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» The Internet of Things revolution

It is estimated there will be more than 20 billion items, including cars, appliances and even clothes, connected by 2020.

Initially created in the 1960s' in the United States to be a computer network for military purposes (known then as ARPANET), the Internet has evolved and become overwhelmingly popular in recent decades. According to data from the International Telecommunication Union (ITU), there are already more than 3 billion people connected to this worldwide network.

Beyond being a technological advancement, the Internet has proven to be a behavioral phenomenon. It has revolutionized, for example, how we communicate with other people (a good example of this is social networks such as Facebook and messaging apps like WhatsApp), receive information, listen to music and even buy products. E-commerce, in fact, has exploded—it is expected to jump from $1.5 trillion in retail sales alone recorded in 2015 to $3.6 trillion in 2019, according to data from an eMarketer research company.

FAR BEYOND COMPUTERS AND SMARTPHONES

Do you think that's a lot? You need to understand that a new connectivity revolution is already underway: the so-called Internet of Things. The term refers to the distribution of sensors in a variety of products and devices—everything from clothes to appliances to industrial machinery and even dog leashes—that connect to the World Wide Web, sending out information. By 2020, we will have more than 20 billion devices connected to the Internet, according to estimates from Gartner research company!

How does this change the lives of consumers and businesses? Users will have more efficient products available, which will make his life easier in various ways. Want a practical example of the Internet of Things? In some countries, it is possible to use a smartphone app to find out where the bus you want to catch is to make sure you get to the stop just minutes before it arrives. No more spending a long time waiting, right?

Another popular example of the so-called IoT is the Waze app. Just connect your smartphone and, thanks to a network with millions of users around the world who provide real-time information about position, travel speed and other helpful information, find out the best way to go, and even how long it will take to reach your destination.

In the area of wearables (devices that work like small computers connected to your body or inserted into clothing), it is already possible to find bracelets, smartwatches and apps that record information about the user's health and physical activities. Synchronized with the Internet, these devices work like a virtual personal trainer, even recording the wearer's performance history. French company Cityzen Science has already taken it a step further by creating the D-Shirt, a T-shirt that includes sensors in its fabric to measure the wearer's heart rate and provide a GPS system that monitors the user and sends real-time data to the cloud.

BIG DATA

For companies, in addition to increasingly innovative products, they will also have access to a never-before-seen volume of information about their customers—which is pure gold for those who know how to evaluate it. The sensors around the world produce key data about consumer habits and preferences that will boost the current so-called Big Data. It will be up to companies to intelligently analyze this information and to turn it into a competitive advantage by creating products more suited to their customers' needs. Whoever doesn't use this type of tool will be left behind.

Industry and e-commerce giants already know this and have initiatives in this area to get increasingly close to their customers. The online retailer Amazon, for example, works with partners such as General Electric Co. to develop devices to automate their purchasing system. With this technology, equipment such as washing machines or printers will notify stores that supplies are running low, allowing for automatic product purchase and delivery.

In addition to facilitating interactions with consumers, the IoT promotes a revolution on the factory floor by connecting machines to each other to provide real-time data, a trend that has been called Industry 4.0. Within it, sensors can be used to monitor all stages of production, following the product lifecycle from design to use. In this industry of the future, any problem identified in manufacturing is automatically reported faster and more efficiently, then resolved even without human interference.

Along with the huge range of possibilities that this type of technology offers, there are important questions associated with the efficiency of the Internet of Things that need to be evaluated so innovation does not undermine company or consumer reputation:

- **Compatibility** – The idea of having many devices connected to the internet and talking amongst themselves is very interesting, but for a conversation to be good, all its participants have to understand one another, right? We have already seen several proprietary Internet of Things systems developed that do not talk to each other. In the coming years, we will likely see an arm-wrestling match among major market players seeking to establish their format—as has happened in the past with, for example, technologies like Blu-ray (captained by Sony) and HD-DVD (backed by Toshiba) for the standard in high definition video. So consumers are not harmed by purchasing a product incompatible with other devices, it is best for the industry to invest in open technology standards, ensuring compatibility.

- **Greater exposure** – In a world with more and more available connected personal devices, the trend is for monitoring and real-time data sharing to grow as well, with greater brand exposure. Being attentive to what customers think, motivating engagement and being flexible during crisis situations will continue to be essential to preserve company image.

  From the consumer side, so-called "virtual footprints" (the tracks that our online habits leave on the Internet) will be increasingly evident. After all, we will have thousands of sensors associated with our behavior, recording our steps at all times. This may be optimal for companies who want to know more about their customers, but it feeds the discussion on the ethical use of personal information collected from users.

- **Digital divide** – According to data from the World Bank, despite the popularity and importance of the Internet, only 40 percent of the world's population has access to the World Wide Web. Having billions of devices connected to IoT will

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not mean a reduction in the digital divide that we currently face. Technology should serve to break down barriers, not increase the chasms that already separate the rich from the poor.

- **Safety** – Companies that embark into this new world of possibilities must also be attentive to the issue of data security, which is still one of the major obstacles to adoption for many brands. This is due to the fact that more connected devices can also mean a greater number of vulnerabilities that could be exploited by cybercriminals. According to specialists, the pace at which this technology has been adopted has been much faster than the pace at which security solutions have been developed for this environment. A study conducted by HP with 10 smartwatches last year, for example, found vulnerabilities in all 10 tested, with problems related to authentication and encryption, among others.

Remember that user information leaks have a strong impact on the level of trust and on a company's reputation. If a company offers devices that monitor, for example, a person's health, the company then has an obligation to protect the sensitive data collected from undue public exposure, both to protect user privacy and so it does not to have to deal with lawsuits and its product being associated with insecurity and neglect. Cases have already been identified with Wi-Fi cameras and camcorders that had their images captured by hackers. In countries like the United States and Brazil, equipment such as baby monitors with internet access has been hacked. Imagine a mother's product satisfaction when she learns that her child is being filmed by a criminal who could even talk to her child through the equipment… In this scenario, investment in security solutions and exhaustive product testing before arrival on the market will be essential to ensuring customer satisfaction and confidence—key elements of a company's good reputation.

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