Department of Business and Management

# *A marketing perspective on the application of IoT technology in the automotive industry.*

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# Abstract

**Purpose** – "Internet of things" in its broadest sense regards the connection between different objects, devices, tools that "talk" with each other. These devices, connected with automated systems can gather information, important data. The latter, when analyzed, gives to the users the ability to learn a new process or to facilitate some actions. In the automotive industry the implementation of this technology started in the early 2000s. This paper aims to examine, from a marketing point of view, which feature of the IoT in a car could be enhanced by a car manufacturer and increase consequently the consumer purchase intention.

**Design/methodology/approach** – The study used a model deriving from Yaping et al. (2014), Pinochet et al (2017) and mostly from Holman (2017). The model based on the D.V, I.V, and a moderator gives us a prospect of what's the correlation between the purchase intention of consumers and the implementation of IoT technology in cars. The questionnaire proposed to the interviewees was structured using a 7-point Likert scale. It was translated into four languages: English, Italian, Portuguese, and Spanish. In conclusion, the responses of the surveys have been analyzed using SPSS software.

**Findings** – The results, when gathered, showed that the moderator has a quite relevant effect among the relationship between the I.V and the D.V. Was found that among all the IoT systems just one model was significant and in particular only one dimension of the four was exhaustive for the study.

**Model** –The integrated model used to develop the project explores the "drivers" that could lead the consumers to change positively their perception towards the "IoT" technology and increase their purchase intention. It is directly linked to the most practical sphere of using a car and its technology. In this case, in fact, the emotional bond that could be present between individuals and cars was not accounted.



**Keywords** – Internet of Things, information, data analysis, car manufactures, LKAS, smart navigation, adaptive cruise control, big data, automotive industry.

# Introduction

The term "Internet of Things" was firstly coined in 1999 by Kevin Ashton. It refers to the technology in which devices are constantly connected to the Internet, permitting a direct "talk" with the user and other machines. IoT is now the big topic for most of the innovations related to different industries of the global economy. Its implementation is going fast and with the introduction of 5G [1]and other infrastructure utilities are going to be even faster.

IoT technologies aim to help the consumers/users in their daily routine. By infusing intelligent systems, normal activities will be more efficient and timesaving (Aris, Sahbusdin, & Amin, 2015). IoT is used in several industries: automotive, healthcare, manufacturing. retail and energy[2]. Between 2015 and 2020 the IoT market reached an annual revenue of almost $7 trillion and 50 billion connected devices[3]. Forecasters stated that the IoT market will change before the 2025 (Leuth, 2015). There will be an increasing revenue among different industries and even more procedures and routines will be computerized and digitalized. Nevertheless, the implementation and usage of connected devices and IoT technologies has brought serious concerns among users and potential consumers[4] (Abashidze & Dabrowski, 2017). It's not easily comprehensive how IoT technologies work and that's why from the individual user's perspective it could be considered as worrying. Privacy, security and access to the data gathered by companies are the main reasons why IoT still keeps some people away from it (Bros, Marijn, & Herder, 2019). Moreover, it's very difficult to interpret and identify consumers responses to IoT devices. Researchers in fact, noticed a huge lack of literature regarding the marketing and consumer behavior with IoT whereas most of it is related to mathematical and engineering studies. Systematically, when we discuss about IoT in cars [5](automotive industry) we refer to:

- *In-vehicle infotainment:* Smart apps are used in cars as a navigation system and entertainment. Google Car and Apple Carplay, for example, can be used while traveling. All the apps that are in our smartphone can be likewise in the car
- *Predictive maintenance*: Sensors in different parts of the car (engines, suspension, tires, electrical system) can measure and forecast the performance of the car. When necessary they alert the driver/owner that a new update or repair is requested.

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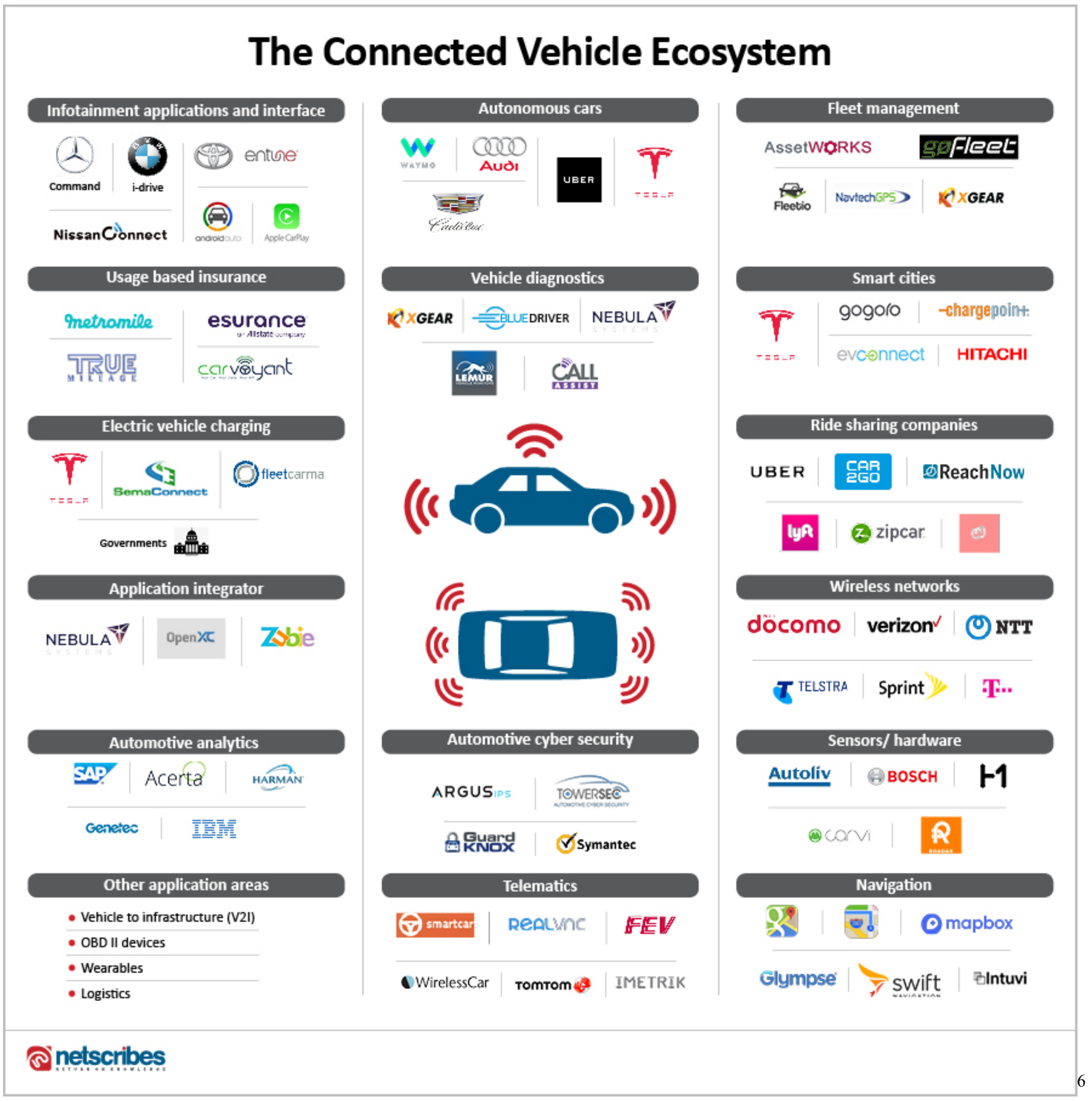
[1] https://medium.com/the-research-nest/the-intersection-of-big-data-and-5g-b543490d45a0
[2] https://iot-analytics.com/top-10-iot-applications-in-2020/
[3] https://www.statista.com
[4] https://www.cybersecurity-insiders.com/what-are-the-biggest-privacy-issues-associated-with-big-data/
[5] https://www.fpt-software.com/applications-of-iot-in-the-automotive-industry/

- *Security and safety*: External sensors are used to prevent collisions with other cars or pedestrians. Tesla and Volvo systems are the most innovative. They can help you parking, assist you while driving and decelerate or accelerate when necessary.
- *Data Analytics and dashboard reporting*: Connected cars offer rich data about the driver and the car. More IoT equipped cars would bring lots of benefit to car companies and customers. It could give faster responses to any mechanical or technological issue and facilitate the work for companies in understanding the needs of customers and how to better serve them.
- *Real-time monitoring*: IoT equipped cars give real time notifications and alerts to drivers and car manufactures when something is not working properly. The systems then, automatically warn the nearest service center or car dealer.



[6]

(Fig. 1)

[6] Fig. 1- https://www.netscribes.com/the-present-and-future-role-of-automotive-iot/

## Literature Review

The so called IoT is the prospect of a new technology that was born several years ago but found its peak in recent years. Since then the Internet has changed. We moved from the usual interface between user and machine to the new era (Web 4.0) where users and machines can interact with each other and computers can even understand consumer' needs in advance (Holman, 2017). Internet of things, apart from the automotive industry, has been used for years in other different industries. Relevant examples are health management services , transportation & logistics. Differently from the past, today marketing strategies relies mostly on data and insights that come from consumer behaviors and decision. In the past for marketers were really difficult to gather information about consumers and create targeted sets of marketing campaigns. Marketing today has new tools, but the consumers have changed alongside. Research showed that consumers perceived traditional advertisings as unauthentic. For this reason, brands are moving to content marketing. Instead of using traditional channels to do marketing, marketers focus on creating specific contents for targeted samples of consumers, in order to reach higher ROI (Kuo, Wu, & Deng, 2009). IoT devices can communicate and interact "among themselves building networks of interconnected objects or with users or other entities in and react to users' needs in anytime and anywhere (Miorandi, Sicari, De Pellegrini, & Chlamtac, 2012). Four dimensions have been taken into consideration regarding the willingness of consumers to purchase a car equipped with IoT. As mentioned in previous research, consumers do feel concerned when talking about giving data and security procedures. Ease of use, interaction with the car and connectivity within the car have also been accounted as features important when deciding which car to buy. Marketing could be used as the touchpoint between technology and consumers. The missing point for consumers is that they do no catch the importance of IoT and the usefulness it could bring them[7]. Researchers have proposed multiple modifications in order to find the most suitable solution to adapt IoT to consumer needs and find what could lead to a better integration of them in their daily life.[8] Some pointed out that consumers and users are afraid and very sensitive about data and privacy. For others, there is a huge lack of communication of what IoT can do and what it is. Our cars can detect people crossing roads, connect to our smartphones, check the traffic, choose the

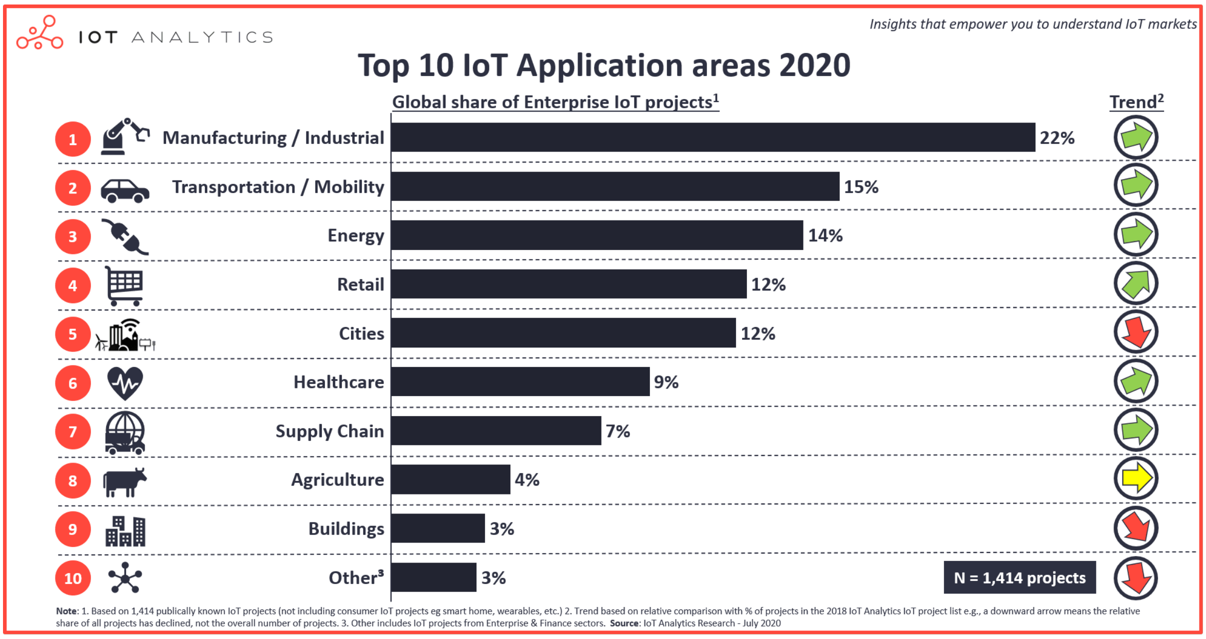
[7] https://www.consumersinternational.org/media/1292/connection-and-protection-the-internet-of-things-and-challenges-for-consumer-protection.pdf
[8] https://www.autonews.com/commentary/5-ways-iot-data-science-can-reshape-automotive-sector

song for us, park without touching the steering wheel and even auto-driving. But, although there have been several ads promoting vehicles' new innovative technologies, drivers are still resistant to purchase them. This could be caused by a general disregard toward innovations or because marketing is doing wrong.

Technically, IoT cars or so-called "connected cars" can be (Cohen, Arce-Plevnik, & Shor):[9]

- *V2V*: this connection allows vehicles to share data with each other. For example, data about location, speed and dynamics that could prevent accidents
- *V2P*: Can be used by pedestrians, sharing their position and check for taxis or even connect to the pedestrian walking system and change traffic lights to cross a road
- *V2I:* It refers to the connection with infrastructure like traffic lights, lane markings, toll booths and road signs.
- *V2X*: It helps the driver knowing if weather conditions could change, accidents on the road. It can be connected to smartphones to start songs or to share localization. (GPS)

This study will seek to identify if marketing strategies are effective on users when choosing a car to buy, identify what system is most accepted and what are the drivers that could help people approach easier to IoT.

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*(Fig. 2) First ten industry of IoT implementation.*

[9] https://www.biz4intellia.com/blog/iot-applications-in-automotive-industry/
[10] Fig. 2 - https://iot-analytics.com/top-10-iot-project-application-areas-q3-2016/

## Model and research hypothesis

The research aimed to determine what are the variables that could increase the willingness to pay of users and potential customers towards cars equipped with IoT systems and if Marketing could have an incisive role in that. The systems used to analyze the different responses to this technology were: Smart navigation, Adaptive cruise control (ACC) and Lane Keeping Assist (LKA). Each system was composed of four independent variables. Thereby:

- *Smart navigation:* It's a way of navigating using apps, web apps, sensors that are connected to the internet. It uses real-time data to give you notifications about traffic situation, speed cameras, road works and any other type of relevant information. Smart parking, sensors and navigation apps are various tools used. [11]
    - *Smart parking system*: It uses sensors in the back and eventually in the front to help the driver in the parking. They are usually connected to an app or integrated in the car system. The latest version of this system can park the car automatically and autonomously without the intervention of the driver.
    - *Smart navigations apps:* Are applications that share real time information while you're driving. Waze, for example, uses real time data to give the drivers instant updates on traffic jam, speed limits, roadworks, car accidents, police roadblocks and speed cameras.


*(Fig. 3) Smart navigation system; (Waze)*[12]

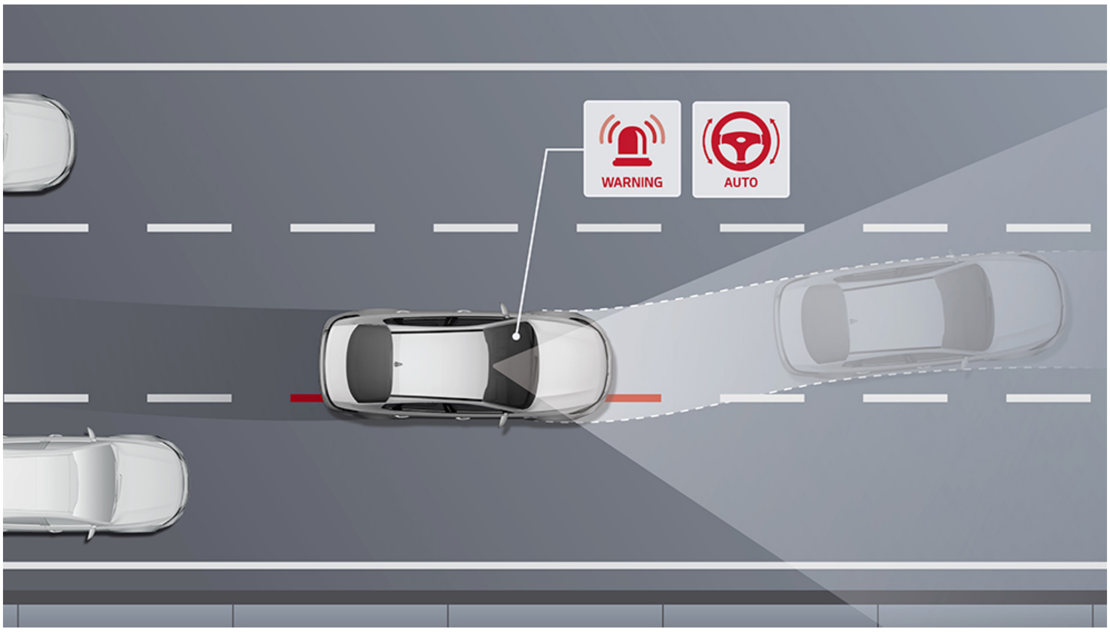
[11] https://www.parkeagle.com/2018/05/23/what-is-smart-navigation/
[12] Fig. 3 - https://thegadgetflow.com/blog/smart-navigation-systems/

- *ACC system:* The adaptive cruise control is an active system that controls the acceleration and braking of a vehicle. It helps the drivers in long journeys and enhance a comfortable driving experience. The vehicle, using its sensor, can monitor the velocity, the position and the direction of the vehicle in front of us and keep the distance with the following vehicle. The system adapts itself to the different settings of the driving mode (comfort, sport and economical) calculating the optimal speed, road curvature, possible accidents and more.


*(Fig. 4) Adaptive cruise control analysis,* 13

- *LKA system*[14]*:* This system allows the driver to remain in his marked line. It actively helps the driver in everyday journeys. The system is equipped with a multi-purpose camera that combines artificial intelligence and algorithm processing. It calculates the velocity and distance between the line and the car. It uses a camera to detect the lane markings ahead and to monitor the vehicle position. When the vehicles start deviating their position, the system alerts the driver with a "beep" and then counter-steers to the optimal position. The execution is possible via electronic power steering or with the individual wheel braking using the electronic stability program (ESP).

[13] Fig.4 - https://www.tomtom.com/blog/adas/what-is-adaptive-cruise-control/
[14] Fig. 5 - https://www.bosch-mobility-solutions.com/en/products-and-services/passenger-cars-and-light-commercial-vehicles/driver-assistance-systems/lane-keeping-assist/




*(Fig. 5) Lane Keeping Assist functioning.*

- *Connectivity*: IoT systems can connect to the internet, collect information and data instantly. It gives help on managing, controlling and tracking. It also refers to the velocity to which the vehicle and the infrastructure are connected and how fast the driver can detect the information he gets on his screen ( (Chang, Dong, & Sun, 2014). Thus, I proposed the following hypothesis:
    - *H1.* IoT connectivity in the car will have a significant effect on consumer's purchase intention
- *Interaction:* Connecting the car could bring a big help to the driver which could facilitate its interaction, reduce the time spent on habitual actions and increase his satisfaction. (Venkatesh et al, 2003). Thus, we formulated the following hypothesis:
    - *H2.* IoT interaction with the car will have a significant effect on consumer's purchase intention
- *Usability:* Facilitate the usage of IoT systems could bring a new level of digitalization of vehicles and improve his quality of driving. (Venkatesh et al,2003). Therefore, I suggested as hypothesis:
    - *H3.* Usability of an IoT system will have a significant effect on consumer' purchase intention
- *Privacy and Security:* Data regulation and managing is a big concern related to IoT. Sharing private information while driving could harm the consumer and undermine his trust towards the brand. (Porto Bellini et al; Diven & Hart, 2016). Thereby:

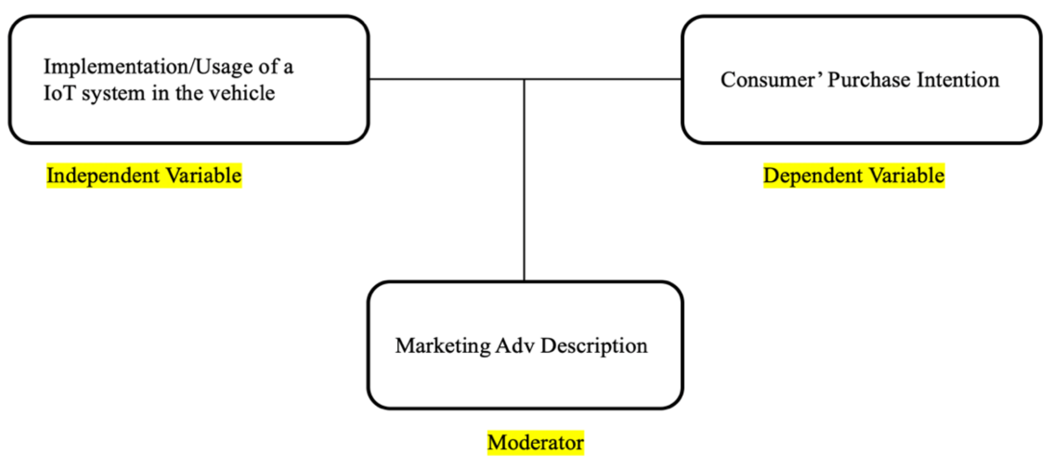
- *H4.* The Security of IoT systems will have a significant effect on consumer' purchase intention.

## Methodology

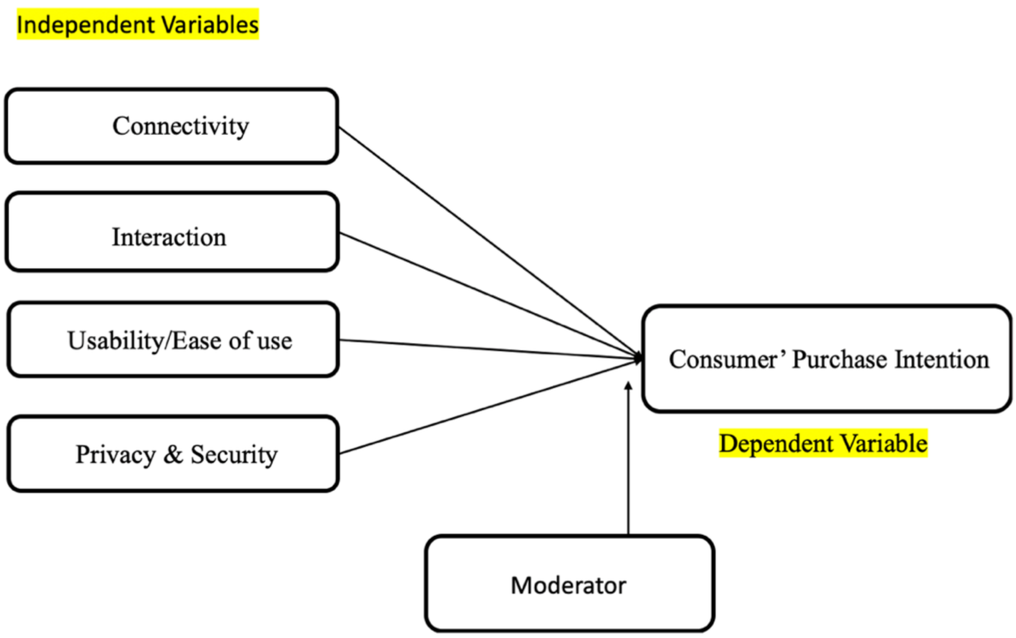
The purpose of the study was to identify which system of the three was the most preferred among the participants and how the marketing ads description changed the perception of the product and influenced the consumer purchase intention. The online survey counted 193 respondents, 52% of male and 48% of female with an annual salary (after the currency evaluation) between 15.000€ and 28.000€. It was translated and then published in four different languages: English (29%), Italian (60%), Portuguese (5%) and Spanish (6%). To adapt the model to the different languages I used the process of the reverse translation checked by specialists. The online questionnaire was conducted through QualtricsXM and was spread using the main social networks: Facebook, Instagram, and LinkedIn and via email. The questions were adapted using a study of *Holman* (2017) at the Texas University and *Yaping et al*. (2014). The survey was structured in 3 pairs of systems, randomized, with or without the moderator, respectively composed of 16 and 15 questions each. The influence of each system on the consumer' purchase intention, based on the same 4 dimensions aforementioned, was measured with a Likert scale of seven points, from 1= totally agree to 7= totally disagree. The figure 1 represents the structure of the research model.

*Conceptual Diagram*

1st Model



*Statistical Diagram*




# Result Analysis

## <u>Respondents' Attributes</u>

According to the demographic analysis of the survey sample, more than half belong to the male gender. However, female represents a big number of respondents which explains a great equilibrium between the two genders among IoT technology and equipped cars. The majority of the interviewees were under 25 years old, but a consistent percentage of adults were considered in the study, who gave a significant meaning to the research. The level of income, which includes individuals and family was remarkably low. Just a small portion of the sample could count on a robust level of annual income (6.8%). Respondents, as showed in the table, were mostly postgraduates which means that they had at least finished a 4 years career.

*(Table 3)*

| ATTRIBUTES | TYPE | N | FREQUENCY (%) |
|---|---|---|---|
| Gender | Male | 100 | 52.40 |
| | Female | 92 | 47. 60 |
| Age group | <20 years | 11 | 5.7 |
| | From 21 to 25 years | 136 | 70.9 |
| | From 26 to 30 years | 14 | 7.2 |
| | From 31 to 35 years | 6 | 3.5 |
| | From 36 to 40 years | 1 | 0.5 |
| | From 41 to 45 years | 5 | 2.6 |
| | From 46 to 50 years | 5 | 2.5 |
| | > 51 years old | 14 | 7.2 |
| Income | <15.000€ | 77 | 40 |
| | From 15.000€ to 28.000€ | 54 | 28.2 |
| | From 28.000€ to 55.000€ | 29 | 15.1 |
| | From 55.000€ to 75.000€ | 19 | 9.9 |
| | > 75.000€ | 13 | 6.8 |
| Education | High school diploma | 26 | 13.5 |
| | Undergraduate | 71 | 37.0 |
| | Postgraduate | 80 | 41.7 |
| | MBA/PhD | 4 | 2.1 |
| | Other | 11 | 5.7 |

*(Table 4)*

| IoT systems | Cronbach’s alpha |
|---|---|
| Smart navigation | .172 |
| ACC | .846 |
| LKAS | .817 |
| Smart navigation without moderator | .724 |
| ACC without moderator | .765 |
| LKAS without moderator | .800 |

The questionnaire was composed of three IoT systems, each one had a version with video and adv marketing description while the other did not. Each system has a set of questions based on four different independent variables: Connectivity, Interaction, Ease of use (Usability) and Privacy & Security. Reliability scores were measured:

(Table 1)

Through the systems which are composed of the four independent variables was found that among the six, just the smart navigation system was not reliable with an alpha that was highly not acceptable. The others, instead, had a level that has been defined as acceptable or even good (See Table 1). As D.V, also the purchase intention was measured. The Cronbach alpha resulted to be .681which means that the Dependent variable is reliable. Firstly, descriptive statistics were run to determine the difference between the systems (with and without moderator) taking into account all the independent variables:

*Means and t-test for variables used to detect purchase intention of IoT cars.*

Smart Navigation

| Variable Name | M(SD)-Modt. | M(SD)- no Modt. | t | P |
|---|---|---|---|---|
| Connectivity | 2.17(1.37) | 2.02 (1.012) | -0,136 | .93 |
| Interaction | 2.04 (1.16) | 2.33 (1.43) | -0,376 | .73 |
| Usability | 1.75 (1.225) | 1.86 (.774) | 1,22 | .23 |
| Privacy and Security | 1.75 (.676) | 1.95 (1.022) | 4,5 | .06 |

ACC

| Variable Name | M(SD)-Modt. | M(SD)- no Modt. | t | P |
|---|---|---|---|---|
| Connectivity | 1.90 (1.12) | 2.45 (1.028) | 1.35 | .651 |
| Interaction | 2.00 (1.14) | 2.48 (.926) | .00 | .440 |
| Usability | 1.80( 1.215) | 2.68 (1.25) | -0,25 | .394 |
| Privacy and Security | 1.73 (1.015) | 2.10 (1.012) | -1,2 | .752 |

LKA

| Variable Name | M(SD)-Modt. | M(SD)- no Modt. | t | P |
|---|---|---|---|---|
| Connectivity | 1.97 (1.217) | 2.15 (1.06) | 1.112 | .421 |
| Interaction | 1.93 (1.05) | 2.30 (1.15) | .731 | 0.82 |
| Usability | 2.00 (1.4) | 1.82 (.917) | 1.63 | .901 |
| Privacy and Security | 2.00 (1.41) | 1.85 (1.004) | -1,28 | 0.01 |

To determine whether the variables suffer from multicollinearity and if there was any case of direct causality between the independent variables was run a Correlation analysis. As represented below, the majority of the variables were statistically significant and no case of interdependence between the variables occurred with a VIF<5. The correlation between Connectivity and Interaction was significantly high among all the systems. In particular, in both ACC model and LKA with the moderator the level of Pearson correlation was the same.

*Smart navigation – moderator*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | USABILITY | PRIVACY & SECURITY |
| CONNECTIVITY | Pearson Corr | | | | |
| | Sign | | | | |
| | | | | | |
| INTERACTION | Pearson Corr | | | | .436 |
| | Sign | | | | .033 |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | .447 | |
| | Sign | | | .029 | |

*(Table 5)*

*ACC – Moderator*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | PRIVACY &SECURITY | USABILITY |
| CONNECTIVITY | Pearson Corr | | .825 | .600 | .500 |
| | Sign | | .000 | .001 | .011 |
| | | | | | |
| INTERACTION | Pearson Corr | | | .70 | .366 |
| | Sign | | | .000 | .047 |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | | .515 |
| | Sign | | | | .004 |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |

*(Table 6)*

*LKA – Moderator*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | PRIVACY & SECURITY | USABILITY |
| CONNECTIVITY | Pearson Corr | | .825 | .590 | .459 |
| | Sign | | .000 | .001 | .011 |
| | | | | | |
| INTERACTION | Pearson Corr | | | .688 | .366 |
| | Sign | | | .000 | .047 |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | | .515 |
| | Sign | | | | .004 |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |

*(Table 7)*

*Smart Navigation – no modt.*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | PRIVACY & SECURITY | USABILITY |
| CONNECTIVITY | Pearson Corr | | .506 | .400 | .485 |
| | Sign | | .001 | .008 | .001 |
| | | | | | |
| INTERACTION | Pearson Corr | | | .517 | .402 |
| | Sign | | | .000 | .007 |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | | |
| | Sign | | | | |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |

*(Table 8)*

*ACC – no modt.*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | PRIVACY & SECURITY | USABILITY |
| CONNECTIVITY | Pearson Corr | | .743 | .500 | |
| | Sign | | .000 | .010 | |
| | | | | | |
| INTERACTION | Pearson Corr | | | .543 | .411 |
| | Sign | | | .002 | .022 |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | | .395 |
| | Sign | | | | .028 |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |

*(Table 9)*

*LKAS – no modt.*

| CORRELATION | | | | | |
|---|---|---|---|---|---|
| | | CONNECTIVITY | INTERACTION | PRIVACY & SECURITY | USABILITY |
| CONNECTIVITY | Pearson Corr | | .823 | | .432 |
| | Sign | | .000 | | .012 |
| | | | | | |
| INTERACTION | Pearson Corr | | | .436 | .471 |
| | Sign | | | .011 | .006 |
| | | | | | |
| PRIVACY & SECURITY | Pearson Corr | | | | .682 |
| | Sign | | | | .000 |
| | | | | | |
| USABILITY | Pearson Corr | | | | |
| | Sign | | | | |

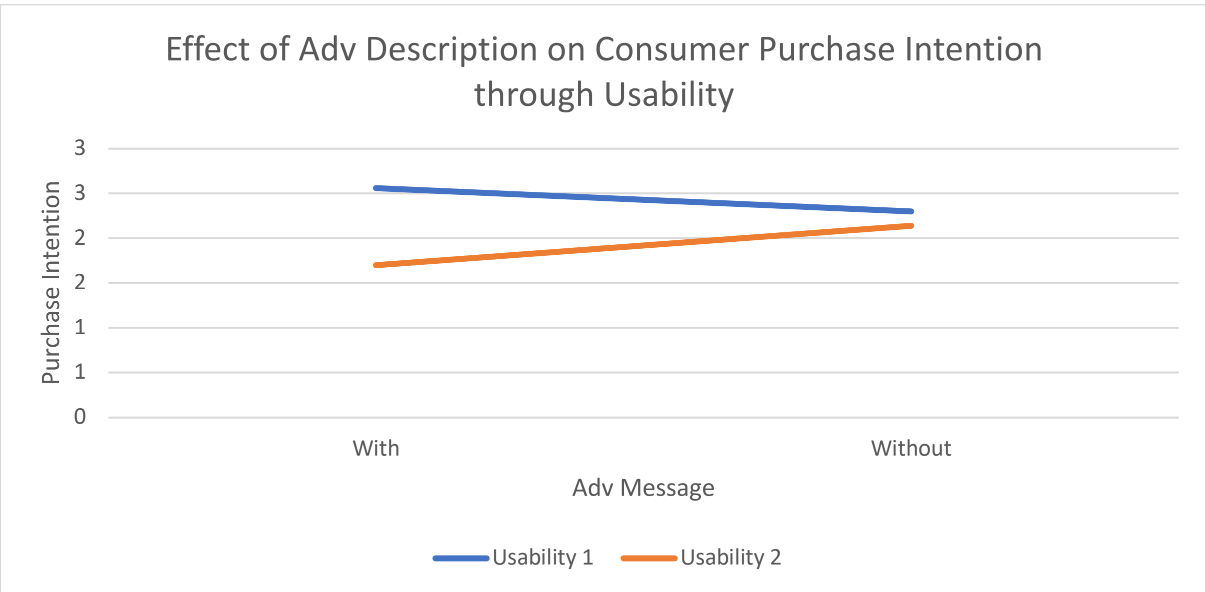
*(Table 10)*

In addition to the correlation, was run a linear regression analysis to determine which factors were significant predictors of purchase intention. The regression analysis determined that among all the 6 systems presented just one could verify the model.

| Lane Keeping Assist System | | |
|---|---|---|
| R | R^2 | Sign |
| .631 | .398 | 0,01 |

*(Table 11)*

Apart from the previous results, **in order to validate** the study and determine if **the model was verified** or not, an analysis of the model 1 was run. To demonstrate the relationship between the independent variable with the dependent and the effect of the Moderator was used a Model 1 of Process Macro. The analysis showed that just one variable of one system could really explain the effect of moderator among the relationship between the I.V and the D.V. The model has been accounted as significant when dealing with the Usability in the Lane Keeping Assist system. The model presented a p-value<0,05 and an R-squared of .83%. In addition to that, the moderator has created a conditional effect of the X (I.V.) on Y (D.V.) accountable for p-value: .04 with LLCI and UCLI respectively of .1219 and 4.519. Therefore, the Model can be represented:



From the graph we can deduce that the Purchase Intention regarding the case of the Lane Keeping Assist through the I.V is significant when we have the adv description and not statistically significant when there isn't. It means that Usability in the first scenario could be represent the case in which consumers are affected by the IoT system which influenced their willingness to pay. Whereas the "without" zone could not be accounted as reliable because not significant.

## Conclusions

The study was an attempt to understand which IoT system potential customers would prefer in their car and what are the determinants that influence consumers when purchasing an IoT product, in particular a new vehicle.

By adapting the models from (Chang, Y., Dong, X., & Sun, W. 2014), (Holman, M. 2017) and (Contreras Pinochet, Lopez, Srulzon, & Onusic, 2017), I showed that the construct is applicable, and the hypotheses were relevant enough. The research allowed to confirm that 1 of the six systems detected in the study was valid and significant. Could be said that the Lane keeping assist system integrated with a moderator effect had a positive result on consumers especially in the scenario where we had Usability as I.V. Differently from the literature, privacy and security concerns didn't affect the choice of the consumers (see Means prospect tables). This is probably due to the fact that, oppositely from other industries and IoT utilization (think about smartphones), consumers can't see the actual correlation between driving a car and sharing their data. The first results achieved came from an analysis of almost 200 respondents, mostly coming from southern countries of Europe, with a big number of youngers. Customs and diverse cultural features may have influenced the decisions of the interviewees. It seems that young consumers are moving away from the concept of having an emotional bond with a car to establish a more functional relationship enhancing features like infotainment, driving systems, autopiloting (McKinsey&Company, 2016). From an analytical perspective, marketers should enhance and magnify the sense of usefulness and advantage that these products could give to customers, influencing their purchase intention and satisfaction (Labus & Bogdanović, 2017). This suggests that advertising could differentiate on IoT technologies (Jooste, 2017) or similar products (related to automotive industry), because according to the findings more than 45% of respondents have never even once heard of IoT technology and 43% are undecided about purchasing a car accessorized with this type of technology. In conclusion, I suggest that car manufactures, and marketing department should focus on the attributes (variables) with the lowest significance and on the systems that could not be able to represent the model in order to create products for specific niches of markets and customers (Maier, 2016), which are always more and more informed, connected and with distinctive needs (Nguyen & Simkin, 2017)

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