickly expand capacity enabling companies to add resources to their network when there is a peak in demand (Zhang, 2010). This is especially interesting for companies that have large batch-oriented tasks as they are able to extend their IT network quickly and meet demand. In addition, companies are able to do this expansion are a reasonable price as they will only pay for the resources they use (Armbrust, 2010). The flexibility to use resources on demand avoids having underused resources when demand is low and losing customers when demand is high as the firm is not able to meet demand with their actual IT resources.

Another characteristic of cloud computing is that it is accessible through any devices that is connected to the internet, giving companies offering cloud computing services the possibility to have their data centres in low cost locations. It also allows offering business the possibility to have international networks as their service can be reached throughout the entire globe (Zhang, 2010). Bhardwaj, Jain and Jain (2010) state that one of the main competitive advantage of cloud computing companies is the ability to have a website through which they can offer various applications to a vast amount of companies of all sizes, having their data stored on servers on different sites.

Having to undergo large investments during the firsts years of a company's life increases the risk, therefore having the possibility to avoid initial capital expenditure will cut down risks and expenses (Armbrust et al., 2009). When using a cloud computing service, the firm deviates its business risk, for example hardware failure, to the service provider. The cloud computing providers have more knowledge on IT resources than most of the companies using the service and

can thus manage risk easier and usually with the correct equipment (Zhang, 2010). Furthermore, by outsourcing most of the data storage a firm can reduce training costs as there is no need to undertake maintenance actions over their IT resources, this will be done by the service provider company (Rimal and Choi, 2009).

The architecture of a cloud computing service will be described in detail in another section, but one of the main characteristic is its layered architecture. The different layers provide a division of the responsibilities and helps focus the owner of each layer on a specific part avoiding too many responsibilities on one single person (Zhang, 2010). Having a layer architecture also reduces risks as each layer is managed by a different person who will have a greater expertise on it that if they were the owners of the whole service.

In conclusion cloud computing services offer a flexible IT resource network from which companies can choose the services they need to utilize and pay only for the consumed resource. This dynamic resource assignment transfers risks to the offering company decreasing risks and costs for the customer firm. (Al-Fares M et al., 2008).

3.6. Cloud Computing typologies

Cloud computing services can be classified into 4 different categories: public clouds, private clouds, hybrid clouds and virtual private clouds. In the next paragraphs these categories will be described.

Public clouds are offered by providers to the general public, giving them the possibility to use their IT resources, only paying for the services used. In a public cloud IT resources are offered through a web application in which consumers can choose the services they need (Rimal and Choi, 2009). The principal interest of this type of cloud is that consumer firms avoid capital expenditure on infrastructure and fend risks off. Nevertheless, data used in the services offered are not controlled by the consumer company, increasing the risk of data leakage. This is one of the main issues that will be discussed on a further section, along with security settings which cannot be controlled by the user (Zhang, 2010).

There are also private clouds, which allow users to have an exclusive use of the system (Wood et al., 2009). This cloud can be managed by the company itself, such as Google, which has all its data in a private cloud, or it can be managed by a third party (Sotomayor et al., 2009). Companies that have developed enough technology to manage this type of cloud, will surely want to self-manage their cloud to be able to put the security controls and the protocols they choose. On the other hand, companies that do not have sufficient capacity and knowledge will use the cloud services offered by another company.

Private clouds offer a high level of security control and control over performance of the company, but are more expensive than the public cloud, thus, it does not offer so many economic advantages (Jadeja and Modi, 2012). This is reflected mainly when starting a business, since a private cloud requires a fairly high investment (Zhang, 2010). Companies that use private clouds handle all their information and have no bandwidth restrictions or legal requirements that public clouds have (Rimal and Choi, 2009).

Finally, there are hybrid clouds, which are a combination of public clouds and private clouds (Goyal, 2014). This type of cloud is preferred by most companies, a study by Avanade showed that more than 70% of companies that use cloud services have opted for this option. The hybrid cloud combines the best of the private cloud and the public cloud, users have access to resources that pay according to their use, but with the level of privacy of private clouds (Zhang, 2010). This type of service allows companies to create new applications without having a fixed demand and at a low cost. In this type of cloud, businesses that employ them must achieve a balance between external suppliers and own contribution (Rimal and Choi, 2009).

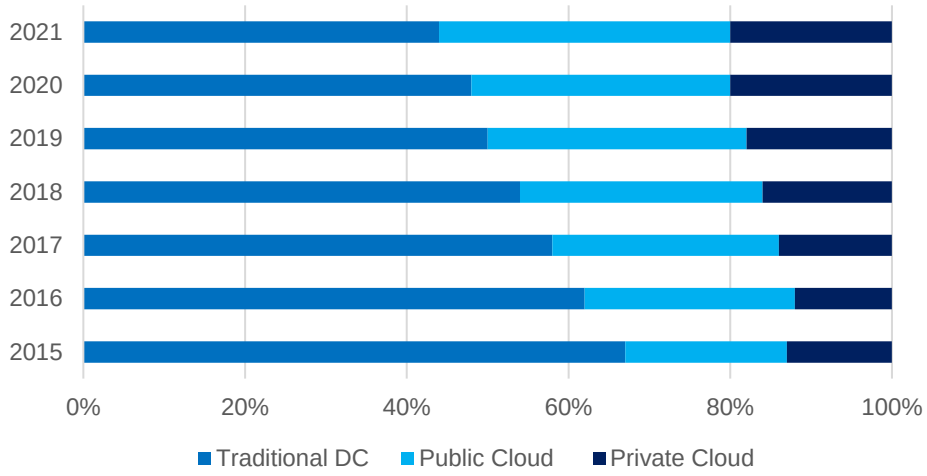

Figure 32: Evolution of cloud infrastructure

As it can be seen in Figure 32 companies are changing the way they store their data. In 2015, up to 63% of companies used traditional databases, giving a competitive advantage to companies that had invested in this type of technology (Columbus, 2017). On the contrary, predictions for the next few years will change the rules of the game. Companies are opting to use cloud computing, avoiding having underutilized technological resources and also allowing them to be able to expand their resources when they need it (Goyal, 2014). This way the firms can meet the needs of all customers regardless of the number of servers the company owns.

Furthermore, it can be appreciated that public clouds are the ones that will grow the most in the coming years. This is because they require a smaller investment, leaving large companies that need high levels of security to hire private cloud services. In order to understand the reasons why a cloud is better than traditional databases, it is necessary to understand how they work and the new possibilities they offer to consumers.

3.6.1. An overview of Cloud Computing architecture

Any type of clouds of those explained in the previous section is composed of 4 layers: hardware, infrastructure, platform and applications (Kim, 2013). These 4 layers are offered as a service to consumers: Hardware as a Service (HaaS), Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). As explained above, one of the main advantages of an

architecture divided into layers is that each of the layers has an owner whom is responsible for ensuring the correct operation, thus reducing the risks for the company that hires the service (Catteddu, 2010). Some authors established 3 layers merging the hardware and infrastructure layers since they are usually offered by the same company. In Figure 33 a diagram with the different layers that make up the computing in the cloud can be seen.

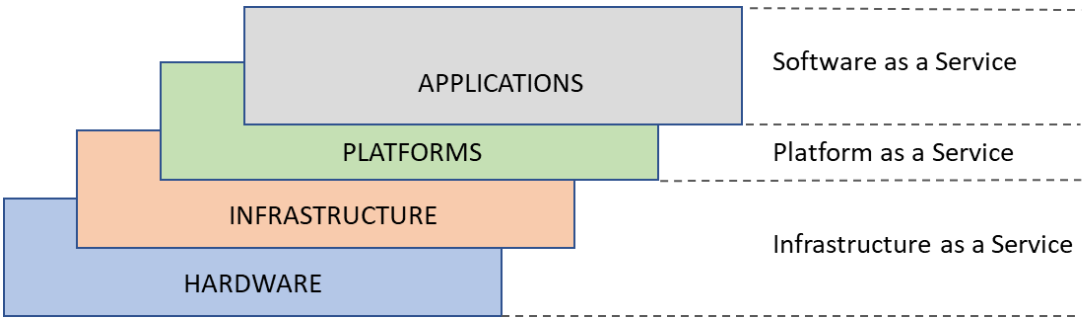

Figure 33:Cloud Computing Architecture

Physical resources are managed in the hardware layer, these include servers, switches, routers, CPU, memory, bandwidth, power, cooling systems… (Mell and Grance, 2011). This layer is usually allocated in the data centres, which contain a vast number of servers and share some systems such as the electricity and the cooling system, reducing their operating costs. Users hire services instead of buying them, sharing data centres with other companies and reducing the company's initial and operating costs (Buyya et al.,2009). Companies send their data through the internet to the hardware supplier company, which performs the actions agreed with the client and returns the data if necessary. For example, cloud computing service providers may offer big data services and they will therefore collect the data from a company, analyse it, extract useful information and communicate it back to the company. This type of service allows reducing costs and risks such as traffic management, power and cooling resource management or hardware configuration.

The next layer that is largely interconnected with the hardware layer is Infrastructure as a Service (IaaS). IaaS allows cloud computing services to offer computer infrastructure as a service, that is, the hardware and software associated with it (Bhardwaj et al., 2010). The IaaS provider offers a completely clean server so that the company who has contracted the service can use it. For this, it is necessary to install the operating system that the company needs using virtual machines. This permits companies to have great flexibility inasmuch they can contract different infrastructures according to their needs and only pay for what they use (Khajeh-Hosseini et al., 2010). In addition, it allows consumers safe access from anywhere in the world to the service using an internet connection, enabling international services (Dodani, 2009).

IaaS offers the consumer a modular system, which can be adjusted to their needs both in size and speed. Among the typical applications of IaaS are the following: Testing, development, lodging of websites, storage, recuperation systems…

IaaS offers servers that can be configured and set to use in a quick and easy manner, providing the consumer with an environment in which to test and develop their programs (Sadiku et al., 2014). Companies can benefit from this as they are able to rapidly commercialise new applications. Furthermore, as the company grows it is effortless to expand their IaaS and optimize their resources in consonance with their demand. Moreover, executing website with traditional technology is not usually as affordable as using IaaS.

Using IaaS services will prevent companies from investing high quantities of money and resources to have storage and to manage it. It will also avoid the need for trained employees or new recruitment. When outsourcing the IT infrastructure, the firm offering the IaaS service will be in charge of all legal requirements avoiding over costs to the customer company (Mazhelis et al., 2012). In addition, the service providers will ensure that backups of all the information uploaded in the system will be done in a regular basis, shunning storage and memory costs.

As aforementioned, companies nowadays collected huge amounts of information which will be used by the application created in the IaaS environment. Mining all this data requirements hefty processing capacity and therefore companies used to have slow data processing or underused IT resources (Moreno-Vozmediano, 2012). With IaaS business can hired more processing power when needed broadening their processing capacity and obtaining useful information in an economic way. They can scale capacity in a short time period and thus control unpredictable demand (Bhardwaj et al., 2010).

As explained before, the main advantages of IaaS are the reduction of costs and risks, as well as the possibility of paying only for what is used, making better use of the existing infrastructure and reducing the cost of electricity. In addition, it allows companies to focus on their key activities without the need to invest time in IT and training employees to manage technology. IaaS permits to innovate more quickly and reduce the time needed to get new applications to users faster. Moreover, IaaS achieves high availability and business continuity, and reduces recovery costs in case of having problems with IT resources. Finally, IaaS helps companies develop their own application without setting any boundaries to their needs, this is why it is the first layer (together with hardware) of cloud computing and is the furthest way from the end user.

The third layer of cloud computing is the platform, which is also offered as a service (PaaS). PaaS provides a platform and environment that allows developers to create applications and services that work through the internet (Dillon et al., 2010). PaaS services are hosted in the cloud, and users can access them simply through their web browser.

The PaaS model allows users to create software applications using tools provided by the system supplier (Sellami et al., 2013). PaaS services can consist of preconfigured functionalities to which customers can subscribe, choosing the functions they wish to include to solve their needs and discarding those they do not need (Siemens AG, 2016). Therefore, companies can create their own application without undergoing expensive investments on technology nor training or recruiting employees.

Companies are able to use applications from other users and customize them to meet their needs. PaaS giving integrate systems for the hiring companies to utilize as components of their

applications, reducing the time need to create and launch a new application. In addition, developer may work with each other to reduce the amount of coding needed and share different systems and tools dwindling the time need to program the applications.

Similarly, to IaaS, PaaS allows companies to analyse vast quantities of data, captured by IoT systems or from data bases, in order to find trend and patterns and be able to foresee possible future trends (Lawton, 2008). Such services are useful for companies to predict results and prepare for peak demands, inventory necessities and even to design and launch new products to the market. Ultimately, PaaS may offer other services that improve a company's applications, such as, workflows, security or programming (Beimborn, 2011).

Thanks to PaaS, the companies that hire this service are able to reduce the time needed to code applications, since they have a great variety of tools and pre-programmed applications. In addition, companies can collaborate with development teams that are geographically distributed in a simple way. This type of services enables businesses to improve the life cycle of the applications with efficiency and allows the development in all types of platforms: mobile, PCs, explorers ... which of special importance in the new Age of the Customer, where companies must be omnichannel.

The last layer of cloud computing architecture is the software, that is, the applications used by the consumer (Cusumano, 2010). It includes any program that can work in a browser, in this way the users of the contracted applications can access and work with the software remotely through the internet (Fox et al., 2014). The service provider manages the hardware and software and, with the appropriate service contract, will also guarantee the availability and security of the application and its data.

Some of the most known SaaS services are web based electronic email such as Outlook or Hotmail (Kundra, 2011). When using these services, the user must login through the internet to access all the messages from any device. The email software is found in the supplier's network and is accessed remotely. Users do not need to understand the coding used to create the software, they are only required to learn how to use the application.

The above example is a free service for personal use. Organisations have many other different services, for instance, they can rent productivity applications, such as email, collaboration calendar; and sophisticated business applications, such as Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), and document management. The firm will pay for the use of these applications through a subscription or according to the level of utilization.

The main advantages of using SaaS, alike the other services described above, is that it does not involve a large investment since the company only pays for the resources that it uses. In addition, using SaaS, allows firms to access very sophisticated applications without having to buy, install or maintain them. Finally, it is important to highlight the accessibility to the services contracted from any place and by any employee, without the need to receive training since they only use the application and do not need to know the coding that backs it up (Armbrust et al., 2009).

As explained before, users of cloud computing do not have to worry about security because in each layer the person responsible for it is the one who guarantees it. Thanks to this layered architecture, users can choose in a modular way the services they hire according to their needs.

Cloud computing is a very recent technology that is very useful for companies that need to manage large volumes of data. But not all are benefits, there are several problems that must be taken into account when using these services. That is why companies must understand how cloud computing works in order to choose the type of cloud that best suits them, as well as the services (explained in the architecture) that they believe are necessary for their companies (Peng et al., 2009). In the next section, the main problems related to cloud computing technology will be explained.

3.6.2. An overview of Cloud Computing challenges

One of the main problems of working on the cloud is that the possibility of having available resources varies according to the number of users that are using it (Grossman, 2009). A few years ago, Google had problems as it was not able to manage the capacity that was being demanded at a certain moment, causing certain companies to not have access to their information (Armbrust et al., 2009). For a company not having availability of their data can generate large losses and that is why using a single cloud has certain risks. One of the ways to solve this problem may be to hire more than one cloud computing service, so that if one of them does not have enough capacity the other can give it to them.

The second big issue that exists with cloud computing technology is security. There are several types of security problems: softwares and APIs, with the users themselves or with the providers. The first threat is due to the fact that most of the data is analysed by external tools and applications, both to the company and to the cloud provider (Chen et al., 2010). The use of this type of applications involves risks such as allowing anonymous access or unencrypted authentication. To avoid this type of problem, application providers must analyse security issues and ensure that authentication access controls take data encryption into account.

Furthermore, there is an internal threat because it is usually the employees of the company who manage all the data (Krutz and Vines, 2010). A disgruntled employee can cause great problems for the company, that is why it is necessary to specify legal clauses in the contracts. When users do not communicate the movements of staff in and out of the company, providers are not able to control internal threats (Kandias et al., 2011). Due to this type of problems they are signing contracts with the provider which users will have access to each type of data to avoid that a single employee has much control over the data.

Finally, the service providers themselves are those that have access to all the data, if the company that hires the service does not know the software the providers could take advantage of it (Dahbur et al., 2011). Due to this fact, they must sign clauses and agreements before hiring the service and it is convenient to know the technical information of the platform. In this way, the company will be able to know who the infrastructure is shared with and what rights the provider has. As the location of the data is not known exactly, the current regulations of the country in which they are located must be consulted with the suppliers to ensure that the storage and processing of the data is done correctly.

In addition, there is the drawback that anyone with a bank account can contract this type of service. Which causes many companies to take advantage and send spam or even malicious code (Sultan, 2010). Having a large contracted capacity makes everything expand very quickly. To avoid this type of problems, a more restrictive registration system should be implemented or companies providing this type of service should monitor customer traffic in order to detect this type of activity (Zhang et al., 2010). Some of the companies that offer cloud computing services have already created public blacklists that allow avoiding this type of misuse of cloud computing.

On the other hand, there are problems with data transfer since it is dependent on the bandwidth that the company has and sometimes transferring a data packet can take a long time. A few years ago, it was proved that it was faster to send hard drives with the information than to upload everything to the cloud. This is why companies should incorporate the latest technology to avoid this type of bottleneck. This same problem also affects the downloading of data since a company may need their data at a certain time and it takes too long for the company to get access to it. In addition, they may have interoperability problems with other types of software. To solve this problem Armbrust (2010) proposes that companies have standardized applications so that users can utilize them with the data they have in the cloud. In this way, data traffic would be streamlined, and companies could derive more benefits from the different applications available.

The technology that uses this type of services can fail at any time, so it is very important to have a data recovery policy (Gonzalez et al., 2012). In such a way, if there is a problem, the databases of the providers must be able to recover all the data in a reasonable time. The contractor of the service should have a clause to ensure that there are replicas of the data in multiple infrastructures so that their information cannot be lost.

As explained above, cloud computing consists in the shared use of an infrastructure with other clients. The provider must guarantee that the data is isolated from the rest of the clients. For this, the company offering the cloud computing service can use techniques such as data encryption. It is important to understand how the data is encrypted before hiring this type of services, as poor data encryption can cause data loss or problems with the availability of data. This type of problems would mean great losses in the contracting service company.

As it can be seen, cloud computing technology has many associated problems. Although most companies that offer this type of services are trying to fix them, it is still necessary to wait a few years to see their results. The use of this type of technology will continue to grow and companies that hire these services will be able to better understand how to use them and the necessary security measures to ensure that their data is confidential and safe. Furthermore, technology is changing the rules of the game and therefore cloud computing services will continue to grow in the coming years. Next, an analysis some of the technological solutions offered in the market will be carried out.

3.6.3. An overview of technological solutions

Amazon Web Services

Amazon is an American company known worldwide for its electronic commerce. Its founder Jeff Bezos created the slogan "From A to Z" and since 1994 it has been expanding all over the world

and has been increasing its service portfolio. In addition to electronic commerce, Amazon offers a cloud computing service: Amazon Web Service (AWS).

Amazon offers services through a platform in the cloud, offering its customers computing power, storage or databases on demand (Figure 34). Therefore, customers are able to expand their resources in a matter of seconds and only pay for what they use. AWS offers more than 50 services that companies can hire as they need it when their demand fluctuates. Amazon also offer the possibility of migrating only the data that the company decides to the cloud leaving the rest on the current servers. AWS is one of the largest cloud computing services that includes 54 zones throughout the world making it possible for international companies to manage their data from a single application.

AWS not only offers storage but also offers tools for developers, analysis tools, machine learning applications, mobile services, tools for creating an application .... In addition, in recent years, Amazon has been developing new virtual reality products together with Internet of Things technology. The services offered also have a security system that allows companies to be sure that their businesses are protected.

Amazon Elastic Computer Cloud (Amazon EC2) is a service that offers a virtual computing environment in the cloud, in which the client can choose the size of the resources. This virtual machine service allows users to use other AWS services such as Amazon S3, which provides users with storage or Amazon SQS, which offers a tool that automates the process of sending notifications.

Furthermore, Amazon offers complementary optimization tools such as elastic load balancing, a tool that automates the distribution of data traffic that is sent to each application. In this way the traffic is balanced and the load that is needed in each instance can be reduced as well as the probability of errors that are due to overload. Another of the complementary services that Amazon EC2 offers is the auto scaling that allows to automatically vary the resources used by the company. Thanks to this service, customers only use the number of virtual machines necessary to perform their service, saving costs for the company. Finally, it is worth highlighting the Amazon CloudWatch service, which offers users the real use of Amazon instances. Through this service the user can monitor the memory, the workload of the computer or even the space available in the memory.

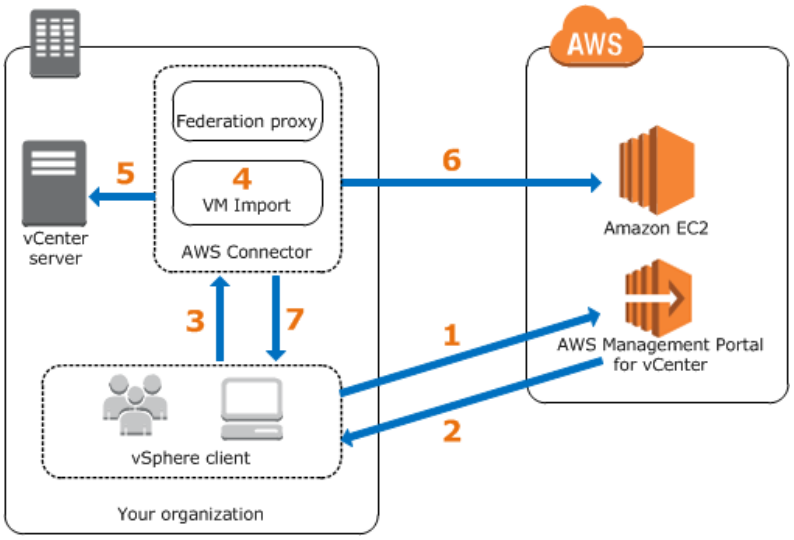

Figure 34: Amazon Web Services

As it can be seen the AWS has a lot of benefits including ease of use, flexibility, profitability, security or scalability. AWS is a very easy to use tool that allows all types of companies to use their tools even if they do not have computer skills. Thus, they can start using the service quickly and safely if the company has an application that already exists or if it is a new application that they are going to create. All the information of the company will be safe and can be reached from any part of the world. It also offers SaaS solutions through which businesses that do not have their own software as they can use Amazon's.

The cloud computing service offered by Amazon is flexible and allows programming in different languages and selecting the operating system. In addition, it gives the client access to different softwares that can use the applications from the firm, in this way it facilitates the migration of existing applications, always leaving the possibility of creating new solutions.

As mentioned in the previous section, one of the main benefits of this type of service is profitability. When Amazon EC2 services are contracted, the client only has to pay for the computing power that he uses, the storage, and the different softwares that the company needs for their application. Thus, small businesses can start their activity without long-term contracts or large outlays of money. In addition, thanks to the complementary tools created by Amazon, each business will be able to expand or reduce the resources it has hired according to the demand they have at each moment. Amazon ensures a continuous connection as well as access to resources whenever the company requires it. Finally, it is important to say that Amazon uses an integral approach that allows to protect all the infrastructure including data and applications since it uses physical, operative measures and softwares.

There are many companies that have trusted Amazon Web Services and have hired their services. A success story is IE (Instituto de Empresas), an international business school based in Madrid. They needed to create an online platform to provide their students with all the necessary material for their studies. That is why they had to organize communications with the different telecommunications service providers. In addition, the school had problems due to the number of

Wi-Fi users and the bandwidth that sometimes was not enough. IE sought to create a platform for quick and reliable access for all its students regardless of their location. For all this they decided that AWS offered what they were looking for.

They started using Amazon Web Services in 2012 for which they had to implement the databases they already had, doing this in less than 5 months. Additionally, a connection was created in which while one database worked the other could be updated. AWS offers 8 servers, including three web servers, a file server and a last one to load CRM information. They also hired a web service to create the application and ensure communication between databases. Among others the Instituto de Empresas uses Amazon Elastic Compute Cloud and its tools.

Thanks to the Amazon service, the access of the students of the Instituto de Empresas to online videos has been improved. The predictions of the number of users who will be connected have been revamped in order to scale the necessary servers, in this way the hardware cost has been reduced, since to be able to offer a safe service that does not require failures, it would have been necessary to invest much more in hardware. Thanks to AWS, the Instituto de Empresas has a 99.9% availability in its online services and access time has decreased by more than 30%.

Microsoft Azure

Another example of a cloud computing technology solution is Microsoft Azure, a platform created by Microsoft. Azure is a platform in which companies can implement their applications to use them in a simple and scalable way. This solution allows its users to have different applications without the need to create or maintain them, users should only be responsible for uploading the necessary information and improving their business. Microsoft also has many applications: it has a database called SQL Azure, which stores all the information used by the Microsoft Azure application (Figure 35). It also has a "Service Bus" service that allows users to connect different applications in the cloud, or applications already created by them with other applications in the cloud. Finally, this Microsoft solution has an access control centre that allows users to give access to other people, such as employees, so that they can use both the applications and the company's data.

One of the main advantages of Microsoft Azure is that a business can create a web page and thanks to the Azure platform this application can be used by few or many people since it allows the application to scale. Azure has more than 100 different tools that allow companies to interact with their users through different platforms with a consistent integration of their data. It also allows the development of applications and websites, updates of these and easy administration. It offers companies that hire the service, virtual machines and content delivery network, which allow users to have a 100% secure transfer of information; express route, which offers private network fibre connections; traffic manager, which allows users to control data traffic to optimize it and ensure its availability at any time and from anywhere. In addition, it offers storage services to store data in the cloud in a lasting manner: Backup, which generates backup copies of servers in the cloud; Site recovery, which ensures the company protection and recovery of data and applications created in the cloud; or Queue storage that offers the possibility of scaling applications depending on the traffic they have.

Figure 35: Microsoft Azure

Additionally, Azure offers a hybrid solution so that companies can migrate their data progressively. So, a company that has databases can continue using these and at the same time use a system in the cloud, Azure allow the coordination between both. It also offers protection systems for local data as well as those in the cloud, avoiding losses and interruptions. Finally, it optimizes the workloads of the physical and cloud databases so that the company saves on expenses.

A success story of Microsoft Azure, similar to the case explained of AWS, is that of the polytechnic university of Puerto Rico. In 2017, Hurricane Maria destroyed a large part of the electrical infrastructure, but thanks to Azure the polytechnic university, it was able to recover its data in less than 36 hours. Due to hurricane warnings the data migration had to be made against the clock. A challenge for Microsoft that made a quick and effective implementation, allowing to save all student data and maintain online services. As the university also has campuses in Orlando and Miami, the integration of information from the different campuses is essential. Microsoft has allowed the expansion and integration of its services until it has created an online platform in which all information is stored securely. In this way, events such as Hurricane Maria will not affect the servers protecting the continuity of businesses such as the Polytechnic University of Puerto Rico.

3.7. Customer Relationship Management

The last piece that a company needs to become customer centric is a Customer Relationship Management system (CRM). As previously explained during the 20th century, production undergoes different changes, as does the process customers do to purchase a service or product. Consumers lost their uniqueness and became a number for the companies, but with the entry of Industry 4.0, firms are changing this, and they are re-establishing connections with each of their customers. This is the reason for which companies need to know how to manage their customers effectively, and thus many of them are implementing technological solutions such as CRM. In this

section what is a CRM system, its implementation, the possibilities that they offer to companies and the risks and improvements they must undergo will be analysed and described. Finally, a technological solution will be studied: Salesforce.com (SFDC) and some success cases.

3.7.1. Definition of Customer Relationship Management

CRMs appeared in the market at the end of the 20th century when companies began to transform themselves to be more customer centric. Fickel (1999) defines a CRM as a technological application used to connect the front and back office with clients. Thus, marketing and sales departments together with financial or operations and logistics departments could be in contact with customers through different channels. As previously explained, some of the channels through which a company is in contact with its customers can be the Internet, emails, telemarketing, Customer Service Centres, advertisements.... Eckerson and Watson (2000) define CRM as a system that integrates all these points of contact that companies have with customers in a data base.

Other authors such as Peppers and Rogers (1999) limit the use of CRM to departments that actually have a direct communication with the client such as sales or marketing. But Goldenberg (2000) does not agree with this vision since it defines CRM as a tool that helps the whole organization and places the client at the core of the company. Gulati and Garino (2000) like Creighton (2000) describe CRM as a tool that allows companies to have a great consistency regardless of the channel used by their customers. In addition, CRM encourage loyal customers to use the service again (Levine, 1993), greatly improves customer satisfaction (Reichheld, 1996), and enhance competitiveness as revenues increase and costs decrease (Jackson, 1994).

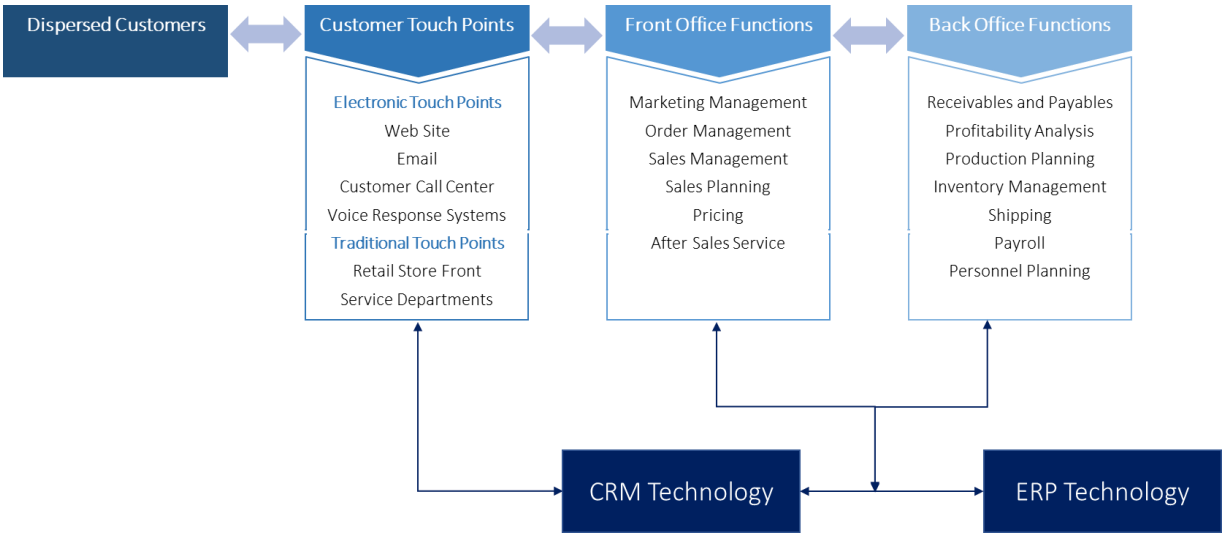

Figure 36: CRM Technology

Figure 36 shows how CRM technology is used to put clients in contact with the company. In addition, a CRM system can contact suppliers to improve the complete service including all stakeholders of the company's value chain (Payne and Frow, 2013). Finally, it is important to highlight that CRM technology is compatible with other technologies such as ERP systems,

offering companies cross-selling opportunities due to the information they use from their customers (Alonso et al., 2005). This type of system offers a complete view of each one of the clients, enabling companies to carry out personalized actions for each one of them.

An example of one of the first companies to use a CRM system is the Ritz-Carlton hotel, in which the requests of the clients during their stays are saved in order to offer personalized services the next time they will be staying in one of these hotels (Chen and Popovich, 2003). Using this CRM system, when a client requests a hypoallergenic pillow, it is stored in the data base and the pillow is offered to him / her at any of the hotels in the network without having to ask for it in their next visit. Another example is Dell, a computer company, that only makes computers that have already been ordered (Acker et al., 2011). Therefore, a customer can personalize their computer by choosing the different components of it and the company does not need to accumulate inventory. When the computer has been manufactured, the client is informed, which can follow his computer through the transport network used by the company to distribute them. This has been achieved through the integration in a CRM and an ERP of all parts suppliers as well as computer suppliers. Hence, the company has managed to reduce costs, offer a customized system and increase customer satisfaction.

3.7.2. A characterization of the enabling technologies of CRM

CRM systems have been possible thanks to 3 technologies of great importance: data warehouse, ERP and the internet. Thanks to these, it has been possible to create a method to link a company with its suppliers, its customers and its stakeholders (Hammer and Champy, 1993). The key to this type of systems is information, which allows to create personalized products, innovate services and calculate the value that each of the clients has for the company (Peppard, 2000). Nowadays, companies that have a CRM system can focus on the client which are more probable to be profitable increasing their sales and therefore their revenues.

The technology of the data warehouse allows companies to have access to customer information through the different databases of the company. This technology not only extracts information from customers but also transforms it so that it can be used by different departments (Eckerson and Watson, 2000). Thus, a database is created that contains all the interactions between the company and its customers. This type of technology allows to capture information about the client in a continuous way avoiding companies to have to spend money on marketing research tools. Data warehouse consolidates and transforms customer information to extract trends and patterns that the CRM system can use, which is why it is one of the most important technologies for the proper functioning of CRM.

Enterprise Resource Planning (ERP) is a software that organizes and manages a company's business processes by sharing information across functional areas, integrating business processes, facilitating interaction and providing benefit to global companies. If this type of technology is implemented correctly, a link is created between the different areas of the company, such as management, manufacturing, human resources, financial services and distribution. It also includes suppliers and providers, so that all participants in the value chain have access to all the information, thus giving greater visibility to everyone (Chen, 2001).

Although it may seem that ERP and CRM systems are the same there are many differences (Jiang, 2009): ERP systems focus on back office functions, while CRMs create a link between front and back office and customers. While ERP systems allow the integration of all functional areas, CRM systems offer an optimization of applications and points of contact with customers increasing user satisfaction and increasing the profitability of the company. The CRM systems can benefit from the information of the company obtained and organized by the ERP system, focusing only on the clients and their characteristics.

The technology that has helped the most to the development of CRM systems is the internet. Before its creation it was impossible to communicate a message to millions of people in a cost-effective way, with personalized messages. Today's customers are informed and have access to a large amount of data about the different companies and the products they offer. That is why they expect companies to offer them the products and services they need, for which companies must analyse all their customers before doing their marketing campaigns (Metz, 2012). CRM systems use the internet's information to understand the needs of their clients (Newell, 2001). They also use the Internet to send personalized offers to each of their clients. Another use of the Internet by CRM systems is when creating a consistent system by obtaining information through the different points of contact. Thanks to databases or systems in the cloud companies are able to store all data and use them when necessary. It can be said that without the Internet CRM systems are useless.

3.7.3. An overview of CRM challenges

The new industry 4.0 and the Customer Age have brought with them many challenges that CRM systems must face. As mentioned above, customers have more information than ever, so it becomes more complicated for companies to acquire new customers, to the point that it costs 5 times more budget to acquire a new customer than to retain an existing one. If companies are not able to retain their own customers, they will incur expenses, which may be due, among other things, to information leaks because they do not have a 360 view of the client that allows the company to know their needs. Thanks to the CRM systems, the customer can be known, thus boosting the loyalty ratios due to the integration of the information that can be captured through several channels. Without the use of a CRM system, some of the data may be lost or may not be consistent when the client accesses the company through several channels.

Companies that have not yet been able to change the centre of their business form their products or services may not understand the new needs of customers. Using a CRM system can quickly and effectively identify the needs of the clients placing them at the core of the business processes. In this way companies can retain their customers and they will know their needs at all times.

Companies that are still in the Age of Information, instead of having changed to the customer era, tend to have a segmentation of their business according to their products or services. Companies that have segmented their services in this way will have communication problems because each segment will try to maximize their sales without taking into account the rest of the departments. This poor customer segmentation does not allow the firm to know the profitability that the latter brings to the business. In this way, using a CRM system, sales can be increased through effective management of the commercial department. The different departments will be able to know the

data of each client and will be able to improve the service they offer, by providing clients with the best package of solutions.

In companies where sales are made through call centres, it has been studied that 80% of salespeople forget to contact a potential customer again. Companies that use a CRM system have access to the different commercial calls to customers and can identify potential customers for the company. In this way the company will improve sales. In addition, the CRM system improves reporting processes through a comprehensive performance analysis. Through the use of different KPIs the company can know at every moment the clients and the profitability they are going to contribute in order to focus their sales efforts on the most profitable customers. Furthermore, it also allows managers to know the different indicators that the company uses to see its performance in order to detect possible failures and identify the employees that have the best conversion ratios (opportunities to sales).

Companies that are not able to get information about their customers often have more trouble converting their selling possibilities into real sales. In the competitive market that exists, customers easily switch from one company to its competitor if their needs are not met. Through the use of a CRM system, companies know what their customers' needs are and can offer them the best product or set of products. In addition, the customer retention ratio is improved since customers tend to be more satisfied when their needs are achieved. Companies that have a CRM are usually the ones with the highest customer retention rate because they are able to know their needs and expectations and see how they are changing in order to satisfy them.

When a company is focused on its products and not on the client, it is not able to see the relationships between products and customers. Thus, there are losses of sales opportunities due to the low knowledge of the customers and their needs. Through the use of a CRM system companies are able to provide customers with the best solution even if it consists of several services or products. In this way firms can increase the number of cross sales and they can schedule a personalized marketing for each client.

Finally, one of the challenges faced by businesses in the Age of the Customer is the lack of visibility of possible business opportunities due to the lack of technology which would allow them to innovate. Through a CRM system, the company will be able to visualize the end-to-end sales process, discovering the points in which it must improve. Moreover, firms can predict the needs of customers by having information about them and the patterns that follow. They will also be able to improve the pipeline of opportunities since the system will identify the customers most likely to purchase, and the company will be able to focus their efforts on them.

In short, CRM systems allow personalized communication by sending messages to each client, tracking cases through their customer journeys, and call routing according to the type of case and the client. In addition, it allows the management of the contents thanks to storage of templates, graphic repository and the configuration of campaigns by audience segment. Furthermore, it offers the possibility of scaling the system which can increase the volume of operations quickly, agile and safely thanks to robust technology. Moreover, it permits the automation of tasks simplifying the management processes by reducing the number of clicks and obtaining workflows of shipments

and updates. It also enhances the identification of business opportunities based on case resolution and automation in the launching of commercial actions. All this allows the company to have a 360 vision of the client which will be more satisfied thanks to the specialization and the involvement of the agents in sales activities and to the reduction in service times.

Although CRM systems have many advantages, their implementation is not easy, which is why many companies hire the services of large consulting firms to implement it. An implementation of this type of system causes a change in the company that affects not only the processes but also the employees. This is the main reason why most implementations of CRM systems do not obtain the expected results. that is why an analysis one of the main implementation systems of this technology will be done.

3.7.4. An overview of the implementation process

The implementation of a CRM system is a process that will affect the whole company, the way of carrying out the processes must be changed, and many employees must receive training to be able to use the CRM system correctly. Due to all this, special attention must be paid to all areas so that the implementation is satisfactory. The process that a company needs to follow when implementing a CRM system is shown Figure 37.

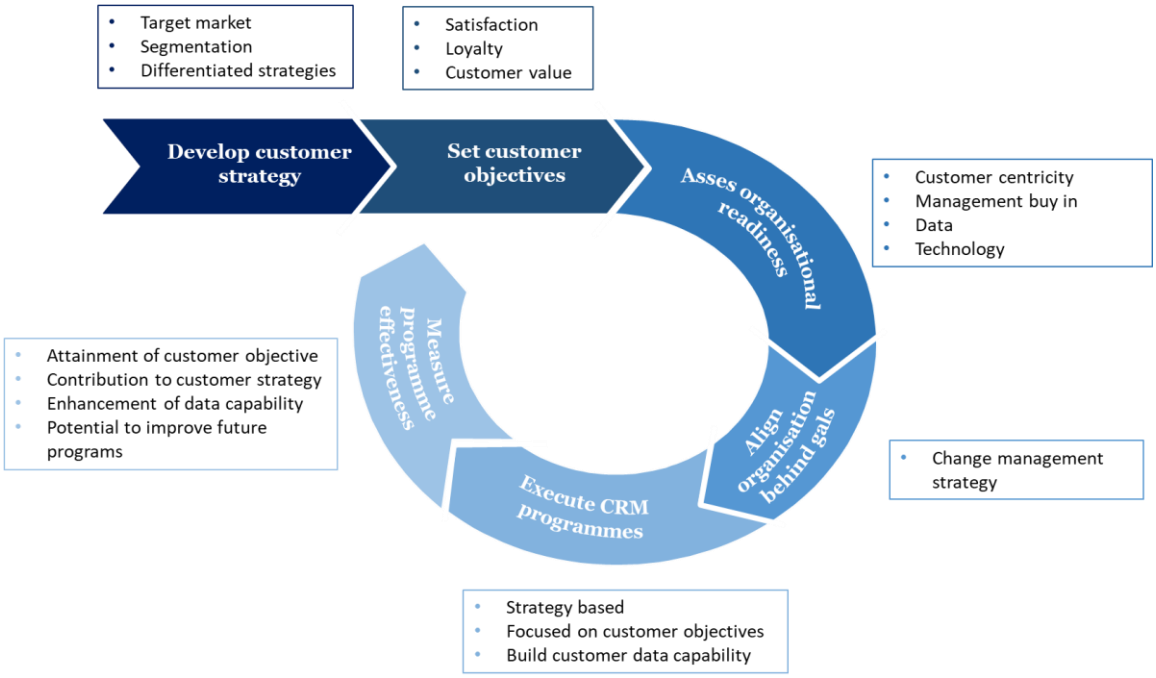

Figure 37: CRM implementation process

The factors that must be taken into account can be divided into three categories: Business, technology and experience.

When focusing in the business the implementation must focus on providing a CRM solution which successfully supports the firm's business goals and process. As to do this key performance indicators (KPI) must be defined, to reflect the impact of the technological transformation for the company. Furthermore, most valuable products and the product roadmap must be identified and

redefined to completely adopt the CRM solution. As to do this first-line managers from different departments should provide expertise about CRM implementation of business processes, and Business experts/middle management belonging to Sales, Sourcing and Operations areas must help with the transformation.

Experience refers to the development of the customer's experience, creativity and "Design thinking" trying to find positive impact in all the stakeholders. It is important to define a performing CRM platform which will maximize user adoption and business value. To provide an improved user experience agile work methodology, that provide flexibility in the developments and adaptability to the needs of the users and customers of the company, are used. An analysis of the user experience must be done before the integration of the technology as to understand their experience from the presale to the post sale activities. This way they can be integrated into the CRM solution helping the company understand how users will be impacted on each scenario and highlighting pain point of the process.

Technology must be used to lever improvements in the customer's experience with a robust and scalable solution. Therefore, the CRM architecture will be different in each company as the data model, hard-coded processes, performance, architecture limitations (technical debt) will differ. A key role appears to help in this part of the integration: Technical Architect, who is able to provide guidelines and detail on the future architecture and the potential impact of the CRM in the existing technology systems. The firm implementing the CRM system must base their decision in finding a balance of costs and benefits for the technological part of the business, and they can do this based in best practices of other companies of their industry.

In conclusion, every major challenge has three critically important lenses that must be aligned the right way in order to help the company to successfully transform its CRM landscape. It is essential to define the KPIs that gather the impact of the CRM transformation for the firm as well as a collection of business processes across all lines, identifying best practices and optimization opportunities. In order to improve the user experience, the company must lean on agile methodologies that will grant the team the necessary flexibility during the analysis and implementation of the system.

Thanks to this methodology, three situations that occur very frequently in CRM implementation projects, change management and adoption of systems or processes can be solved. First, walls can be demolished, since different departments will be involved in the project stages where dependencies arise due to systems integration, requirements taking, validation of functionalities or during the adoption of new systems, through constant communication with the teams. During the definition of processes, it is necessary to evolve the processes that are to be implemented, thus obtaining the maximum performance of the CRM and improving the efficiency and quality of the team's service.

Second, new value will be discovered, instead of working on constant analysis and reviews of how to improve processes, the firms should listen to the client to implement quick wins jointly between users and the company. Special attention must be paid to the relationship between the processes, to ensure that the company transmits a homogeneous message focused on what the end customer

needs and how the company can help. Finally, user acceptance and the scalability of the tools are important since they are indispensable elements in the result of any CRM implementation project. It must be guaranteed that the company will be able to evolve with the new system. For this, the employees of the company must be trained once the implementation has been completed. This way, companies can move from a federated channel model that generates a fragmented customer experience to a model that fully integrates the multi-channel components

As mentioned above, one of the main problems of CRM systems is change management. Many employees will see that their positions may be in danger, making them avoid the changes of the company. A poorly implemented CRM can make the investment done not worthy as the company will need to incur in further costs until the system is correctly implemented. That is why it is important to see all the repercussions of the implementation and that the company is capable of managing the project, risk, dependence, economy and resources.

Project management consists of ensuring that all planned activities are carried out correctly and according to standards. This will allow all the activities carried out in the implementation process to be undertaken effectively. Risk management includes activities related to the control of risks that may appear. These risks must have been studied before the CRM implementation project, and they must also be reviewed during the project as new risks may appear. The sooner the risks are detected, the sooner a solution can be implemented avoiding incurring in large investments. The management of dependencies consists in a management for the communication of the project with the different areas involved. All project stakeholders must know what is going to be done, how it is going to be done and when. To achieve an effective dependency management, it is necessary to have effective communication lines that go from the directors to the employees of the last level.

The economic management of the project is related to the pure management of the project, that is, the management of the changes, the management of resources and the risk management of the project. Through an adequate management of resources, it is ensured that the project has access to the adequate number of resources for the set of skills and experience required. To ensure that the CRM implementation project is carried out correctly, periodic monitoring of the project is necessary, ensuring that all the activities carried out are done correctly.

For the correct management of CRM implementation, it is necessary to take into account eight large blocks of change, which are the ones that will allow the strategy to be integrated correctly in the company. For this it is necessary to use people, processes and technology as levers of change. The eight blocks are: vision of transformation, aligned leadership, commitment of stakeholders, impact of change, communication, training, adoption and sustainability. In addition, cultural changes and the transition of employees must be managed efficiently.

The company that is going to implement the CRM system must define its vision of transformation, that is, understand why they are undergoing the change. Some of the most common answers among the companies in which the last implementations have been made are:

- Improvement of processes and automation of transactional activities in order to create greater strategic value to the business
- Activation of organic growth through the identification of cross / up sales opportunities

- Reorganize the relationship between companies in order to reduce inefficiencies, thus increasing the service capacity to customers
- Improvement in customer service in order to have a competitive advantage in the market

The change must be aligned with the structure of the company so that the directors must endorse the changes and convince the lower levels of the benefits that this change will bring. The Steering Committee serves as a central vehicle of consensus among project leaders to unify design decisions. The monthly reports of the Steering Committee will show the status of the Project. Likewise, the leaders will be responsible for dealing with the activation points of change in the organization. The main levers of change will be aimed at alleviating any resistance between the departments, as well as eliminating barriers to keep the objectives aligned.

The stakeholder analysis details both the members involved and the key groups that will see a change as a result of this project, and their position on the commitment curve to update the future state. A selection of the main stakeholders will be interviewed to understand: a) their concerns b) opportunities c) what they need to lead the change as leaders / managers, and finally the needs that the different departments involved could have. The continuous monitoring of the management plan of the stakeholders will include the different resistances that may arise during the transformation. This will ensure that those involved work in favour of the project and not against it, facilitating the implementation of the CRM.

As the implementation of the CRM is carried out, the impact it has on the company must be measured. The Change Impact Tracker (CIT) is a tool to capture specific changes in the business, identify which stakeholders will be affected and the degree of impact as a result of the implementation. The changes will also have the corresponding interventions to support the parties affected by the change. The impacts of the change are collected from the high-level design phase to establish the initial vision of what will change in the future state. Through the CIT, the main areas of resistance can be identified. The CIT will be updated upon completion of the detailed design of the implementation.

In addition to using the CIT to measure the impact of the change, the Deployment Readiness Metrics can be used, which serve as a scoring system to determine the preparation for the business from the point of view of people, processes and technology to meet the needs of the Go-Live. This evaluation will be done at 90 days, 60 days, 30 days and 1 week before the implementation in order to mitigate the risks, and address the barriers before starting to use the CRM.

Because normally the company that is going to implement the CRM will hire the system and the implementation, the communication between both companies is very important. The communication needs are based on an understanding by the employees of the company of the precise changes that are taking place. That is why there must be a continuous and coordinated dialogue between the teams of both companies to ensure adequate progress of the project. Having a detailed communication plan helps to convey the right message, at the right time for the target audience. This plan must include: Delivery date, communication event, audience, key messages, expected results ...

The analysis of the training needs identifies the training topics and the necessary skills so that the groups of stakeholders of the company reduce the differences of knowledge between departments, and the users prepare themselves for their new system, adopting the new ways of working. The training strategy and the plan detail how and when the training will be given, to which groups, and the vehicles to be used. The plan also includes the necessary training documents: pre-work, exercises, videos, etc. According to the strategy and the training plan, different vehicles will be used to guarantee the retention of knowledge in the employees of the company. The most important will be the training sessions, but short videos on specific functionalities will also be taken into account, as well as agile documentation that will help resolve the doubts of the end user.

The adoption and sustainability of the implementation project of a CRM system must support the stakeholders to incorporate the new systems and processes as improvements, or as an update of obsolete platforms. In addition, they must align and reward the new expectations of performance in sales, marketing or customer service, with respect to the roles and job descriptions of the impacted groups. Finally, the surveys made to the stakeholders must be distributed and discussions should be carried out to identify differences in training, measure satisfaction and develop an action plan to minimize differences in knowledge and information.

Through the correct implementation of CRM and the meticulous management of change in the company, success will be achieved in the adoption of the new system. If the company does not take into account the blocks mentioned above, the implementation of the CRM could not be done correctly, making the investment risky. It is for this reason that an analysis of the company should be carried out in depth in order to manage the change in the most efficient way. This change management methodology is also applicable to the other technologies mentioned in the chapter.

3.7.5. An overview of technological solutions

There are many companies that offer CRM systems today but the best known is Salesforce.com (Gartner, 2017). The company is specialized in SaaS, and although it is best known for its CRM (Sales Cloud), it also offers marketing, customer service or artificial intelligence services. Salesforce offers different cloud solutions such as sales, service, marketing, community, analytics… they can all be observed in Figure 38.

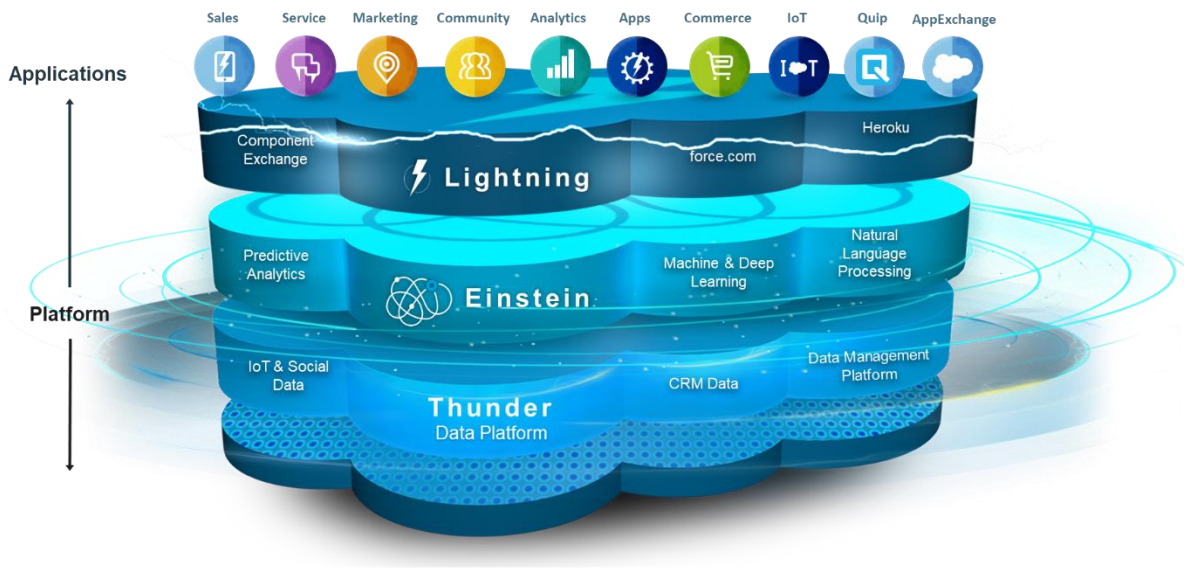

Figure 38: Salesforce applications

In this document, the features of the Sales Cloud and Marketing Cloud solutions will be analysed since they are the ones that most companies are hiring. The Sales Cloud mainly allows to increase customer satisfaction, automate tasks and identify sales opportunities. On the other hand, the Marketing Cloud helps companies to have a personal communication with each client, to manage the contents of their marketing campaigns and to quickly and safely increase the volume of operations. Both tools get a 360 view of each client, thus increasing sales possibilities and customer satisfaction.

Sales cloud

The company SFDC has created the first CRM system based on artificial intelligence. In this way you can analyse the conversations of employees with customers to find patterns and to focus their efforts on the most profitable customers. The system captures all the sales activities carried out in the company together with the information of the different clients. Once the information is analysed, Sales Cloud generates a list of next best actions and possible responses to the client. So, the representatives of the companies are able to focus on creating relationships with customers knowing that the probabilities of selling are much higher.

In addition, Sales Cloud allows to keep the client's information in a consistent way through the different channels. This gives the possibility to different employees to work with the same client having all the information about them. This avoids having to ask all the information about the person before starting the sale. The SFDC CRM system allows you to easily handle the complete sales pipelines, so that each company can adjust its criteria. Furthermore, the system shows the information in a very graphic way so the sales team does not need to waste time searching for information in databases that are difficult to understand and with information in different places. Having the information of each client displayed on a screen prevents problems or errors and therefore increases customer satisfaction.

The main advantages that Sales Cloud offers are the possibility of obtaining a 360º vision of each one of the clients of the different companies, and also without needing to know how to program. This allows companies of all sizes to use the software to build a different customer journey for each customer. Salesforce also offers the Lighting App Builder, through which a company can build applications quickly and efficiently without buying the hardware, software, network ... It is also a provider of cloud services, which as mentioned above allows the companies build the applications according to their needs.

SFDC knows that companies must focus on their key activities and that most do not have computing resources to create applications, that is why it allows access to their clients to the AppExchange. In this platform, companies can exchange different components or applications to create the system they need. This allows companies to keep their applications updated because when the application is updated in the AppExchange it is also updated in their systems. Today, AppExchange has more than 400,000 applications and more than 300 components that can be integrated into Salesforce. An example of Salesforce can be seen in Figure 39.

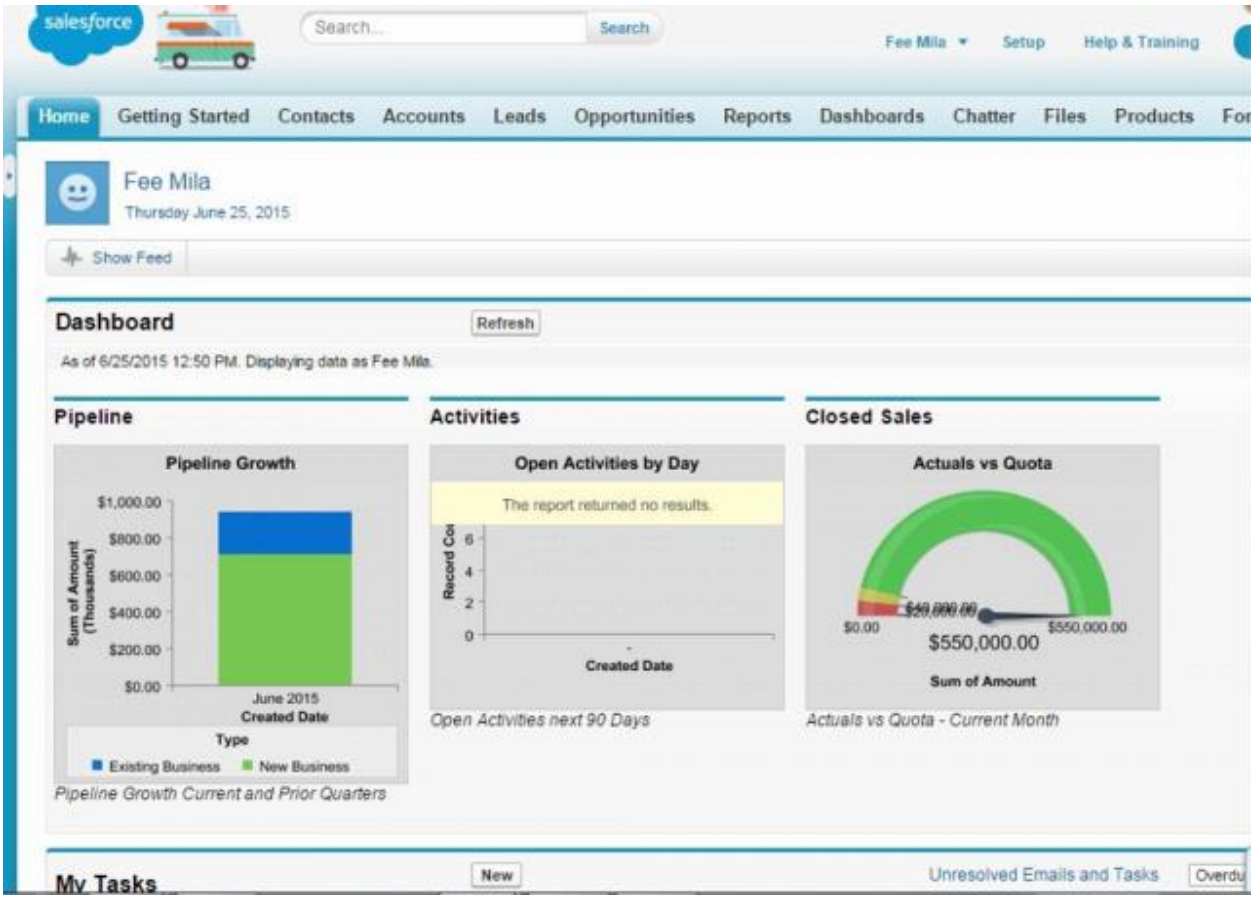

Figure 39: Sales Cloud example

In addition, SFDC has created an application through which companies can connect to their CRM system from anywhere in the world. From the mobile application, companies have access to their accounts, customers and sales opportunities. This allows employees to make sales from all around the globe. A 30% increase in the sales of companies that have mobile vendors has been proven.

Furthermore, the Salesforce Inbox has been created, which allows you to connect the calendar with the email and with the Sales Cloud so that the representatives have at all times the information they need to make the sale, or to send a message at the right time to the correct client.

Another functionality of SFDC is the Sales Cloud PRM (Partner Relationship Management) app. This application allows companies to have all the information about their suppliers, either through the manual introduction of data or drag and dropping website content in the app. Like the rest of applications, the clicks work, and it is not necessary to create code. Einstein Content Recommendations help partners find the right files and the right time. For example, say to partner views to new product overview. Einstein Content Recommendations will recommend to pricing guide, product images and implementation manual, saving partners time and delivering an amazing experience.

Another of the most outstanding features of Sales Cloud is the CPQ, which allows users to configure the prices of all products without having the possibility of making mistakes. It also allows the company to select the best price for a set of products and offer discounts to each of the customers. Also, thanks to the artificial intelligence that the system uses, the firm is able to see the trends in prices to decide when it is better to make a discount or increase the price of the product. Having all prices in a database and knowing all the sales that have been made will allow the company to have more control and reduce the time to perform accounting.

SFDC offers its customers a Sales Analytics system, which allows them to control all the information about the clients so that the employees of the company have all the data they need at the moment they need it. Having such a clear vision of the company allows the detection of problems quickly in order to solve it as soon as possible. In addition, all employees of the company can access the information, so they will be working on the same information and there will be no errors. Offering a consistent service is seen by customers as a high-quality service. They hope not to have to repeat information so if they have to do, their expectations they will not be fulfilled, and they will not be satisfied.

Finally, SFDC offers an application called Chatter, through which the company can contact experts when required. This allows companies to have useful information that they can use in advertising campaigns or even when creating a presentation to sign a contract. Offering employees information that can be useful during the sales process will improve the productivity of the company. Companies that use Chatter in the Sales Cloud to collaborate on selling, see a 40% increase in their employee productivity.

As it can be seen, the Sales Cloud offered by SFDC has many features, but the main advantage is the possibility of connecting the different services offered to put all the information in all the contracted systems. In this way, marketing focused on the client can be carried out according to the information collected by all the employees of the company. That is why a description of the Marketing Cloud offered by SFDC will be given and interactions with the Sales Cloud will be analysed.

Marketing cloud

Along with the Sales Cloud, SFDC offers a Marketing Cloud to their users which is composed of ten applications (see Figure 40): email studio, social studio, web studio, mobile studio, advertising studio, analytics builder, content builder, audience builder, journey builder and personalization builder.

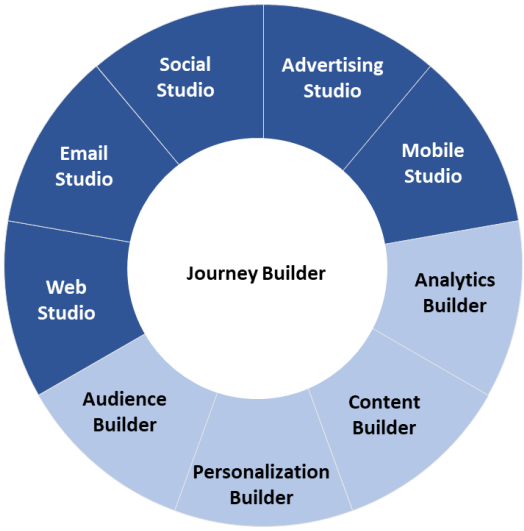

Figure 40: Salesforce Marketing Cloud applications

Email studio is a feature that allows the company to create a 1-to-1 customer journey with personalized email marketing at scale. With this application each client will receive a personalized message at the moment that is most appropriate. In this way, the company can create a message for each client in a quick way, for example it can be customised by entering the customer's name. The system checks that the client is still on the mailing list, that is to say that it has not been unsubscribed and sends the email to the address that comes in the database. This process is shown in Figure 41

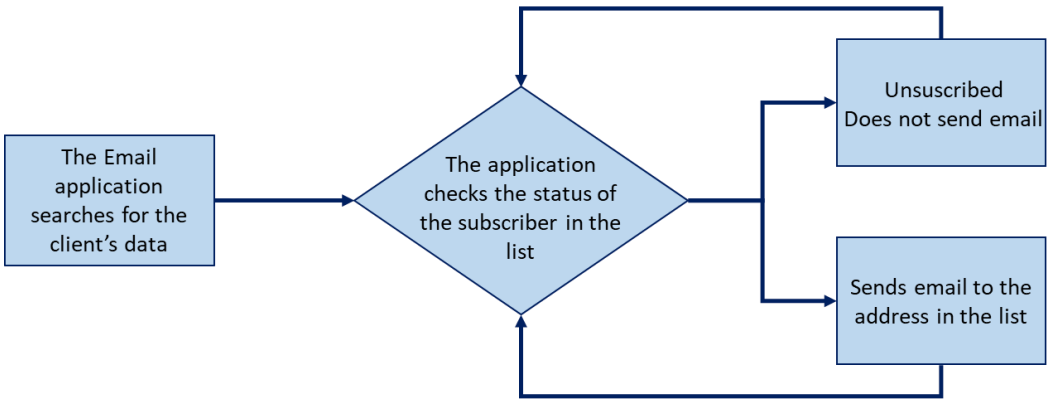

Figure 41: Email sending process

Using personalized emails will allow the company to send the information that each of its customers wants to see, without needing to see information that does not concern them. This will

increase the sales opportunities of the clients and allows to create a customer loyalty system quickly and efficiently.

The Social Studio allows to listen, engage, publish, and analyse customers' conversations on social media. Companies can benefit from the information obtained through social networks, understanding better what the needs and expectations of different clients are. Thanks to this application companies can find new customers and new sales opportunities without the need to invest in technological equipment and without knowing programming. The Social Studio allows companies to increase their sales opportunities since they can base their sales on more information. Companies can interact with the company through the different social media. The application can also be used to do marketing campaigns and promote their products or activities.

The Web Studio offered by the company SFDC allows customers to create personalized web pages. Each client that enters the web page will obtain relevant information according to the type of consumer that is. By offering the right information, the company can increase the number of sales and also improve customer satisfaction as it will find information that is relevant. the application allows you to follow the behaviour of the client when you visit the web page, seeing what information is more emphasized or where on the page you click. Therefore, the company that uses the Web Studio can customize the information that it shows, increasing sales opportunities.

Mobile Studio is composed of three different applications:

- Mobile connect: used to create, send, receive and track mobile messages
- Mobile push: employed to create and send push messages to mobile application users
- GroupConnect: through which the firm can send messages to contacts via messaging apps

It enables users to have all the information on the mobile phone and to be able to send messages through it. In this way companies can be in contact with their customers from anywhere. When a company is able to know the messages that have been exchanged with customers, it is easier for them to understand their needs and expectations and offer them the best product. In addition, thanks to the follow-up of messages, all employees can see which messages have been sent so as not to repeat them and not forget any customer.

The Advertising Studio offered by the Marketing Cloud allows users to create advertising campaigns for the different segments of customers that the company has. Thus, each group of customers will receive personalized offers. When customers have information of their interest it is easier to make a sale, therefore using marketing campaigns aimed at different segments will increase the probability of sale. In addition, through this application the company will only pay for the messages you send without having to incur large investments. Finally, it allows the company to use drafts of other companies in its same sector to launch its advertising campaign.

The Analytics Builder allows users to capture information about how their clients navigate the web page and through the mobile application. This information is shown in the profile of each of the customers, giving the company more information about each of its clients. The company can analyse the researches of the customers or the pages they visit and the time they spend in them.

Also, with this SFDC tool the company can make reports on the different channels and customers. Having this information, the company can get in touch through the preferred channel of each of the clients. The Analytics Builder can also be used to create the different KPIs that the company can use to improve the understanding of its customers. Through the selection of the different KPIs, the company will be able to monitor the activities of its clients and may find fault or improve quickly.

Another tool offered by SFDC in the Marketing Cloud package is the Content Builder through which a company can create the content of its website and its advertising campaigns. For this, the Content Builder gives the possibility of creating adverts, emails, websites... based on a preconceived model which is offered as a template according to the sector in which the company operates. In addition, the tool allows the user to create and edit the content of both the web page and the mobile application, having to edit only the content in the SFDC application. This way, the information that the company wants to show its clients is quickly changed and in a consistent manner.

Since each client is different, all companies need to segment their consumers into different groups. In this way they can use different advertising campaigns for each type of consumer. That is why SFDC has created the Audience Builder, a tool that allows subscribers to be segmented in different ways in order to send them targeted messages. As mentioned earlier this will increase the sales opportunities for the company. In addition, the tool allows the company to create different segments for the same client, for example, the firm could classify them by age, by level of studies or by gender, so the company can send personalized offers to each of the groups.

The Journey Builder is a tool that helps to understand the journey made by users to acquire a product or service. Therefore, it offers the possibility of making a plan of the advertising campaigns taking into account the different channels used by the company. It also allows to personalize the conversations between the company and its clients, being able to treat each client in a personalized way. In addition, this tool allows companies to have triggers points that activate different actions. For example, a recent search by a user could result in a beginning of their journey in which they will be offered similar products, or discounts for that type of product. Figure 42 shows an example of a customer journey.

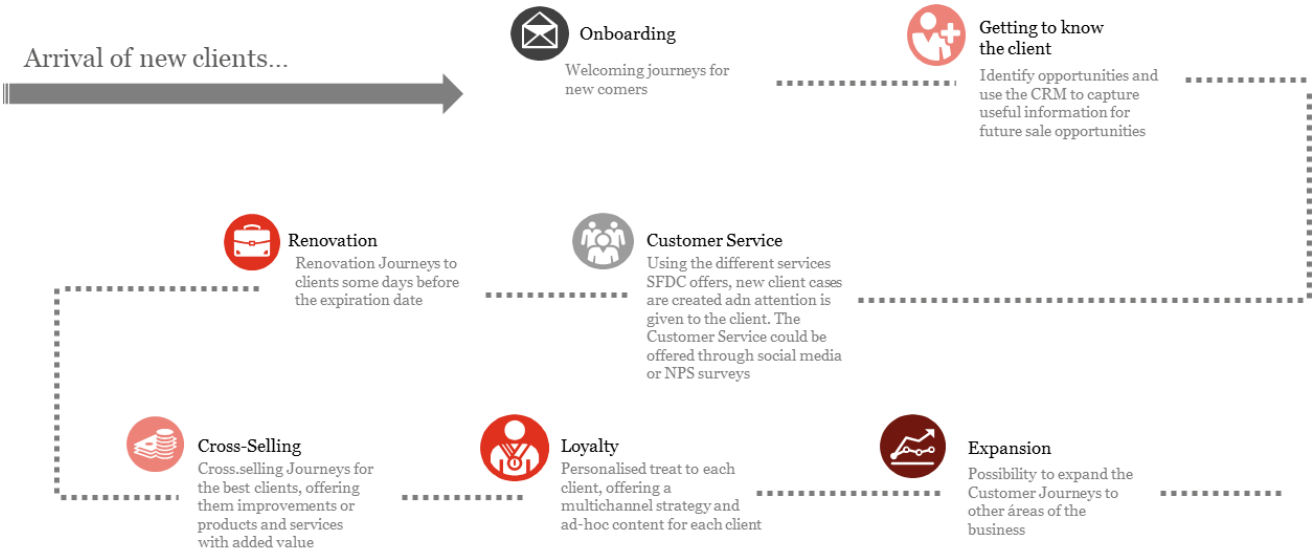

Figure 42: Customer journey Salesforce example

Thanks to an application of SFDC Marketing Cloud called Automation studio, the company can carry out a marketing by stages in which the actions carried out by the company change according to the type of client and the point of the customer journey in which they are located. In addition, the company can have the option of creating multichannel campaigns that allow them to optimize the information sent to the client to ensure that they are receiving consistent information through the different channels.

Finally, SFDC offers an application based on artificial intelligence which is capable of predicting the best way to capture a future sale. Analysing the purchase patterns of the different clients, the Personalization Builder offers a list of best next products. When representatives have knowledge of this it is easier for them to be able to sell a product or service. In addition, the personalization builder proposes different content to each client based on the information that has been collected along the customer journey that has followed.

These are the main tools and functionalities that SFDC offers through its Sales Cloud and Marketing Cloud. The main advantage it offers is to have all the information available in the different tools. In this way, the company is able to get updated information about the different clients in order to predict their future movements and be able to offer them the best product or service. Thanks to this CRM system, most users have seen an increase in sales and customer satisfaction. There are other CRM systems, but none provide so much flexibility and visibility of each of the clients of a company. It has been proven that 80% of the sales teams that use the Salesforce CRM have managed to generate a positive impact on customer retention.

A company that has known how to use Sales Cloud to boost its innovation is Philips. Philips is one of the most important technology companies in the world. They are mainly focused on the electronics, healthcare and lighting sectors. Philips offers its products all over the world, so they have a great diversity of customers. In order to create new innovative products Philips has decided

that it must understand its customers and understand their needs. That is why they are using Salesforce to analyse all the information they capture about their customers in different countries. Philips needs to understand the needs of all customers and be able to compare them all, so it is important that all information is akin and stored in one unique place. Thanks to SFDC Philips can find all the information of all their customers from any store. This allows Philips sales teams to have real-time information from all customers, which gives them a 360 view. The firm also wants to provide their R&D team, supply chain and product groups with information about the opportunities and needs of the customers. Customers are in constant evolution and using the Sales Cloud technology Philips is able to identify trends and needs from their customers. And thanks to Chatter, everyone throughout the different stores of Philips can easily share information and collaborate regardless of the time zone and geographic location. Philips has also started using Marketing Cloud to get to know its customers even better and interact with them through social channels.

Chapter 4: Case study: The Retail Sector

The retail sector includes retail activities to individual customers. Companies in this sector sell a limited number of products to many end customers (Accenture, 2015). The retail sector is the opposite of the wholesale sector, in which companies sell large quantities of products to few customers. In the case of the retail sector, it is a matter of obtaining a large number of customers and not of products sold. This sector includes a large number of businesses such as supermarkets, fast food restaurants, fashion chains or shopping centres (PricewaterhouseCoopers, 2011). In this chapter an in-depth study of the technologies used in the retail sector describing examples of various companies included in this sector will be done.

The retail sector can be divided into three types: offline, online and brick and mortar (Laroche et al., 2005). The offline retailers are those whose business model focuses on the sale of products through their physical stores. Online retailers, also known as e-retailers, use the Internet as a sales channel, without having any physical store (Laudron and Traver, 2013). Finally, brick and mortar retailers use a hybrid model in which physical stores are combined with online sales (Huang et al., 2008).

All these types of retailers have some characteristics in common (Strader and Shaw, 1997). The first is direct interaction with the end user, that is, the company deals directly, with the customer who will buy the service or product, personally. This implies that companies in the retail sector have to guarantee good customer service and a good after sales service. In addition, when dealing with small volume sales, purchases are repeated on a recurring basis. The vast majority of companies in this sector carry out marketing and communication campaigns that are aimed at end customers. Finally, it should be noted that companies in this sector have a large dependence on logistics. They need to be able to control their products and their distribution networks in order to optimize their processes and reduce their costs.

The retail sector is of great importance as it affects a large number of customers. Worldwide sales of this sector exceed 19.5 trillion euros (Orange, 2016), which continues its growth especially through online stores. It is expected that by 2019, electronic commerce will exceed 3.6 trillion euros, accounting for 12.8% of total sales in the retail sector. As technology becomes increasingly important in the lives of customers, the e-commerce sector is gaining importance. Globally, 75% of consumers in the retail sector have made an online purchase during the last 30 days.

Therefore, the different stores are developing brick and mortar stores that allow users to access the firm through the Internet or make purchases in physical stores. This change is reflected in some stores such as toy stores or clothing and footwear stores, which have created online stores in 95% of cases. It should be noted that not all stores are following this trend, a clear example are the opticians, among which only 20% have an online store (Laudron and Traver, 2013). This is due to the need to contact the customer to make the sale. Even so, customers want to have as much information as possible for which they use the Internet to compare different offers. That is why certain trends have been detected that can be seen in the different retail stores.

One of the clearest trends is the digital transformation of companies in the retail sector to obtain a multi-channel store (Julien and Raymond, 1994). Thus, users can use different channels to buy products and services from anywhere. In order to achieve an omnichannel business, merchants must use different technologies that allow them to obtain a consistent system and a global vision of their business. Furthermore, companies are looking for the customization of their products and services to meet the requirements of all their customers (Moon et al., 2008). For this they need to understand their clients and how their needs change. Companies that are able to understand buying habits will be able to approach customers early and make more effective recommendations.

As aforementioned, the number of clients that access stores through online channels is increasing (Li and Yeh, 2010). Companies must integrate all channels and also use technologies, such as smartphones or tablets, to increase sales opportunities (Gaspar-Erburu, 2015). In addition, they must use Big Data systems that allow them to detect trends and predict demand in order to adjust their production and logistics at all times. Finally, it is important to highlight the importance that social networks are gaining, which will stop being marketing tools to obtain social commerce that improves the value chain (Constantinides et al., 2008). For all this, companies that are not able to use technology correctly will have difficulties to be competitive in the retail sector.

In Figure 43, some of the main technologies companies in the retail sector can use, are shown (Accenture, 2018). It can be observed that technologies can be aimed to improve the customers experience or to benefit the company itself. Some of the technologies that appear in Figure 43 will be detailed in the following paragraphs.

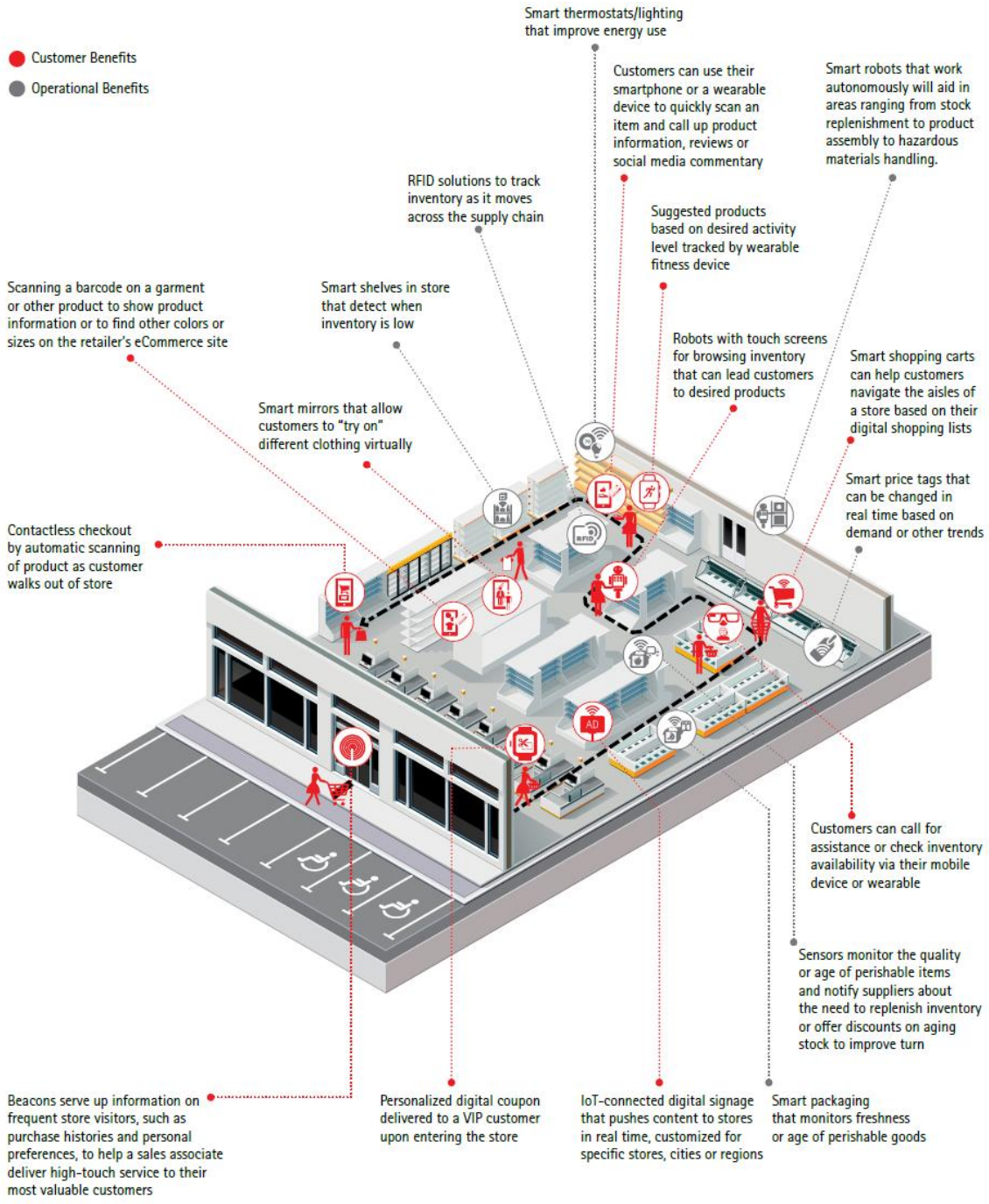

Figure 43: Technology in the Retail Sector (source Accenture (2018))

In order to understand which technologies companies should focus their efforts on, a study of the main uses that companies are giving to the 4 technologies mentioned in the previous chapter: IoT, cloud computing, big data and CRM; will be carried out. Additionally, a technology that is gaining importance in the retail sector will be analysed: augmented reality and virtual reality. This

technology is being used mainly in this sector, so a definition and some examples of existing applications have been included.

4.1. IoT in the retail sector

The Internet of Things is playing a key role in the digital transformation of many companies in the retail sector (Lee and Lee, 2015). It offers the possibility to capture a vast number of data of each client which can afterwards be analysed and used to improve the customer's experience (Porkodi and Bhuvaneswari, 2014). In the retail sector the main technologies of IoT that are being used are beacons, which enable proximity marketing; RFID, that allow companies to locate their products and clients; wearables, empower an offline to online (and vice versa) customer journey; and QR codes which facilitate communication with the clients (Orange, 2016). In this section all of these technologies will be analysed, and examples will be given to understand the potential of each technology.

4.1.1. Beacons

Beacons are small hardware devices that transmit signals with a unique identification for each device (Figure 44) (Newman, 2014). These devices are based on Bluetooth technology, and allow the connection of mobile phones and other technological devices when they are near the Beacon. The size of the devices similar to that of a coin, and as they use Bluetooth low energy (LE) they are able to last up to 2 years using a button cell battery (Nowodzinski, 2016). Beacons are small, so they can be hidden and placed anywhere. They are usually offered in a plastic housing that makes them watertight, so they can be placed on any surface. One of the main applications is the distribution of messages in points of interest such as shops, bus or metro stops, or near vending machines (Grady, 2007).

Figure 44:Beacons

As Beacons use Bluetooth technology to communicate with the device, a lasting connection is created so that it is not necessary to connect both devices each time information is to be sent. In addition, this technology allows geolocation of each user up to a distance of 40 meters and works in places where the GPS does not do so as for example inside a parking (Mansell and Curran, 2016). This new technology allows companies to offer different experiences to their customers (Nowodzinski, 2016). Furthermore, companies of all sizes can use this technology as the Beacons

are sold separately and can buy the necessary number without incurring large expenses and adding Beacons to your business as it grows.

These devices offer great advantages both for the company and for the consumers, which is why they are gaining great importance in the retail sector (Newman, 2014, Willmott, 2014, Shankara 2015). Through this technology companies can interact with customers and can improve the capture of information. Using Beacons, companies can show their consumers different products and can offer additional information to improve the conversion of sales opportunities (Puto, Koscielniak 2015). Moreover, through these devices companies can send coupons and discounts in real time to each user. Another use that is being given to this technology is when making payments as it allows users to identify themselves using their mobile phone and allowing them to pay from their smartphones (Flamme, Grieve, 2014).

Some of the companies in different sectors are using them to conduct guided tours or to transmit information in real time to passengers at train stations and airports, providing users with information about changes or delays in their trips (Dziekan, Kottenhoff, 2007). Beacons allow companies to send rewards to users based on actions they have taken, for instance, they can send offers if one of the customers has approached a store (Thamm et al., 2016). But not only there are advantages for customers who receive personalized information in real time, companies can also use the information they capture through these devices (Giurea, 2015). For this they can use the advanced analytics technology explained above.

By using Beacons companies can count the number of customers that enter the store during a specific period of time (Figure 45). In addition, they can measure the time spent by each of the customers in the store. Thanks to the possibility of geolocating them, companies are able to know in real time where each user is inside the store, being able to see in which areas customers usually spend more time (Mendelson, 2014). It also allows marketing campaigns within their premises, sending consumers offers when they are near a product (Papandrea et al., 2010). Furthermore, thanks to the continuous connection between the smartphone and the Beacons, companies can send messages depending on the client's status in the loyalty program (Allurwar et al., 2016). Finally, it should be noted that a company can specify a route to users within the store to reach a product (Statler, 2016). In this way the company can make consumers pass through a certain area increasing the chances of cross selling.

Companies gain visibility thanks to Beacon technology and consumers can benefit from increased information about products and greater power in the relationship with the company (Grandhi et al., 2013). Some of the companies that are using Beacon technology to do proximity marketing are Mc Donald's or Carrefour. The chain Mc Donald's has developed a good strategy of proximity marketing, it uses Beacons located in their premises that send promotions when customers pass by (Kamal, 2014). This way, Mc Donald's is able to send specific promotions to each one of its clients based on the preferences that they have previously selected in the application. The company has managed to improve the personal relationship they have with users. The fast food chain has developed a marketing campaign to promote a new line of coffee drinks in Turkey through the use of Beacons. Thus, when a customer approached one of the establishments, a discount for one of the drinks was sent to the mobile phone. The results obtained have shown that 30% of the users

who have received the discount have used it more than once. This indicator shows that the strategy used by the company has been satisfactory for both consumers and the company.

Figure 45: Mc Donald's technology

Thanks to the use of Beacons, Mc Donald's has been able to know in real time the conversion rate of visits to purchases, in addition to prove the interest of consumers for new products. They have also been able to observe which users are the ones that have repeated and when they have done it. For users who have not used the discount, they have been sent different promotions that have nothing to do with the new line of beverages. Thus, users receive information and discounts on the products that interest them most. Thanks to the use of Beacons technology, Mc Donald's has managed to increase the number of visits to its establishments which is of great importance in the competitive market in which it plays.

On the other hand, the French supermarket chain Carrefour has carried out experiments in several establishments in Madrid (Abhishek & Hemchand, 2016). The company has created a network of distributed sensors throughout the store. In addition, Beacons have been added to the shopping carts and baskets so that the devices can communicate with the sensors located on the roof of the store to have located all the customers of the supermarket (Ives et al., 2016). Some of the cars have been added a screen through which users can interact with the store, being able to find the products they need and follow the instructions on the screen to find the product (Figure 46). This is possible thanks to the geolocation function of the Beacons that has been mentioned previously.

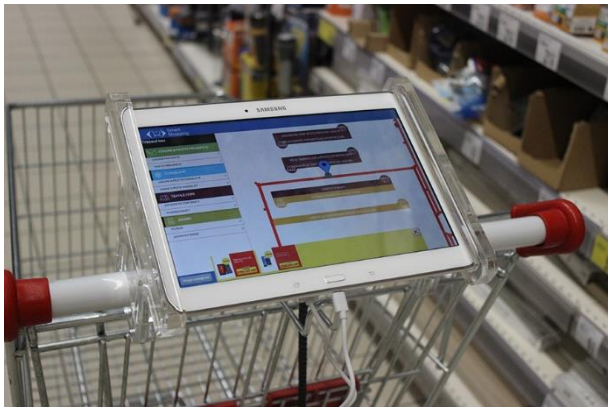

Figure 46:Carrefour shopping carts

Furthermore, users receive personalized offers since they have integrated the customer's card into the system. The company has used all the data obtained on the movements of the customer in the store to analyse where they spend more time. All the data collected by the sensors are sent directly to a platform in the cloud in which the data is analysed and stored. Thanks to this information, the supermarket has been able to distribute its products to avoid overcrowding of certain areas in the store, and also to be able to carry out more effective promotions and cross sales. Users who do not use the supermarket application provide data, such as time spent in the supermarket, but do so anonymously so that the supermarket obtains real information taking into account all consumers.

Another way to use the beacons is the one carried out at the Levi's Stadium in San Francisco (Figure 47) (Bal and Fleck, 2016). The company Aruba installed 1,200 beacons throughout the facilities with a separation of 100 meters between them, in order to provide information to viewers (Statler, 2016). They could obtain information about where there were free parking spaces, how to get to the seat they had assigned or even order food through their mobile. This way the spectators received offers and discounts from the different establishments of the stadium in real time. According to Aruba, this action resulted in more than 18,000 people using the Wi-Fi network to transfer 3.3TB of data

Figure 47:Levi's Stadium in San Francisco

As it can be seen, Beacon technology offers many possibilities to companies that can carry out proximity marketing campaigns. In addition, it allows them to obtain information about each of their clients in order to offer them discounts and information customised. Although the Beacons have not spread across Europe, they have done so in the United States, offering the possibility of payment through this system. There are many advantages offered by this type of technology that offers customers exclusive and personalized experiences. These are some of the examples of companies that are using Beacons technology to improve their relationship with customers and thus increase their sales. But this is not the only technology that IoT offers to companies in the retail sector. Next, the uses and advantages of RFID technology, that is gaining place in the market, will be analysed.

4.1.2. Radio Frequency Identification

Radio Frequency Identification (RFID) has been proven to be one of the most important technologies for economic growth in the following years (Santucci, 2010). Tags that use radio waves to connect with each other are employed across all sectors (Figure 48). Information is sent from the transponder tag to the reader or interrogator. Usually the transponder tag is embedded on a product which can be followed throughout the factory. The interrogator tag is used to read the information of the transponder, and it can be used to write more data in the tag (Novotny, 2015). RFID tags can store up to 64kbytes of information (Finkenzeller, 2003) which allows the producer to include product specifications in each tag. The most powerful tags can be read from around 10 meters.

Figure 48: RFID tag

Different types of RFID tags have been developed and each has its own characteristics, so it is difficult to classify them. In general, they are classified into active and passive tags (Ahuja and Potti, 2010). Active tags are those that need a power source, they can either be connected to the electrical network or have a battery installed (Khan et al., 2009). This type of tags tend to be more expensive, and also must be near an electrical outlet or contain a battery which makes the tag are much bigger and have a shorter life. This means that active tags are not used very often.

On the other hand, passive tags do not need any power supply, making them have a longer lifespan than active tags and allowing to reduce their size to be able to stick it on any product (Chawla and Ha, 2007). Passive RFID tags are composed of an antenna, a semiconductor and a capsule. The semiconductor is responsible for connecting the antenna with the tag, and the capsule is necessary to protect the tag. In this type of tags, it is the reader that activates the communication between both tags, the passive tag antenna captures the energy of the reader, by magnetic induction or electromagnetism (Want, 2006).

As mentioned above, this type of technology can be used in many sectors. For example, electronic payment can be used in tolls, when the car approaches the toll booth the tag attached to the license plate sends information to the reader. The toll system automatically charges the payment to the credit card that has been previously entered in the tag and opens the barrier (Swedberg, 2004). In airports, this technology is also being used to monitor suitcases (Mishra and Mishra, 2010). Furthermore, in libraries it is beginning to be used in order to have the information of all books quickly, avoid having to make long and tedious inventories, and to speed up the book reservation process (Molnar and Wagner, 2004). As it can be seen the different sectors are taking advantage of this technology to improve their systems, to the point that it is used in some prisons to manage all the prisoners (Hickman et al., 2010).

There are many advantages offered by RFID technology over traditional barcodes (Kaur et al., 2011). While with a barcode all products of the same type carry the same codes, with RFID tags it is possible to identify each product individually and thus be able to perform an individual traceability. In addition, RFID tags allow manufacturers to store much more data than in barcodes, so they can know, for example, the production date of each product (Lapide, 2004). Furthermore, the information that is stored inside the tags can be updated quickly, while a bar code can only be read, there is no information that can be written inside.

One of the main advantages of RFID technology is that products that have an RFID tag can be read without having line of sight with the tag (Véronneau and Roy, 2009). This is impossible with the barcodes which need to be scanned to obtain the information they contain. Thanks to RFID technology, the tags of a product can be read without having to remove it from the box or container. This facilitates the counting of merchandise in companies that have large stores. In addition, RFID tags can have protection to prevent them from damaging due to moisture or dirt; in barcodes this is a problem since many times a bad impression can make it difficult to read the code. Thanks to the protection that RFID tags have, they have a much longer lifespan than barcodes.

As explained, in order to read a barcode, it is necessary to have a direct vision of the barcode forcing an operator to scan barcodes (Smart, 2005). RFID tags do not need human intervention to be read. In addition, it is not sensitive to orientation, unlike barcodes that need to be scanned in a specific position. Furthermore, RFID tags are more difficult to counterfeit making the information inside them more secure. Bar codes can be printed with any laser printer (Barrus et al., 2005). Finally, it should be noted that, although barcodes are cheaper to produce, it is usually necessary to have more workers raising their cost. This is the main reason why many stores are changing barcodes by RFID tags that allow them to carry out inventory continuously and quickly without incurring large personnel costs.

These advantages are making RFID technology expand across all sectors (Zhu et al., 2012). Some stores are trying to create smart mirrors and smart fitting rooms through RFID tags on clothing and a reader in the fitting rooms. As mentioned, RFID tags have a much longer life than barcodes, which allows them to be used on durable objects. Want (2006) proposes placing RFID tags on clothing and a reader in the washing machine. This will show which garments are being washed and the characteristics of the washing can be adjusted and even warn the user if garments that are put in a washing machine cannot be washed together. Similarly, he proposes placing a reader in the microwave that is capable of reading the RFID tags that come in the food in order to adjust the cooking time. The main impediment of this technology is the high costs involved and that is why it is still not used at the domestic level.

In the retail sector there are many companies that are beginning to use this type of technology because it allows them to obtain information about the clients and the products that are offered. An example is the company Zara, which has placed RFID tags on all the clothes that it offers so that they can be followed from the factory to the point of sale (Collado and Nieves, 2017). The Spanish chain has one of the highest inventories turnover ratios in the market because they change the clothes offered every 15 days. These changes would not be possible if they did not have RFID tagging that allows them to know what products have been in each store and the amount of sales of each size that have been made (Anlehu, 2017). If a customer needs a garment that is not in the store, employees can consult through their mobile phones in which other establishments there is a pledge of the characteristics that the customer requests.

In addition, thanks to RFID tagging, customers who make their purchases online can follow their orders' shipments through the distribution network (Bendavid et al., 2006). This allows having a reliable delivery system. RFID technology has also allowed adjusting clothing inventories in each of the establishments (Michael et al., 2005). It can indicate the products that must be replaced,

making the company maximize the revenues especially when there are peaks of demand. Thanks to this technology the clothes can be transported quickly between stores and warehouses avoiding stockouts.

In addition, Zara is benefiting from this technology when making the inventory. The time it takes to perform this activity has been reduced by 90% thanks to RFID tags that allow the company to post products reliably without the need to scan each garment (Tajima, 2007). The time needed to search for a product inside one of the stores has also been reduced since employees can know the location of the products. But there are not only advantages for Zara customers. The company is able to study the habits of customers since each sale can be easily associated with customers who have loyalty cards. As mentioned above, having information about customers is an important step in getting a customer-centric company.

Another company that is benefiting from RFID technology is Deckers' (Figure 49). It is an American footwear, apparel and accessories company that is testing smart mirrors in some of its stores. The company has placed RFID tags on the soles of shoes and boots that allows buyers to see information and content related to the product when a screen is approached. Customers put on their shoes and when they approach the screen the reader captures the identification number of the RFID tag. This generates an instruction for the screen to present product information, the client receives information about the available shoe colours. In addition, it offers suggestions of products that can complement the footwear. The company Deckers' has thus enabled their customers to enjoy a multichannel experience.

Figure 49: Deckers' store

The company prints the labels in the store and sticks them to the footwear. In order to get the most out of RFID technology, Deckers' should place the labels on the shoes as they are produced at the factory in order to track them between their supplier and the store. Even so, the experience it offers in its stores has shown good results, so it is thinking of extending the idea to other locations. The use of labels to give information about the product offered the company the possibility of cross-selling and increasing customer satisfaction.

4.1.3. Wearables

Wearables are a set of electronic devices that are incorporated in some part of the body to interact continuously with the user and other devices. Some of the best-known wearables are smart

watches, sneakers with GPS or wristbands that control the user's health status (Rawassizadeh et al., 2015). These devices incorporate a microprocessor capable of capturing information continuously. Although it is a technology that has existed for many years, it was not until the year 2000 with the appearance of Bluetooth that this technology has begun to gain importance.

Wearables exist in multiple ways since they are sensors incorporated into accessories that are used on a day-to-day basis. These sensors include cameras, microphones, thermometers, heart rate monitors etc. that capture information continuously or at least are prepared to capture the information at all times. In addition, all these devices are often connected to other technologies such as mobile phones. In this way the information they collect is processed and can be displayed through the mobile screen. Therefore, the user can interpret the information that wearable has collected and perform a certain action. Nowadays most wearables come in the form of a wristband, watch, glasses or even clothing. Notwithstanding, as technology advances new forms of wearables are appearing in the market. A study conducted by PwC (2014) shows the following scheme (Figure 50):

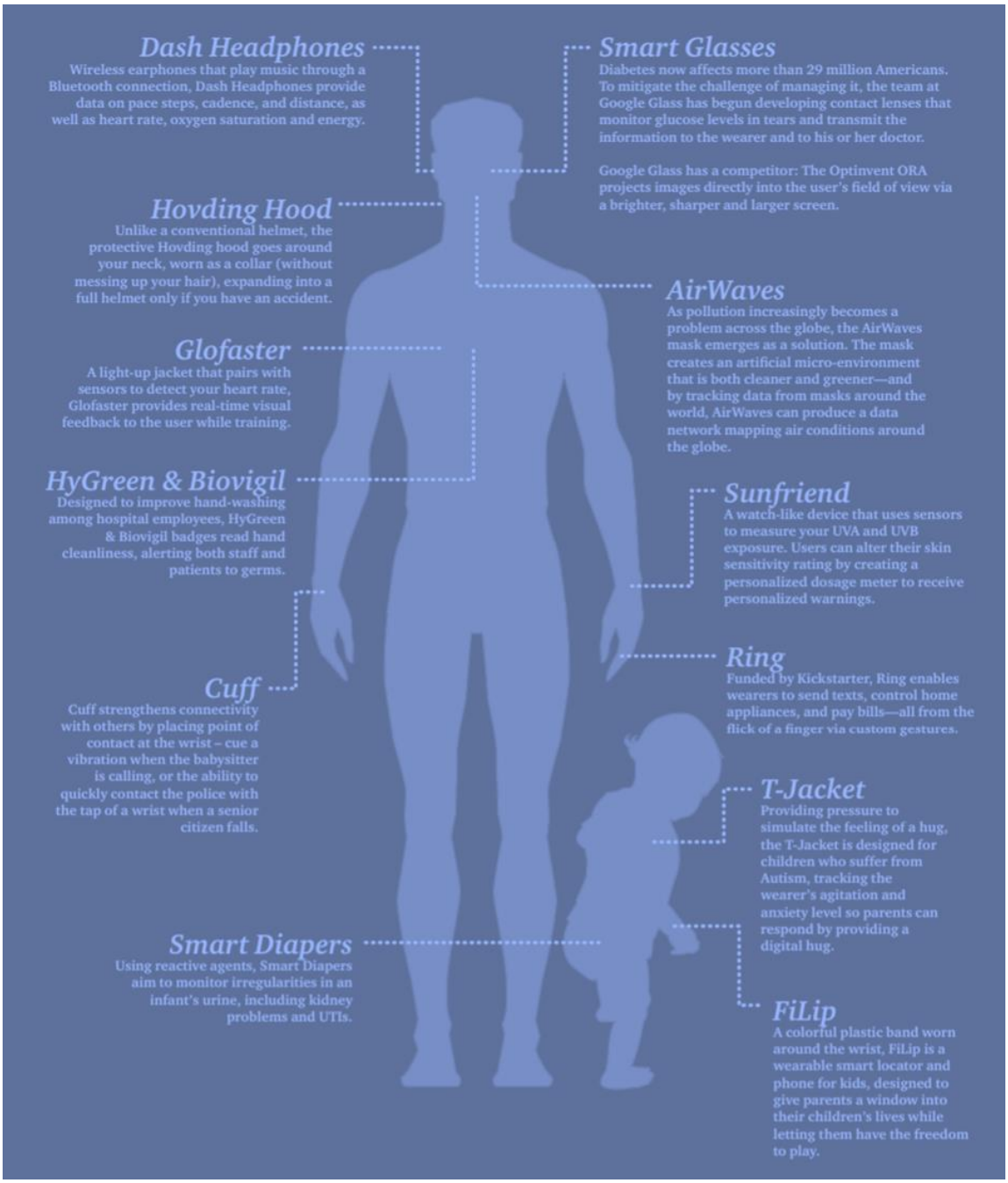

Figure 50: Wearable technology (adapted from PwC (2016))

Although today wearables are often paired with other technological devices they are beginning to evolve to become standalone devices (Grant and Cruz-Hernandez, 2014). This is due to the advances that are being made in the size and life of the batteries. Since most wearables are incorporated in clothing or accessories, they must be small so as not to disturb the wearer. Furthermore, wearables should be aesthetic since most users wear them throughout the day and these would not have great penetration if they were not stylish and unique (Hiremath et al., 2014). Wearables are being implemented in many sectors since they can help workers continuously.

Although this type of technology offers great advantages, attention must be paid when sharing the information collected by wearables (Zavec, 2017).

Some of the examples of the sectors in which this type of technology has been best integrated are: access control, tourism, sporting events, loyalty, transport or payment (Power, 2005). In addition, other industries such as life insurance are taking advantage of this technology to get more out of a business. Wearables allow companies to control the accesses in a simple way using for example a bracelet. Thus, in large events the influx can be controlled, and the participants can use the bracelet not only to enter and leave the enclosure but also to pay for what they consume inside. Companies with a large number of workers are also benefiting from this application and are changing the access cards for wristbands that are easier to carry. In a similar way the hotel complexes are using this type of technology so that the client can access the room, common areas or book activities through a wearable device.

The transport sector is using applications that allow users to use smart wristbands to access the bus or subway or even to rent bicycles (Wei, 2014). Another use that has been mentioned is customer loyalty, for this the companies are converting the classic card into a wristband or watch strap that the user can comfortably carry. Hence, the customer carries everything he needs in his hand and the company obtains information and promotion of their brand (Shahmiri, 2016). Many insurance companies are offering their clients different wearables that allow them to know the activities they perform throughout their day to day. Thus, companies reduce insurance payments depending on the type of customer. For example, the life insurance of clients who do sports and have a healthy life will obtain price reductions. In return, the company can meet its customers and avoid unprofitable customers.

In addition, wearable technology can be very useful when it comes to preventing occupational risks. An example is the new helmets of firemen that have been invented. These allow to measure the levels of oxygen and the temperature that the firefighter can resist in the firefighting works (Kumari, 2017). Furthermore, they incorporate a GPS that allows to know the location of the firefighter at any precise moment. The textile industry is also benefiting from this technology. There are for example clothes capable of measuring the temperature and sportswear that allows analysing the movement of the athlete (Perego, 2012). LED sweatshirts have also been created to illuminate the dark streets through which users run and at the same time monitor heart rate, calories burned, or distance travelled.

Although the sector that is benefiting most from the technology of wearables is the healthcare sector (Tröster, 2005), in the retail sector these devices are also being integrated into the customer experience. The main uses that are being given to wearables in the retail sector are to give the customer more information about the products and to pay for different services.

The Spanish company JogoTech has installed in the fitting rooms of several clothing stores in Madrid a technology that is based on a mirror with digitalized functions to improve the customer experience (Figure 51). The mirror allows the client to show the models, colours or complements with which he can combine the clothes that are being tested and request them to the employees of

the store (Montaño, 2016). Therefore, they client will only need to try one outfit and they can see the different colours in the mirror without changing their clothes.

Figure 51: Intelligent mirror

This is possible thanks to the devices that are attached to the clothes and the reader that has been installed in the mirror. Thus, customers can ask for accessories, sizes or colours without having to dress and go out to find more clothes. In addition, through the mirror employees talk in real time with customers, to meet their needs while they are inside the fitting room and provide assistance until the end of their purchase, which increases their satisfaction and improves their shopping experience. Finally, the company Jogotech through the mirror facilitates, even, the direct payment of the garment, which is then collected in the register. From the point of view of the store, the technology of the wearables makes the management of the fitting rooms more effective, considering that it is one of the most important places in the store when it comes to selling. On the other hand, customers who use this technology can register in a database to receive recommendations for purchases and offers, according to selections of clothes or tastes made in the fitting room.

Another example of using wearables in the retail sector is the MagicBand bracelets (Figure 52) created by Disney to improve the experience of their customers when they are at the Disneyland theme park (Dunlap and Hood, 1994). The company has designed waterproof wristbands that fit the size of each user's wrist. The bracelet includes the key to the room and access to the theme parks, in addition the user can use the bracelet to pay. Disney has integrated the Disney Photo Pass service allowing users to access the photos that have been made throughout the day through the bracelet and select the ones they want to pay for when at the hotel. The MagicBand can be used to buy food or gifts inside the Disneyland facilities.

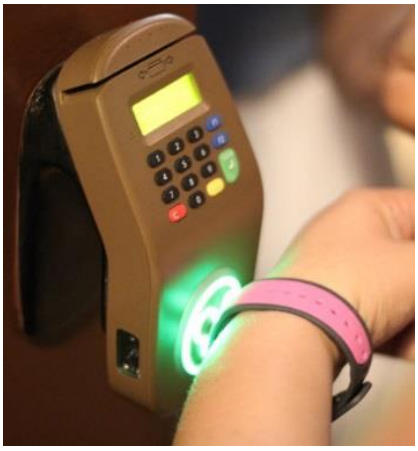

Figure 52: Disney Magic Band

Although this system does not seem safe, the company has created a system in which users must enter a 4-digit code when they want to enter the room or pay something. In addition, it allows users whom wear the bracelet to go through the fast line and thus avoid queues. The company Disney collects information about the different users and their movements throughout the park, as well as the purchases they make. In this way they are able to send personalized marketing during the experience and once the experience is over. Furthermore, the company allows its customers to personalize each bracelet to make them part of them, improving their experience through the technology of wearables.

4.1.4. QR Codes

QR codes (Quick Response) are two-dimensional codes that allow to store information (Rodríguez and Roget, 2009). QR codes enables an interaction with customers through their smartphone. By scanning a QR code using a smartphone, the client can get immediate access to the content stored in the bidimensional code. The QR code reader can then perform an action, such as opening the web browser for a specific URL (Rikala and Kankaanranta, 2012). Other actions that can be performed are the storage of a business card in the contact list of the smartphone or the connection to a wireless network (Ebner, 2008).

The QR codes were created in 1994 by Denso Wave, a Toyota subsidiary, whose philosophy was the storage of more information with respect to traditional barcodes. With moderate success in the implementation in the industry, the advances in mobile telephony have allowed to develop between marketing agencies and companies, which has created an opportunity to use these codes to connect the physical world with the internet (Lee et al., 2011). The main use of QR codes are marketing campaigns that take advantage of the main benefits offered by this technology. QR codes are used to offer extended information about products and services, add contacts in the telephone directory, send an email or a form and even extend a physical marketing campaign with digital actions such as audios or videos (Liu et al., 2008).

As aforementioned, the main application of QR codes is to carry out marketing campaigns (Cata et al., 2013). The main advantages of QR codes include the innovation they bring to companies that can carry out marketing campaigns at low cost and through a new channel. The production

and reading of these codes is free, so the company should only invest time in creating the marketing campaign and then link it to the code. In addition, this type of codes has a large storage capacity that facilitates communication in a dynamic way between the company and clients (Lombardo, 2012). Furthermore, QR codes can be modified so information can be added or deleted easily and quickly without the need to create new codes. Also note that QR codes can be placed almost anywhere, making marketing campaigns have a wider audience (Cata et al., 2013). Finally, the most important advantage offered by these codes is that the results of the campaigns are measurable. The company obtains results continuously, thus optimizing the campaign at any time to obtain better results. Because of all this, there are many companies that are beginning to use QR codes to carry out their marketing campaigns.

The supermarket company Tesco has opened a virtual supermarket in a subway station in Seoul (Szymczak, 2013). While passengers wait to take the subway, they make their shopping through the mobile application. For this the company has placed images of their products along with QR codes that users only scan to add the product to their virtual shopping cart (Román, 2012). The metro station has been transformed with the images of the different aisles of the supermarket that is updated automatically (Figure 53). Users can see the images of the products and scan the QR codes of each product. When they have finished making the purchase they can go through the online application and they receive the shopping in their homes. In three months they managed to increase online sales by 130%, and customers by 75%.

Figure 53: Tesco Subway Store

In the same way, the Spanish supermarket chain Sorli Discau, with almost 100 stores spread across Catalonia, opened this summer the first virtual supermarket in Europe at the Sarriá Station in Barcelona (Salazar and Espinoza, 2018). Sorli Virtual allows the customer to buy more than 400 products and receive the purchase in their homes (Savastano et al., 2018). For this, giant panels have been installed that emulate the aisles of the supermarket including a QR code next to each

product. The user only has to read the QR code with his phone and, automatically, it is added to the virtual shopping cart of the mobile web. After validating the purchase, the customer receives a call to confirm the order and manage the delivery date and time at home, where the payment will be made (cash or card).

Victoria's Secret company has also used QR codes for one of their advertising campaigns (Cueva and Cevallos, 2012). The lingerie company installed several ads in which part of the image was censored and offered a QR code to see the full picture. When the client read the QR code with his phone he could access the whole image. Customers could see the product and all its features and even buy online. With this advertising campaign, the company managed to get its products to be seen by a large number of clients through their smartphones.

Another example is the campaign launched by Danone, "Alimentando Sonrisas" (Zhao and Balagué, 2015). The Danone campaign aimed to increase the number of loyal customers to the company. For this, they have created a campaign based on the accumulation of points when buying the brand's products that can later be exchanged for gifts from a catalogue or discounts to buy their products. Using QR codes customers can scan the code that appears on the products, with the Danone application to get points that turn into discounts (Figure 54).

Figure 54: Danone QR codes

The company has invested more than 1 million euros to place QR codes on all its products. Over 60 million unique QR codes are generated monthly and users can scan and accumulate points in their Danone accounts. The first time they scan a code, customers must fill in their personal information. Therefore, each time a customer scans a code the company stores information about the products they buy. Thus, they have created a database that they use to be able to make a personalized marketing for each one of their clients. Danone is able to send offers of specific products to users according to the QR codes they have scanned. Thanks to this campaign, Danone has achieved more than 2 million loyal users.

Another application of QR codes is the payment of products (Schoenberg et al., 2013). One of the companies that is benefiting from two-dimensional codes to improve the customer experience is Walmart (Suresh et al., 2014). Walmart has launched a mobile payment technology that can be

used in their stores at the end of 2015, Walmart Pay. It is based on the reading of a QR code, which appears in the cash registers at the end of the transaction and through which payment is enabled. To make the payment, it is mandatory to use a specific application of the company, which is already used by 24 million customers every month. Walmart is the first company that has created its own application to be able to make payments in its stores, which is a great example of digital transformation. Thanks to the application Walmart is able to improve the experience of its customers and avoid having users who are going to buy other platforms online.

4.2. Multichannel experience

As explained throughout the document, companies must seek a multi-channel experience for their customers (Venkatesan et al., 2007). For this, many companies have taken different paths to achieve a multi-channel experience. Although there are many channels that customers use in the retail sector, they can be divided into offline and online (Lu et al., 2011). So many of the companies in this sector are trying to combine both creating an O2O (Offline to Online) experience. The main solutions that companies have followed so far are: Click and Collect, Buttons, Geolocation, Apps, and showrooming.

Today all companies try to reach their customers through several channels, but this is something recent because in the past there were many companies that sold their products offline and not online and vice versa (Mosquera et al., 2017). The business model of companies that sell their products online is no longer competitive in the new market of the retail sector. That is why many companies are changing their business model to include several channels (Brynjolfsson and Rahman, 2013). An example is vinopremier.com. It is an online wine portal that decided to open a physical store so that their customers could be in contact with the company and with the products. This type of models allows small businesses not to incur large expenses and once they have created a solid customer base they can expand by opening a physical store. Vinopremier.com is using the physical store not only to offer its products but also to offer experiences to its customers such as wine tastings or presentations and tastings of products. They also offer customers the possibility to buy their wine on the online shop and pick it up at the store.

The companies that offer a Click & Collect service allow their customers to buy online and go to collect their purchases at the store (Aubrey and Judge, 2012). This allows the client to save the shipping costs and also the possibility of buying other things when they go to pick up their order (Piotrowicz and Cuthbertson, 2014). It also allows to reduce the time since most stores have a shipping service that takes more time than if the customer goes to pick up the product the store (Visser et al., 2014). The customer can also enjoy a visual inspection of the product before buying it to make sure it is what he was looking for (Beck and Rygl, 2015).

Figure 55: Click & Collect example

On the other hand, companies benefit from this multi-channel solution since they avoid incurring shipping costs (Mercier et al., 2014). In addition, they increase their chances of cross-selling since the customer goes to the physical store where they can offer different products. It also avoids having problems with the shipping companies that will not offer the same quality of service as the employees of the store itself (Jones and Livingstone, 2015). In addition, it should be noted that the companies that offer their online services allow their customers to know all their products easily and visually, allowing them to get in contact the products once the purchase is made.

Although there are many stores that have already opted for this omnichannel solution, the pioneer company in Spain was El Corte Inglés, which has a Click & Collect service since 2014. Nowadays, all types of companies in the textile sector offer this type of service, for example, Zara or Women Secret. El Corte Inglés has several online channels to make purchases, through the computer, mobile, a tablet .... Once the customer has made the purchase online they can go to pick up the items purchased at any of the company stores. This offers customers the possibility to purchase products of different categories without having to look for them in the store and then pick them up at the nearest collection point. The same service has also been included for all its El Corte Inglés supermarkets, thus allowing customers to make purchases through any online channel and go to the most convenient store with the car to pick it up.

Another solution offered by supermarket chains that want to integrate both channels is Click & Drive. Supermarkets such as Eroski offer their customers the possibility of buying online and go to the supermarket without having to go through the establishment. The Click & Drive service combines the ease of online shopping, at any time and from anywhere, with the pick up of the order without leaving the car at the fast delivery point installed in the hypermarket car park. There, the personnel responsible for the service loads the order directly in the customer's boot in less than five minutes and without waiting. This reduces costs for the supermarket and allows customers to have flexibility when it comes to shopping. If customers had done the entire online process they would have had to be at home to pick up the purchase at a certain time. Thanks to the Click & Drive they can go themselves when it suits them best to the supermarket they have at hand.

Figure 56: Eroski Click & Drive

Another multi-channel solution that many companies are adopting are virtual supermarkets (Cristóbal et al., 2013). As mentioned above, Tesco has used QR codes to get a multi-channel sale, but this is not the only solution. The French company Carrefour has created a device that allows the user to make the purchase from home. It is a device that allows you to scan barcodes of different products and add them to the shopping list. When the user scans a product, the device called Connected Kitchen, makes suggestions for products related to the item that has been scanned. The device connects via Wi-Fi and allows users to store up to 1.3 million barcodes. In addition, Carrefour has included items that are not of its own brand offering a wider range of products to its customers. Furthermore, the French company has added the possibility to scan coupons and discounts. Once the bar codes of the products that the customer is going to buy are scanned, the user can finalize their purchase through the application and then go to pick up their shop at the collection points that the supermarket offers.

Similarly, Amazon has launched an application called Dash buttons. Its features have been explained above, but its applications in the retail sector have not been explained. The buttons are related to a single brand, are connected through Wi-Fi and are configured once the buttons are purchased through a retailer application. The customer can configure the products that he usually purchases in order to buy them through Amazon with a single click. Once ordered the product Amazon sends a confirmation message and sends the product in a maximum time of 2 days. Although it is not yet fully developed, a similar device may be used in products such as detergent, so that when it is finished automatically the devices sends a replacement request.

Another technology that many companies are using to achieve a multi-channel strategy is geolocation. Thanks to geolocation, users can now discover nearby outlets where they can buy their favourite products or obtain offers while moving inside a store. All companies already have a website where users can find information about their products. Using geolocation companies are able to transform their sales opportunities into real sales because they can offer personalized information according to the location of each client.

Almost all companies already offer the possibility of searching their stores on the Internet, so geolocation is mandatory in order to be competitive in the retail sector. There are many companies that use geolocation to get their customers interactions with the company through several channels, but other companies need geolocation to perform their activity. An example is Wallapop, a

platform for buying and selling second-hand objects that is based on the use of geolocation and smartphones. The platform shows the products that are for sale around the user. Without geolocation the platform would not offer products close to the client and he would not be satisfied.

Even so, there are many companies that use geolocation to improve the experience of their customers. Starbucks is one of these companies, which at the end of 2014 created a Mobile Order & Pay service (Figure 57). With this service customers can place orders through mobile devices and then go to pick their order up at the store. Thanks to geolocation, the company knows where the customer is in order to offer the nearest store and have their order ready when the client arrives. In order to use the service, customers must accept the use of geolocation systems since the selection of stores is made through the GPS of the mobile terminal. In addition, this service allows users to pay through the Starbucks application or pay at the store and thus expand your purchase.

Starbucks has already reached more than 20% of transactions in its stores made via mobile devices, an indicator that two years ago was 9%. There are several reasons for this increase: the ease of use, the network effect (if a customer in the store queue sees that another uses the application, the possibilities of the users trying it out are higher) and the design of its loyalty program, which drives to customers towards mobile payments. This is how Starbucks has achieved a multi-channel strategy in which customers interact with the application and employees at the same time. The company uses the data collected from the application in order to offer its users discounts and offers that interest them, thus improving customer satisfaction.

Figure 57: Starbucks Application

There are many companies that are benefiting from technology to improve the customer experience. Although most people are connected to the Internet through different channels, there are still people who are not. That is the reason why some companies are placing tablets in their stores so that customers can enjoy a multichannel experience. In this way, a mixed customer journey (online and offline actions) of all customers is achieved. On the one hand, customers receive a more personalized treatment than if they were only accessing the store physically. In addition, it allows them to obtain more information about the products they are going to buy, and they can compare the different offers in an easy manner. They also receive a personalized treatment that cannot be achieved through an offline customer journey. On the other hand, companies get information about their customers quickly that they can use to understand their needs and offer adapted solutions.

Another solution that many companies are using to achieve a multi-channel strategy is the installation of tablets in their stores (Mehra et al., 2013). The employees of the company have access to all the information that customers request quickly, and also get access to updated information (Gensler et al., 2017). An example of a company that has made this change in their stores is Burberry. The company has introduced iPads in 300 of its establishments so that employees can offer a better service. Burberry started using iPads in 2013 allowing its employees to be informed of all the products in real time. The objective of the modernization of the stores was to increase brand loyalty and achieve loyalty to the different customers who visited the stores.

When a customer goes to visit a store, employees approach to identify the customer through the iPad and thus be able to offer a better service. For new customers, employees help them create a new account that will allow the company to have information about the client and the user to receive discounts. According to the analysis that were carried out to verify the performance of the company after the change, the use of iPads in stores has increased online sales by more than 30%. In addition, customers see the service offered by sellers as high quality, since through an application they can find a product that is not available in the establishment. In this way the retention of the clients is increased since even if they do not find what they are looking for they can know where to find it, and they can even ask that if a product is not in the store to ship it from another establishment.

Burberry sellers have the tools they need to do their job, this includes access to the purchase history and consumer habits of the customers (Figure 58). When employees have this information, it is easier for them to offer customers the best products and to transform more real sales opportunities into sales. In addition, when a customer enters a store and sees how the employee manages the website to find their products, they learn from him. This allows all types of customers to search and review the products on the Burberry website and then go to the store, give a reference number to one of the vendors and have the employee look for the product so that the customer can try it on. Since the iPad has been implemented in Burberry's business strategy, the company has increased its revenues by 17%.

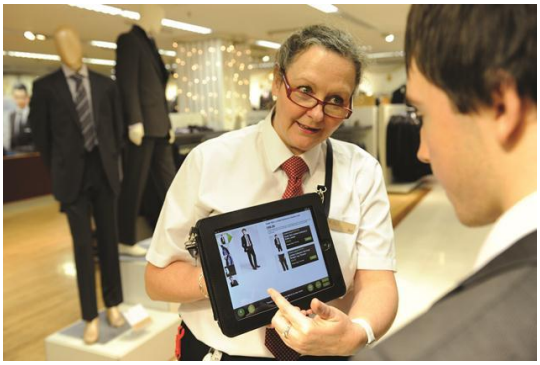

Figure 58: Burberry store

Another company that is destroying the barriers between offline and online channels is Guess. The company has included iPads in its stores and has created applications to help both customers and employees during the sales process. Similar to Burberry employees, Guess employees can use the devices to provide more information to customers. In addition, employees have been provided

with a mobile phone that can be connected to iPads, through which they can see the products available in the store. Customers are able to use their account to navigate through the different clothing collections and if they do not have the product available in the store they can order it from another. The company has placed the tablets in mobile displays that customers can use when they need it. It has also included some devices in the fitting rooms that allow clients to explore add-ons to the products they are buying. This has led to sales being increased and inventory management being improved among the different stores.

Another option of multichannel strategy enabled by technologies is showrooming and webrooming. Showrooming is when the clients of a company visit the physical store and then make the purchase through an online channel (Mehra et al., 2017). An example are the retailers of the automobile sector, which have exhibition vehicles but are not the ones that customers buy. For example, Tesla does not expect many of its vehicles to be sold at the malls and dealerships, they expect sales to occur online after the initial experience at the dealership (Figure 59). The customer can go to the store to see the car but use the website to customize the vehicle. This way the company manages to have contact with its customers without the need to have a limited number of products. Tesla also offers a service in the physical store where customers can prepare the order of their new car with the help of employees. This allows consumers to customize their cars, which increases their satisfaction and also the company can produce cars on demand.

Figure 59: Tesla store

On the contrary, webrooming consists of exploring the company's website to find the product that is being searched and making the purchase in the physical store (Flavián et al., 2016). This allows customers to navigate through the website quickly and using the search filters that suit them, and then check that the product they are going to buy is the right one in the physical store. An example of a company that performs a multichannel webrooming strategy is Kohl's.

The US retailer Kohl's has developed a strategy that includes personalized offers to customers, which arrive via digital channels to their mobile phones and which are adapted to the historical record of their purchasing habits and trends (Figure 60). These offers are generated in real time when customers walk through stores and are related to the area where they are located. On many occasions the offers refer to products that those same customers have searched online but have not purchased, trying to take advantage of the fact that customers respond more frequently to an offer, when it comes to them at the time they are in the store shopping.

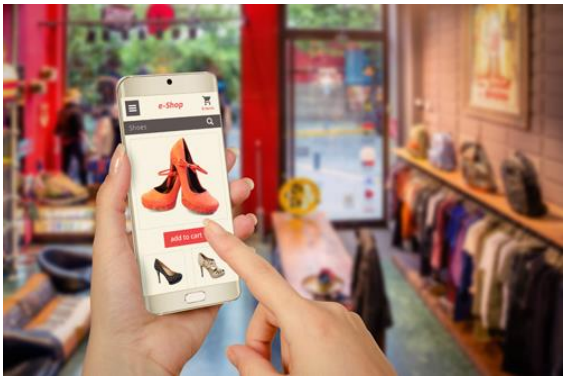

Figure 60: Kohl's store

In conclusion, how stores are changing their business strategies towards omnichannel models, which allow them to improve customer experiences, can be understood. Through a digital transformation, companies in the retail sector are modifying the customer journeys of their customers to convert them into mixed customer journeys (Fader, 2012). Thanks to the use of new technologies, companies can offer a personalized service to each of their clients and have useful information about them. They can analyse the information captured to carry out customized marketing campaigns and improve the conversion ratio of sales opportunities in real sales. Customers on the other hand enjoy a customized service or product that meets their needs optimally. Furthermore, it allows them to have information about the products and companies that offer them in order to choose the solution that gives them the most benefits. Thanks to new technologies and their developments, companies in the retail sector can achieve competitive advantages since they are modifying their business models towards a customer-centric model, with a strategy which is difficult to replicate.

4.3. Augmented Reality and Virtual Reality

Augmented Reality consists of combining images generated by a computer on the user's vision of the real world (Azuma, 1997). That is, the user can see both the real world and the image generated by technology (Milgram et al., 1995). This technology appears at the beginning of the 90s, the moment in which fast processing computers, real-time rendering techniques and portable tracking systems are achieved. The main difference between augmented reality and virtual reality is that augmented reality maintains the user’s world and complements it with information while virtual reality does not maintain contact between the user and the real world.

Thanks to the versatility that augmented reality offers, it has expanded in all sectors with great ease (van Krevelen and Poelman, 2010). It offers companies a way to interact with the customer, the product and the environment at the same time. Since almost all customers are usually connected to the internet through their smartphones, companies can use this device to create augmented reality applications so that with the technology of the clients is sufficient to undergo an augmented reality experience. Another option that big technology companies are investigating is augmented reality glasses (Denning et al., 2014). These have a camera, a screen and different sensors that are able to understand the movement of the user and connect with the database. For example, users

can utilize augmented reality glasses and when they look at the different monuments of a city, and they can obtain information about each monument. This is done by identifying the monument and the stored information. Another application that has been created in the tourism sector is the visualization of the city in ancient times through a digital reconstruction of historical elements.

Another possible application of augmented reality is in the industrial sector (Caudell and Mizell, 1992). For example, some companies are developing applications that help workers on an assembly line. In this way, employees can obtain additional information about the actions they carry out. This same system can also be implemented in the repairs of vehicles or industrial machinery, since the app can show the worker all kinds of warnings about damaged parts (Regenbrechtet al., 2015). In addition, video games with augmented reality are being developed, for example, Droid Shooting, a game where you must search and destroy a series of robots that are marked on a radar. Furthermore, augmented reality allows to carry out the development of gamification video games that support learning.

In the retail sector, augmented reality is helping to improve the customer experience during purchases (Beluarca and Tamarjan, 2010). Thanks to augmented reality, customers have an active role in the company, which allows customers to better understand the company and the products it offers (Lu and Smith, 2007). In addition, it is a digital experience through which customers are able to be in contact with the products and obtain maximum information. But not only in physical stores it can be useful, also in eCommerce, improving the online shopping experience. A transaction through the internet does not allow you to touch the products, but thanks to this technology customers can get a much tighter idea of the final product (Blázquez, 2014).

An example of a company that has known how to take advantage of this technology is Mango. The Spanish company has created an application, Scan & Shop, based on augmented reality. Through the application, customers can scan the images of their catalogue and adverts to obtain information about them. The application also allows the user to buy the garments through Mango's website or gives information to the customer about the stores where they can find the garment they are looking for. Mango's application combines several technologies to improve the customer experience, through geolocation customers can find the nearest stores, and they are able to download the application in different wearables that allow purchases through voice recognition.

On the other hand, the company Topshop has created an augmented reality tool, Topshop Kinect, which has been installed in the fitting rooms of its stores and can be used in different devices (Sampaio et al., 2017). The tool allows customers to try on different clothes without putting on clothes. Thanks to the application users can try on clothes from their homes. The application has been created using the technology offered by the Microsoft company, which creates virtual mirrors so that the client can see how things look. The virtual fitting rooms that TopShop has created have cameras installed so that the program can see all the gestures of the user to fit the clothes to the figure. Giving customers the possibility to try different models in a fast and easy way will improve customer satisfaction.

The new IKEA application, Ikea Place, is also worth mentioning (Baier et al., 2016). The Swedish company has created a program that allows decorating houses without having to buy the furniture

to see how it looks like. The application contains a large number of sofas, armchairs ... that can be seen placed in any house thanks to augmented reality (Rese et al., 2014(. Thus, users of Ikea Place can see how the furniture is in 3D and in real scale in their homes through their smartphones (Figure 61). In addition, users can rotate and place the furniture as they wish and can even zoom in to see all the details. In this way IKEA has managed to get its customers to interact with their products, improve the experience and the satisfaction of their customers.

Figure 61: IKEA augmented reality

In addition to augmented reality, many companies are using virtual reality to offer their customers a digital experience. Virtual reality unlike Augmented Reality does not allow users to see the real world but creates a fictional world in which users can see the products they are going to buy and interact with them (Steuer, 1992). This technology allows users to customize the products before buying them, thus offering a more realistic view of the product (Vrechopoulos et al., 2009). The automobile industry (Ong and Lee, 2004) and travel agencies are already using virtual reality as a marketing tool (Williams and Hobson, 1995). In the first case, to virtually test the vehicles and offer 360º views of them; in the second, to offer videos about travel destinations and virtual tours before the potential buyer decides on a specific package.

Figure 62: Leroy Merlin virtual reality

In the retail sector, one of the companies that has known how to take advantage of virtual reality is Leroy Merlin (Vareille et al., 2017). The company has launched a service that allows its customers to visualize how their kitchens will be by using virtual reality glasses. The client puts on the glasses and can move through a virtual kitchen where he can see the different details of the products they are going to buy. In addition, it allows them to personalize the different pieces of furniture, offering the possibility for customers to change colours or furniture according to their preferences. Leroy Merlin has created an application that allows its customers to have a digital experience, through which they can see different product models without having to increase the space needed in the store (Figure 62). In this way the company is able to show a wide variety of products in a very small space. This is very important for this type of company because without the technology offered by virtual reality, the company needs more square meters to show all its products increasing their costs. Through the use of the application, customers can see and combine the different products easily. This improvement in the customer experience will allow Leroy Merlin to provide personalized service and increase sales.

As it can be seen augmented reality and virtual reality can help companies improve their service and give their customers a new customer journey in which technology has a great importance. Augmented reality gives companies the possibility to create an offline to online customer journey where their clients gain importance by interacting with the product. In a few years this technology will continue develop, decreasing its price and increasing its applications.

4.4. Cloud technology

Cloud technology explained in the previous chapter offers companies the possibility to store and understand huge amounts of data (Gandomi and Haider, 2015). This will give companies a competitive advantage as they will be able to understand their customer and their need in almost real time. In addition, it allows companies to offer a consistent multichannel experience to their clients, which will improve their satisfaction and enable them to purchase in an easier way (Sagiroglu and Sinanc, 2013). Through the use of technology firms can reduce their costs and improve efficiency. Although most of the companies across all sector can benefit from this technology, the retail sector if of special interest as their contact with the clients and the number

of products offered is high (Agrawal et al., 2011). Cloud computing technology enables business in the retail sector to manage their information and improve their relationship with their consumers.

An example of a company in the retail sector that has known how to take advantage of cloud computing and data analytics technology is Domino's Pizza. This chain of pizzerias has a high demand when it comes to meals and by hiring a cloud computing system they can use the servers of a third company to increase their order processing capacity during peak hours. In this way, the company optimizes its devices and is also able to store all the information in a single server, being able to access the information of its customers from any location (Orange, 2016).

Cloud computing offers the possibility to try new products and ideas. Cloud computing gives companies the opportunity to innovate and create new concepts at any moment and it encourages participation of all employees. An example is the company Falabella, which has used cloud computing to leverage their digital transformation (González, 2015). The Chilean company has created a Click & Collect system, to enable their customers to have an online to offline customer journey. In addition, they have used the cloud computing programs available to improve their website as to be able to have a different webpage if the clients use a smartphone, a tablet or a computer. Falabella has invested in new technological devices that enable their employees to search for their products to give clients information about the size and colours they have in the stores and where to find the clothes they are looking for.

Falabella has also benefited from a private cloud in which they store all the information about their clients. Thanks to cloud computing technology the investment in which they had to incur was low and they were able to try out their database to ensure it was working correctly. They have also been able to improve their supply chain management and logistics to make sure that their orders and shipped with the correct amount of time to reach the client. Finally, they have created an "Innovation Day Falabella" in which people can propose new ideas to the firm. They have been able to create a smartphone application that allows users to have a gift list and share it with their friends. Although they did not have software developer expert in the company, they benefited from the application hub that cloud computing offers to launch the application and monitor their results.

Furthermore, cloud computing helps companies understand their clients and store all their information in a reliable system (High, 2012). As aforementioned, understanding customer needs and being able to adjust the products offered will increase sales and customer satisfaction. Adidas has understood this and has started to analysis trends in the different social networks to comprehend their customer needs (Mehrsai et al., 2013). The company is trying to position itself as a leader in the market for which it must understand the changes in trends, for which cloud computing and data analytics is essential. In addition, the firm has managed to understand its clients in a way that has created new segments to be able to make a more precise marketing. Adidas tries to approach each client individually to be able to offer them a customized customer journey according to the customer's preferences (Ceballos, 2016). Without cloud computing Adidas would not have been able to have a database that all employees can access and through which employees are able to influence the decisions of the client.

Burberry is also making use of cloud computing technology to improve communication among its employees (Agrawal et al., 2011). They have created a tool that allows their employees to talk to each other regardless of the location through a chat, Burberry Chat. Through this tool employees can ask information to other employees to understand in detail the customer with whom they are or to see if certain items in other stores quickly (Sprovieri, 2017). Cloud computing has enabled the company to create this application quickly and try it by monitoring its use and the improvements the company has benefited from. Thanks to cloud computing Burberry has started implementing the chat in a small part of their store and is now expanding its use to all stores as the first ones have shown good results. The IaaS that cloud computing offers has enabled Burberry to expand their chat when they have needed to do it.

In addition, cloud computing technology allows companies to manage their points of sale, creating a consistent multi-channel company. Companies that have all the information of their customers in the cloud can access it at any time in order to offer the customer the best possible service. This technology allows small businesses to group information from their clients when they connect through different channels, at a low price without the need to incur large investments (Ma, 2007). Companies that manage their points of sale efficiently obtain more loyal customers and can also offer a personalized service that increases sales.

There are many companies that are using cloud computing to improve the consistency offering customers an omnichannel service. One example is the Catalan company DABA, responsible for distributing Nespresso products in Spain (Orange, 2016). This company has used cloud computing to comprehensively and effectively manage the different channels it offers its customers. In this way, online sales with physical points of sale are integrated, and a call centre has been created to solve the problems of its customer community.

It should be noted that cloud computing technology allows the integration of other systems in the company. In the case of DABA, a CRM system and an ERP have been installed to allow managing both customers and all their products. In addition, it has managed to employ a new digital marketing strategy that has allowed them to increase sales. To ensure that the implementation of cloud computing is done efficiently, DABA has started by installing the infrastructure in a single store and thanks to the possibilities offered by cloud computing technology the firm has been able to reproduce the system in the rest of the subsidiaries. This way the company has been able to verify how the system works and has been able to understand the management of the change that has been necessary for its correct installation. Once optimized, the entire process has been implemented in the different subsidiaries in a satisfactory manner, offering an efficient and fast system that allows the company to offer the best service to its customers. In the future, the company would like to expand the system so that even mobile agents are able to access all the information at any time.

In addition to efficient client management, cloud computing technology allows companies to manage their products and prices in real time (Nannarone et al., 2012). Thanks to the use of electronic labels, companies can change the prices of their products quickly and minimizing the possibility of error. The company Metro, known in Spain as Media Market, has installed electronic tags in all its stores. The labels show the price of the product and can be changed thanks to an

application that connects the labels allowing the firm to see the price of all their products. This facilitates price changes needed when having discounts, the insertion of new products in the inventory and even monitoring the effects of marketing campaigns. Furthermore, the company has chosen to place different information points in digital screens in order to allow customers to interact with the products. So, customers can get all the information about a product in real time. Moreover, the company has made a digital transformation of its stores creating training rooms in which customers can learn to use the products they are going to buy. Metro is taking great advantage of cloud computing technology, improving the experience of its customers and offering them a new shopping experience.

4.5. Amazon Go

A company that has been able to analyse all the technologies and get the most out of it has been Amazon. The company has created new supermarket named Amazon Go. The technological giant has invested in a new sector, thus expanding its business. Amazon has created a new brand of supermarkets that use different technologies to ensure that the customer does not waste time in activities that do not add value to their purchase. It is a 170 square meter store located in Seattle, which opened its doors on January 22, 2018 (Figure 63). The store offers customers various products of prepared food and some fresh products. In addition, Amazon offers food prepared by their cooks, being able to buy breakfast, lunch or dinner. The store opens from 7am until 9pm.

Figure 63: Amazon Go

Amazon has created a supermarket where clients do not have to wait in line to pay for the products (Qiao et al., 2017). Customers identify themselves at the entrance, go through the different aisles of the supermarket taking the products they need and then simply leave the store without waiting for queues to pay. For this, Amazon has created an application called "Just Walk Out" (Wingfield, 2018). Amazon has used its employees to train the technology that is using in supermarkets creating a base from which they have learnt. For this the company has been almost 2 years

experimenting with his employees to be able to optimize the system. Nowadays Amazon Go offers a reliable system capable of detecting the different users and the products that they remove from the shelves, hence being able to charge them without having to go through the cash register (Thomas, 2017).

Amazon offers the possibility to reduce the time of purchase of its clients since these should not wait queues to be able to pay for their products (Rus, 2018). It also allows their customers to only need their mobile phone to make the purchase, no purses, or credit cards. Amazon has eliminated human interactions from the customer journey of the consumers of a supermarket. In addition, Amazon has eliminated the shopping carts so that the customer can easily walk the different aisles of the supermarket and put the products directly in their backpacks or bags. In this way Amazon Go customers can make go shopping quickly and without need to interact with another human being.

Amazon also obtains different advantages thanks to the technology that it is using (Mangalindan, 2018). The first is the reduction of their costs since they do not need to have employees in the cash registers. In addition, the company does not need to incur in costs of baskets and shopping carts since the customers can put the products directly in their backpacks. Furthermore, thanks to the technology that Amazon uses in its supermarket, the possibility of theft is reduced by reducing expenses. It should be noted that, although the company does not need to have employees in the cash registers, there are still workers who prepare the food and who place the products on the shelves. Through the technology that Amazon uses it is easy to know what products are in each shelf and thus be able to adjust their inventory to reduce costs (Howlett, 2018). Finally, it should be noted that Amazon uses the information of its customers to offer a personalized experience. Thanks to the knowledge that reaches the company through its customers and their purchases, the system can continue learning and improving to avoid errors, using deep learning.

Although everything seems to work correctly, the technological company has also had some problems. During the first few months of opening, Amazon Go had to control the number of customers inside the store in order to track their movements accurately. For this they needed to create a queue at the entrance making customers have to wait (just the opposite to the competitive advantage Amazon offered to their customers: avoid queues). Another problem with Amazon Go is that they have not created a way to return bought products. That is why if the system does not identify a product and a different product is charged to a customer they must go to the store to claim, complicating the return of their products. Amazon is improving its system through deep learning to avoid failures of this type and offer its customers the best possible shopping experience. If an item is not added to the virtual cart of a client Amazon does not charge them for it as they rely on their system and losses will be very rare. Whenever a product is incorrectly charged the company assumes the cost, they think that customers will not lie and as the company has a lot of information about each client, Amazon will be able to detect any misuse of their system.

Amazon Go uses a wide combination of technologies created by the group to identify each customer in the store and to know what product has been collected in order to charge it to the correct client. To do this, Amazon uses QR codes, facial recognition, cameras and sensors, beacons, proprietary codes for product identification and deep learning algorithms (Figure 64).

This way, each customer is identified individually and the different products that are collected are added to their account. The technology must be accurate to avoid errors, especially when clients are next to each other in the store. That is why Amazon has needed almost two years to optimize their system.

Figure 64: Amazon Go entrance

When the customer enters the supermarket, he must use the Amazon Go application that is linked to a credit card. The client must use a QR code that allows him to open the entry barriers. In this way the system is able to know the customers that are inside the establishment. In addition, the supermarket uses a facial recognition system to follow the customer through the establishment. Amazon has placed numerous cameras that allow customers to be followed through the establishment. For this function, it also uses geolocation systems that place the customer at an exact point in the store. Using Bluetooth, WiFi and beacons the firm is capable of locating all the different clients inside the store precisely.

Figure 65: Amazon Go store

Thanks to the cameras that Amazon has installed on the roof of its store, they are able to identify which customer is taking each product and thus be able to add it to the account through which the customer has been identified (Figure 65). In addition, it uses proximity and weight sensors that allow identifying each product and avoid errors. The weight sensors are placed in different shelves and when the client is located near the shelf and changes the weight, the system is able to identify the product that has been taken, although the cameras do not have complete vision. Furthermore, if a customer chooses a product and then returns it, the system is able to identify the product that has been returned even if it is not placed in the right place. Customers can store the products directly in their backpacks and the Amazon Go system will charge their price into the account associated with the customer when entering the store.

As mentioned, Amazon prepares food that customers can buy to eat directly. For this they have employees who are dedicated to preparing and packaging their different products. These products are endowed with codes created by Amazon that allows the cameras to identify which product the clients are taking. This facilitates the work to the cameras since they can read the code easily, and also ensures that the products are not been confused since many are very similar. The products of other companies pose a challenge for Amazon because in many cases the packaging is akin between them. That is why the company has needed to place weight and proximity sensors to know what product the customer is taking.

Finally, Amazon is using beacon technology to be able to send its customers personalized offers to their mobile phones. The use of proximity marketing increases the average basket by 3-5%. Thus, customers receive personalized offers during the purchase, offering complementary products to those they are taking from the shelves. Once the purchase is finished, the customer only has to leave the store and a few moments later he will receive the invoice of his purchase in his Amazon

account, through the application. The user can see a summary of their products and the time spent in the establishment making the purchase.

Amazon has created a deep learning system that allows the system to learn from the different customers that the store has. To train the system, the company has used its employees for almost 2 years to understand the functioning of all sensors and cameras and also to understand how customers make their purchases. Amazon has been able to solve problems such as how to charge a product if there are two customers who are very close when buying. Thanks to the deep learning algorithms, Amazon has created a system in which it is difficult to steal, erasing customer and employee theft, thus reducing costs in over 50 billion dollars annually. In addition, the possibility of undergoing errors when doing inventory has been reduced. Thanks to the trial period Amazon has been able to understand that it is necessary to have employees in their stores since the customers were lost during the first experience in the store. That is why they placed several employees both at the entrance and at the exit to help customers and explain them how everything works.

Figure 66: Amazon Go operating system (adapted from Amazon Go)

In conclusion, the Amazon Go system works according to the scheme of Figure 66. Clients are identified through the Amazon Go application. Once the client has been identified and the account associated with it is linked, different micro-localization technologies (Bluetooth, Wi-Fi or beacons) are used to be able to know the clients position continuously. Through the use of cameras, codes (RFID and those created by Amazon) and sensors (weight and facial recognition) the company is able to know what products are being taken by each customer to be able to add them to their virtual shopping cart. For this Amazon Go uses the company's own technology: Amazon Web Service IoT that allows the interaction of the store system with the Amazon Web Services cloud application. It also allows to store the information of each client making the system link the products to a user and thus be able to predict future purchases.

Amazon uses the different technologies that it has developed so that the firm avoids incurring in additional costs. Furthermore, it allows linking the clients' account with their Amazon Prime accounts to obtain a database that allows them to predict future actions and customer needs. The technology used by Amazon is easy to replicate allowing a rapid expansion once implemented in one of the stores. In 2017 Amazon acquired the Whole Food Market company, which suggests that its next move will be to include in the different stores of the acquired chain its technologies to create new Amazon Go stores. There are already plans to open new Amazon Go establishments in Chicago and San Francisco. An economic study will be carried out to understand how Amazon Go will be able to cut down the employee expenses and how the company will increase their sales thanks to proximity marketing, enabling the comprehension of the profitability of this type of premises.

For the economic study it will be assumed that within ten years Amazon will transform the various premises of the company Whole Food Market to create supermarkets that include their technology "just walk out" implemented in the establishment of Seattle. The company Whole Food Market has around 479 stores distributed through the USA. With this data the savings that Amazon will achieve as they do not have any employee in the cash registers, will be calculated.

It is going to be assumed that each supermarket has an average of 4 cash registers and that the opening hours of the establishments will be the same as the current Amazon Go schedule, that is, from 7 am to 9pm. Amazon Go will need to lengthen the opening schedules, as their competitors are starting to offer 24h services in some of their establishments. Hence, it will be supposed that Anmazon Go will be opened from 7am to 9 pm Monday to Saturday and Sundays the opening hours will be reduced to 7am to 2pm. Thus, the establishments remain open 14 hours a day for 6 days a week and 7 hours on Sundays. It is going to be assumed that each employee earns an average of 9.97 $ per hour (average salary of a cashier in the United States). Therefore, the savings that involve not having cash registers can be obtained in the following way:

$$\text{Savings} = \begin{matrix}\text{Number}\\ \text{of stores}\end{matrix} \times \begin{matrix}\text{Number of}\\ \text{cash registers}\end{matrix} \times \begin{matrix}\text{Salary}\\ \text{per hour}\end{matrix} \times \begin{matrix}\text{Number of}\\ \text{hours per day}\end{matrix} \times \begin{matrix}\text{Number of}\\ \text{days per week}\end{matrix} \times \begin{matrix}\text{Number of}\\ \text{weeks per year}\end{matrix}$$

$$Savings = 479\ x\ 4\ x\ 9.97\frac{\$}{h} x\ 91\frac{h}{w} x\ 52\frac{w}{y} = 90{,}393{,}124.64\frac{\$}{year}$$

Amazon Go will benefit from a reduction of their costs of around 90 million dollars per year if they transform all the stores of the recently acquired Whole Food Market.

Another advantage that Amazon Go has with regard to other supermarkets is the possibility to do proximity marketing. Thanks to all the different technologies the firm has installed in their stores there are able to know the position of all the customer and can send them special offers during their experience in the establishment. It has been shown that proximity marketing is capable of swelling the average amount of money spent in 3%. Thus, Amazon Go will see an increase in the average basket of their consumers. As to calculate the increase in sales per year in 2025, the number of stores the company will be supposed to be 479, the number of establishments Whole Food Market poses. A hypothesis of the number of clients per hour has been done as well as the

mean basket of the customers. 50 clients have been supposed to enter a store in an hour, and an average basket of 20$ will be used as a hypothesis as the store only sells basic food.

Increase in revenues	=	Number of stores	x	Number of clients per hour	x	Expense per client	x	Number of hours per day	x	Number of days per week	x	Number of weeks per year	x	Increase due to marketing

$$Increase\ in\ revenues = 479\ x\ 50\frac{clients}{hour}\ x\ 20\frac{\$}{client}\ x\ 91\frac{h}{w}x\ 52\frac{w}{y}\ x\ 3\%$$
$$= 67{,}998{,}840.00\ \$\ per\ year$$

If Amazon Go is capable of transforming the 479 stores to implement proximity marketing, they could benefit from an increase of around 68 million dollars per year. It can be seen that investing in technology brings many benefits not only for Amazon, but also for their customers. Although Amazon Go has been the first company to invest in technology to create this type of supermarkets there many other retailers starting to move towards a technological store.

It is possible to verify with the large number of examples of companies that are using technology to improve the customer experience, that the retail sector is undergoing a digital transformation. Although the majority of companies in this sector are knowing how to use technology, there are many retailers that are finding it difficult to carry out their digital transformation. This happens mainly in the oldest and smallest stores. This type of companies have less capital and therefore have more difficulties when it comes to investing in technology. Due to the changes that consumers have suffered, companies must adapt their systems to remain competitive in the new market in which they operate. This is mostly seen with millennials, who use technology continuously and require companies to have omnichannel environments. This fact supposes a greater pressure for small businesses that do not advance in their digital transformation.

In addition, there is a resistance to change, especially by managers because they have a great ignorance of the advantages of digitization. To achieve the digital transformation of a company it is necessary that all company managers support new initiatives and see investments in technology as an opportunity instead of an expense. Furthermore, it is necessary that companies hire personnel that are capable of understanding the technologies and that help ensure a correct implementation. It also influences employees, since a digital transformation poses a challenge for companies whose workers do not understand the current technology.

Finally, it is important to take into account the lack of confidence on the part of consumers on issues such as privacy, personal data or payments. These issues are one of the main dictators of digital transformation in the retail sector. A large portion of consumers believe that existing laws protect consumers from physical stores, but not those who buy through online channels. In addition, the digital transformation of the retail sector is something new, where there are many customers who do not feel safe due to ignorance. That is why companies should focus on creating secure pages that allow the customer to have confidence when paying and receive the privacy they want.

It can be seen that there are some barriers for companies in the retail sector to carry out digital transformations, but these barriers are beginning to disappear, offering all companies the possibility of having a digital strategy.

Chapter 5: Conclusions

One of the main objectives of this document was to understand how consumers have evolved in the 21st century. In addition, it was intended to analyse the changes that companies have made to continue satisfying the needs of new customers. In order to achieve this objective, a study of the current situation in which new business find themselves has been carried out. It has been proven that they have evolved thanks to the different technologies that have come into play. The customer journey of the clients has changed radically and the companies that have managed to understand this change are those that are going to be able to obtain a competitive advantage that allows them to increase their income.

After the analysis, it has been discovered that consumers no longer follow a linear path when buying a service or product, but that it has become a cycle (Figure 10). In this way the different experiences of the client in a company are linked with each purchase. The main difference that has been found is that customers of this new era of the consumer, look for information about the products or services that they will acquire before making the purchase. Clients are more informed than ever before, making them have higher expectations. If these expectations are not met, they will think that the service or product offered by the company is of poor quality (Parasuraman et al., 1988). It is therefore important for companies to manage the information about their products or services.

It has been discovered that new customers not only obtain information before buying the product but leave an evaluation once they have used the product. The Word of Mouth has gained great importance in recent years especially through social networks. If a product does not satisfy the customer, the client will publish a comment that could affect the company as other customers will read it. The main difference with the old consumers is that they did not evaluate the products before and most of the information was kept by the company.

Another change that has been discovered throughout this document is the increase in channels that consumers use. Until a few years ago, customers used to make personal contact with companies, but thanks to the use of technologies there are many types of channels that consumers can use nowadays. The main channels that have been included are social networks, web pages and applications. Companies must use technology to change their sales channels, consistently including all the new methods that have appeared. The main problem that a firm may have is the loss of clients for not offering the possibility of purchase through a channel.

In addition, a comparison has been made between the different customer journeys that new customers can follow to buy a product. Certain activities have been identified that remain the same regardless of the channel that the consumer uses. But it has also been proven that there are many more actions when customers make their purchases through several channels. That is why it is important for companies to have a multichannel strategy that allows users to interact continuously through different channels both online and offline. One of the main ways to achieve this is to rely on technologies that allow companies to be customer centric. When companies place the client at the centre of their business, they can understand through which channels they contact the company and thus offer continuity throughout their experience.

Secondly, an analysis has been made of the different technologies that allow companies to place the customer at the centre of their business. There are four technologies that most companies are using to carry out their digital transformation. The first is IoT that has been discovered to be used to capture data about the different clients and products of the company. IoT technology is essential to achieve a global vision of the firm, which will be able to optimize its processes in order to offer a better service or product to its clients. The main companies that offer IoT services are Amazon, Cisco and Honeywell, each one is focused on a different activity and therefore each business should investigate which firms offers the best product for them.

Another technology that has been identified as essential for companies that want to be customer centric, is cloud computing. Through their use, companies are able to store data to their clients and have access to them when they need it. This type of technology also allows firms to create applications quickly and pay only for the service that is used. In this way, companies are able to adjust their technology to the demand at every moment and can optimize the use of their devices. Before the creation of cloud computing companies should have sufficient technology to ensure their service to any demand so most of the time the devices were underutilized.

Big Data has also been identified as one of the most useful technologies for companies when it comes to getting to know their customers. This technology allows the analysis of a large amount of data to find patterns and trends that help companies predict future actions. Big data has not been very useful until the 21st century as there were no systems for managing the amount of data needed. Thanks to this technology, companies are capable and adjust their services to the demands and to know not only their clients but also the different processes and the possible failures they may have.

Finally, it has been detected that, although all the technologies that have been stated are very useful, it is necessary to have a platform that allows the company to get in touch with the client in an easy way. That is why the CRM has been identified as an essential part for any customer centric company. This system offers a global vision of each one of the clients being able to know information about purchases that they have made in the past and create a personalized marketing that increases the probabilities of purchase. This software not only offers a 360º view of each client, but also proposes a list of next actions for each of the customer segments that it allows to create. It can be concluded that any company that wants to be a customer centric must include a CRM system in its business.

A research of the different technological companies that offer solutions of each type of technology has been carried out. A resume of the company and the technologies they aim their solution at can be seen in Table 2.

Table 2: Technology summary

Technology	**Company**
IoT	Amazon
	Cisco
	Honeywell
Big Data	IBM
	Google
Cloud Computing	Amazon Web Service
	Microsoft
Customer Relationship Management	Salesforce

In spite of the number of solutions shown in Table 2 there are many other companies that offer technological solutions. The above companies have been chosen as they are leaders in their sector of activity and are the most well-known. All of them must keep adapting their solutions in order to maintain their market share and continue being competitive.

Although the main companies that offer solutions are large, they are specialized in the implementation of their technologies in all types of companies. In addition, the vast majority offer their systems as a service, allowing users to pay only for what they use, thus reducing the investment cost they must make. Even so it remains pending that the firms help their clients during the implementation to ensure that this is done correctly and to manage the change efficiently. Nowadays, this job is usually hired to consulting companies that have a lot of knowledge since they have performed this type of services in a large number of companies from different sectors.

The second objective pursued by this project is to understand how technologies have been applied in the retail sector. For this, examples of companies that have managed to implement these technologies correctly have been described. Through the different examples, it has been possible to understand the main advantages offered by technologies to the retail sector. Many of the companies used in the examples have implemented more than one solution, thus creating a customer centric company. It has been proven that companies that have changed their business model have managed to improve their results and the experience of their consumers. In addition, it has been understood that a change in the business model is needed to make a firm customer centric.

In the retail sector, IoT technology has been used through different devices such as beacons, employed to carry out proximity marketing and enable companies to offer their customers personalized offers according to where they are located. They have also used wearables, which have begun to enter the market and are already showing the wide range of possibilities offered mainly to give information to customers about the different products. Another technology used by companies in the retail sector is RFID tags, through which companies can control the products they have or provide information quickly and easily to their customers. Finally, it is worth highlighting the QR codes that companies use to carry out marketing campaigns and that also offer information to their customers. It can be concluded that in the retail sector IoT technology is mainly

used to give the client additional information that allows them to evaluate the products before buying them.

As mentioned earlier, in the Age of the Customer technology is being used to create customer centric companies that allow their clients to contact companies through different channels. To achieve a multichannel business, companies must combine the use of different technologies such as IoT, cloud computing and CRM systems. Having a multichannel strategy allows companies to offer a mixed experience to their clients in which the firm uses both online and offline channels. There are many companies in the retail sector that have created Click & Collect systems so that users who make their purchases online must go through the stores to pick up their purchases. Through this type of system, companies manage to increase contact with their customers, increasing the possibility of cross-selling.

There are many companies that use geolocation systems to create a mixed customer journey. Customers can use this technology when making their purchases as proposed by supermarket chains that offer a system of geolocation in their shopping carts. Another use of this technology is to place orders with the nearest stores and pick up and pay for the product. There are companies that have installed electronic devices in their stores to be able to inform their customers about their products and also provide personalized offers when they are connected to the devices.

Some companies have gone further and are testing technologies such as augmented reality and virtual reality. Through the use of these technologies companies can offer new experiences to their customers. It has been discovered that this technology allows interaction between customers and final products that was not easy to get before. In addition, it allows users to customize the products without incurring expenses and verify that the products they are going to buy conform to their needs. Companies in turn are able to reduce the space they need to show their products and improve the customer experience. Augmented reality and virtual reality will begin to appear in different sectors offering new possibilities to companies.

The last technology that has been found to be crucial for companies to become customer centric is cloud technology. This technology enables firms to store and analyse data in a continuous flow helping them to understand the information they capture through IoT systems. Companies in the retail sector are benefiting from the flexibility this technology offers to start their digital transformation in one of their store and expanding it once the test have been proven to be satisfactory. Cloud computing technology avoid large investments on tests allowing small businesses in the retail sector to have the chance to undergo a digital transformation and become customer centric.

Many changes in the way companies are doing their marketing campaigns have been spotted. During the realization of this paper the changes in the way companies are doing their marketing strategies have been found to be one of the main challenges. Technology has opened a wide range of solutions and possibilities that have enhanced customer centricity. During the Age of the Information, that is, during the 20th century, companies in the retail sector used different methods to carry out marketing. Mainly firms sent their customers adverts through mailboxes, they offered discount coupons when they made purchases and used stores to inform their customers of generic

offers. This has changed thanks to technology, and in this new Age of the Customer, companies no longer use these methods for marketing.

Nowadays the companies of the retail sector mainly use the applications and social networks to carry out the marketing of their establishments. As it has been possible to analyse throughout the document, most of the companies that have made a digital transformation have a community of clients which accumulate points or receive discounts after their purchases. In addition, in the retail sector, the use of social networks is being exploited to make brands and products known. This new method is much cheaper and more effective than the old mailing and allows companies to know their customers in detail. In the 21st century, personalized marketing can be carried out thanks to technology, which allows each client to have different publicity focusing on their needs. All these changes have been analysed in the last chapter of this document, in which these types of activities have been identified in the retail sector.

In the first chapter of this document different business models have been studied and it can now be concluded that those business models are not valid for companies that are undergoing a digital transformation. As it has been seen with the case study of Amazon Go, new disruptive business models based on technology in which the customers are in the core of the business are needed. Only customer centric business models will enable companies to survive in the competitive market in which they are found nowadays. The structure of companies should be modified to understand customers and for this, technology is of great importance.

Having the company's structure divided by customers instead of products can be achieved with the use of CRM systems. Understanding the customers' needs instead of the company's requirements can be accomplished through the use of big data. Metrics used to measure the firm's performance can be reshaped by the use of cloud computing and IoT technology. It can be concluded that a customer centric business model must use technology to transform the actual model. In addition, companies that do not manage to become customer focused will probably not survive in the Age of the Customer, that is why this document is of great importance for firms to understand the changes they should undergo.

As it has been mentioned in the first chapter of the document, companies are changing and becoming customer centric. For this a hypothesis of the new 5 forces of Porter diagram has been done (Figure 2). After having completed the paper it is possible to validate the hypotheses. It has been proven that small start-ups are able to challenge bigger firms as the entry barriers have been lowered. Technology has enabled small companies to appear specially those who sell their products through the internet. The costs they need to launch the company are lower and investments in technology have been reduced due to the possibility to pay it as they use it. In the near future this trend will persist as prices of technology continue to fall.

Throughout the Age of the Information, customers did not have information about the products, but it can be proven that in this new era consumers dictate the terms of each product. Thanks to technology, companies are able to show more information and in different ways to their clients. For their part, customers can use technology to compare information between the different options

they have when buying a product. It can be concluded that the assumption made about the buyers is valid.

The next block that has been analysed are the competitors, formerly the markets were stabilized and there were a limited number of competitors. In the new era competitors are beginning to use technology to achieve competitive advantages. In this way, when one of the leader companies of the sector makes a strategic move, even the smallest companies will be able to do so. It can be concluded that this hypothesis is not 100% true although it has been observed that in a couple of years this hypothesis will be true since competitors of any size will be able to respond quickly thanks to the use of technology.

Regarding substitutes, it has been proven that they no longer used the price to block their customers but use the technology to offer them better service and improve customer satisfaction. In this way companies are able to retain their customers using mainly customer loyalty systems. Therefore, it can be concluded that this hypothesis is valid since the most well-known companies are using technology to avoid being replaced, as it has been observed in the examples of the last chapter.

The last Porter force that has been analysed are the suppliers. These have suffered the digital transformations of the companies for which they work. Many of the companies have made digital transformations along the entire value chain. This is affecting the suppliers that must adapt their businesses to satisfy companies. In return the suppliers are getting more power as companies are starting to be loyal to a single provider that allows them to optimize their processes thanks to technology. A clear example are companies using RFID stickers to follow their inventory and are obliging supplier companies to install stickers in their products. Therefore, the hypothesis stated in the first chapter is valid.

It can be concluded that the hypotheses made at the beginning of the document are valid in most cases. In the blocks in which this is not fulfilled, it can be observed that the trend followed by the companies derives in the hypothesis and that in a few years this will be true.

In conclusion, it has been seen that customer centric companies have many advantages and therefore companies should invest in technology to be able to focus their efforts on customers. Thanks to predictive analytics and consumer information, companies are able to identify the preferences and the next best actions they should do to get more sales. Without the technology explained in the second chapter it is impossible to get this information and be able to improve the income.

After the completion of this document it can be concluded that companies are undergoing a change due to technology. All those companies that are not able to implement the new technological solutions that are appearing in the market will be left behind with respect to their competitors losing market share. In addition, it has been proven that the leading companies in their sectors have changed their business model to place the customer in the centre. All customer centric companies are benefiting from an increase in their income as they are able to know their customers better and offer the products and services they need.

It can also be concluded that customer centric benefits from many advantages. Among others, firms can increase customer contact that will improve the levels of satisfaction and quality. It will also increase the retention and profitability of the clients. Being customer centric ensures that the technological structure of the company is compatible with the evolution of the company and will enable the company to optimise their processes and resources. Moreover, customer centricity allows companies to have a continuous control over the processes in order to measure the efficiency and profitability of all the transformation. Finally, it is important to highlight that customer centric firms will be capable of transforming the customers knowledge into profitable actions and transform the company into a multichannel firm.

This study contributes to the existing literature by giving an in-depth analysis of the main technologies that enable companies to become customer centric. In addition, it offers companies examples of uses of the technology applied to the retail sector. Furthermore, technological companies can benefit from the examples of actions carried out by companies in the retail sector, as they can sell their products with different objectives. Although further research in other sector must be done companies can understand the meaning of customer centricity and the benefit it could bring along with possible solutions for their businesses.

Throughout this document the technologies that are helping companies to become customer centric have been detailed. Its features and the possible applications that the technologies offer have been analysed, it is therefore pending to conduct an economic study to understand which solutions are the most profitable. In addition, it will be necessary to update the different technologies used since they are constantly changing, and the technologies used today may not be the same in a couple of years. Some of the main technologies that are starting to develop and will be crucial in the future years and artificial intelligence and new sensors that will help companies develop wearables and understand their customers' requirements.

In the second part of the document, an analysis was made of the use of technologies in the retail sector. It remains pending therefore to carry out this same analysis for the different sectors and to see which companies are being able to take greater advantage of the technology. Likewise, it will be necessary to look for new technologies that are not being used in the retail sector but have applications in other sectors. In addition, an analysis of the different actions carried out by companies with existing technology should be carried out, which will therefore expand the applications of each technology.

It may be interesting to carry out a feasibility study in which small companies are analysed and the possibilities they have when carrying out the digital transformation. This type of company has not been studied in this document since it is necessary to carry out an in-depth study of each one of them. SMEs are very different from each other and not all have the same amount of money to invest in technology. Furthermore, this type of company has different needs depending on the sector in which it operates, and therefore they will have carried out different actions to digitally transform their businesses. The main solutions that SMEs usually carry out is to hire small companies or start-ups that offer specific technological solutions at a lower cost.

The start-ups that help other companies to transform digitally and become customer centric companies, usually only use a single technology. This type of company has not been studied and therefore an analysis could be carried out as further research. In general, this type of company has a limited number of clients and they are not well known. Finding information about them is more complicated but an analysis of the different applications they offer, and the prices could be of great help for small businesses.

To conclude, it is important to point out that technology and computer skills are developed at great speed: emerging technologies such as artificial intelligence are going to have a huge impact on business strategy and on the relationship of companies and brands with their customers (starting with technologies such as chatbots or virtual assistants). The path to put the client in the centre through technology is starting, and the journey that has changed the way in which companies (including other organizations such as citizen-related administrations) get in touch with their customers, impacting deeply on their operational and economic model.

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