

# The Acceptance and Consulting Quality of Automatic Emergency Call Systems for Cars

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**Abstract.** Since March 2018 cars in the EU need to be equipped with a car emergency call system called eCall. The continuous critique linked to eCall and data protection was the starting point for two studies: the first analysed acceptance factors of the eCall system, while the second study analysed the consulting quality in relation to data protection linked to emergency call systems in cars. The safety feeling generated by the existence of eCall, concerns regarding the data usage as well as trust in handling data have been identified as the main drivers for the acceptance of eCall systems. The second study showed that customers as well as seller/consultants are not yet properly informed about the new system.

**Keywords:** emergency calls, data protection, quality of consulting.

## 1 Introduction and Aims

The amount of produced cars in Europe is continuously increasing and has reached the number of over 17 Million cars for the year 2017 [1]. As a consequence the total amount of registered cars in the EU is currently bigger than 45 Million [2]. At this number, it is natural that the death toll in traffic accidents reached more than 26000 persons within the European Union [3]. Although this amount stagnates, it is still a considerable number. Only in Germany during the year 2015 3277 persons died as a result of a traffic accidents [3].

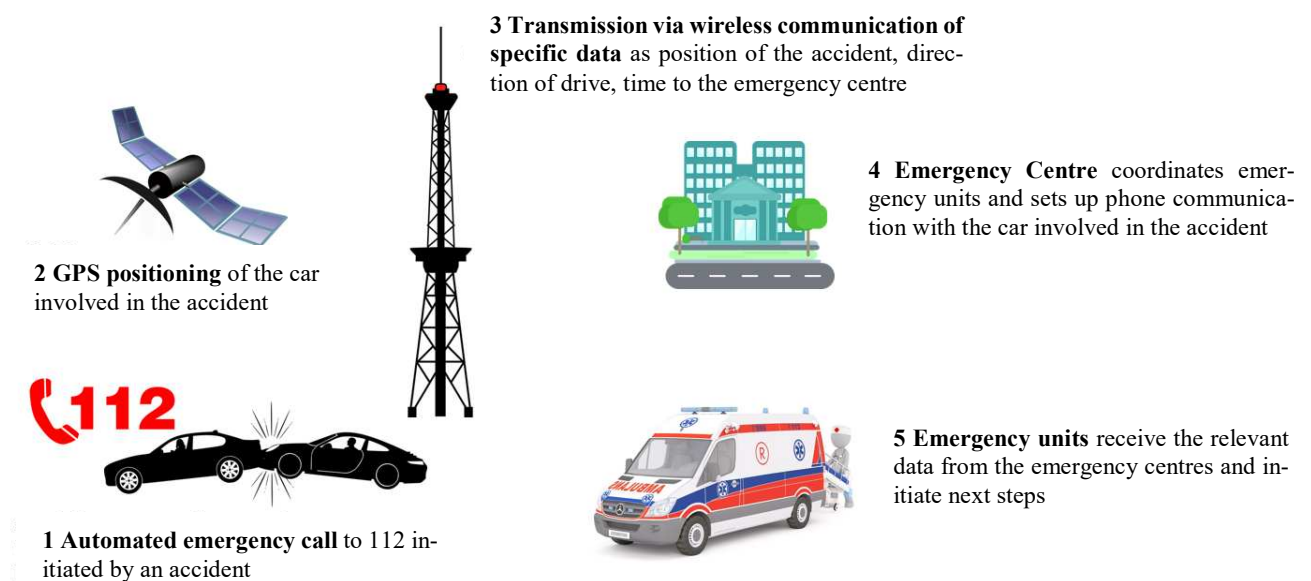
Often a seriously injured victim of an accident is not able to make an emergency call. This inability reduces the chance of survival of the victim considerably. To improve this situation, the European Union made the introduction of an automated emergency call for cars – called eCall - mandatory for the manufacturer of cars and trucks. This rule is in place since the 31<sup>st</sup> of March 2018 [4].

Since the introduction of eCall there was plenty of critique related to data protection. The aim of this paper is to evaluate acceptance factors for data protection as well as to evaluate the consulting quality related to the use of data in the context of emergency call systems.

The paper will give a brief overview of the differences between the two most important emergency system types. Then two studies will be addressed. While the first one is addressing customer acceptance of the eCall system, the second is addressing the topic eCall and data protection at the level of consultants of car dealers.

## 2 Comparing Emergency Call Systems

The eCall system integrates crash sensors that are able to identify a traffic accident. In case of a traffic accident, the emergency call system will initiate a free emergency call to the emergency number 112. During this call important data including position, time of occurrence of the accident, car identification number and direction of travel will be transmitted to an emergency call centre. Additionally, based on the position of the seat belts the system is able to identify the number of passengers traveling in the car involved in the accident [5]. The initiated phone call will enable the emergency team to talk to the injured persons and to collect additional information related to the accidents and to the types of injuries of the passengers [6]. After this, properly informed and equipped emergency units can be sent to the accident as outlined in figure 1.



**Fig. 1.** Overview of the emergency processes initiated within the eCall system

The EU-eCall service requires the collection and transmission of data. However, personal data is protected by General Data Protection Regulation (GDPR) [7] and additional data protection regulations specified for the eCall service [4]. These regulations limit the use of data for rescue operations only. It is prohibited to use data for other objectives or to pass data to a third party [8].

In addition to the by law required eCall service, car manufacturer can offer their own emergency services, known as TPS-eCall-Services. These services do not have to comply with the strict regulations for eCall. As a consequence TPS-eCall services can collect more information than regular eCall services. Another difference relates to the online time of the service. While EU-eCall systems are activated only in an emergency case, TPS-eCall systems can be permanently online. Consumer protectors see this critical, being afraid that car manufacturer might be tempted to collect more data than necessary and make collected data available for additional commercial services. For a better understanding the differences between the two types of eCall services have been listed in the table below.

**Table 1.** Differences between the EU-eCall service and TPS-eCall services, based on [9]

Categories	EU-eCall Service	TPS-eCall Services
Services	Only emergency calls	Emergency call service combined with additional services, e.g. tracking, regular calls to service centres
Regulations	Legislation adopted by the European Parliament. It contains clearly specified regulations regarding the collection and processing of data	Privat-law agreement with the customer based on data protection regulations.
Emergency call forwarding	Forwarding to the next local emergency call centre (112)	Forwarding to a privat call centre of the supplier
Data content	Datatypes are contained in the minimal data set of EU-eCall	Contains more data than the data contained in the minimal data set.
Call priority	Has the same priority like a phone emergency call.	Normal call without priority
Can the service be deactivated?	Not possible	Possible

The incentives for the use of TPS-eCall services are many. Technically there is almost no limitation in storing data. As a consequence the technologies used within eCall allow access to data originating from different types of sensors, controllers as well as

microphones and speakers. This allows the generation of driving profiles that might be of interest for car manufacturers, insurance companies, suppliers and authorities. The amount of data collected by the different TPS-eCall services of car manufacturers is unclear to the public. Only car manufacturers know in detail what data is collected, processed and stored. Customers are required to rely on the transparency and honesty of car manufacturers, which is not easy on the background of the current mistrust.

GDPR issued by the EU in Mai 2016 defines clearly the condition under which the collection, processing and storing of private data is allowed. With regard to this any person can decide if she agrees to fill in a declaration of consent for the collection, processing and storing of its personal data. In reality there are a couple of hurdles. When this consent is not given, e.g. because car manufacturer did not outline the data to be processed in detail, this might exclude the customer from the use of additional services of the car manufacturer. This might limit also the amount of third party benefits, e.g. benefits of insurances linked to the availability of certain personal driving tracking data. Very often the customer is not aware of the existence of the EU-eCall service and is not aware of the difference to the TPS-eCall service provided by manufacturers. Therefore it is important that customers are informed properly during the vending consultation about the use of privat data by the different emergency call systems and its protection.

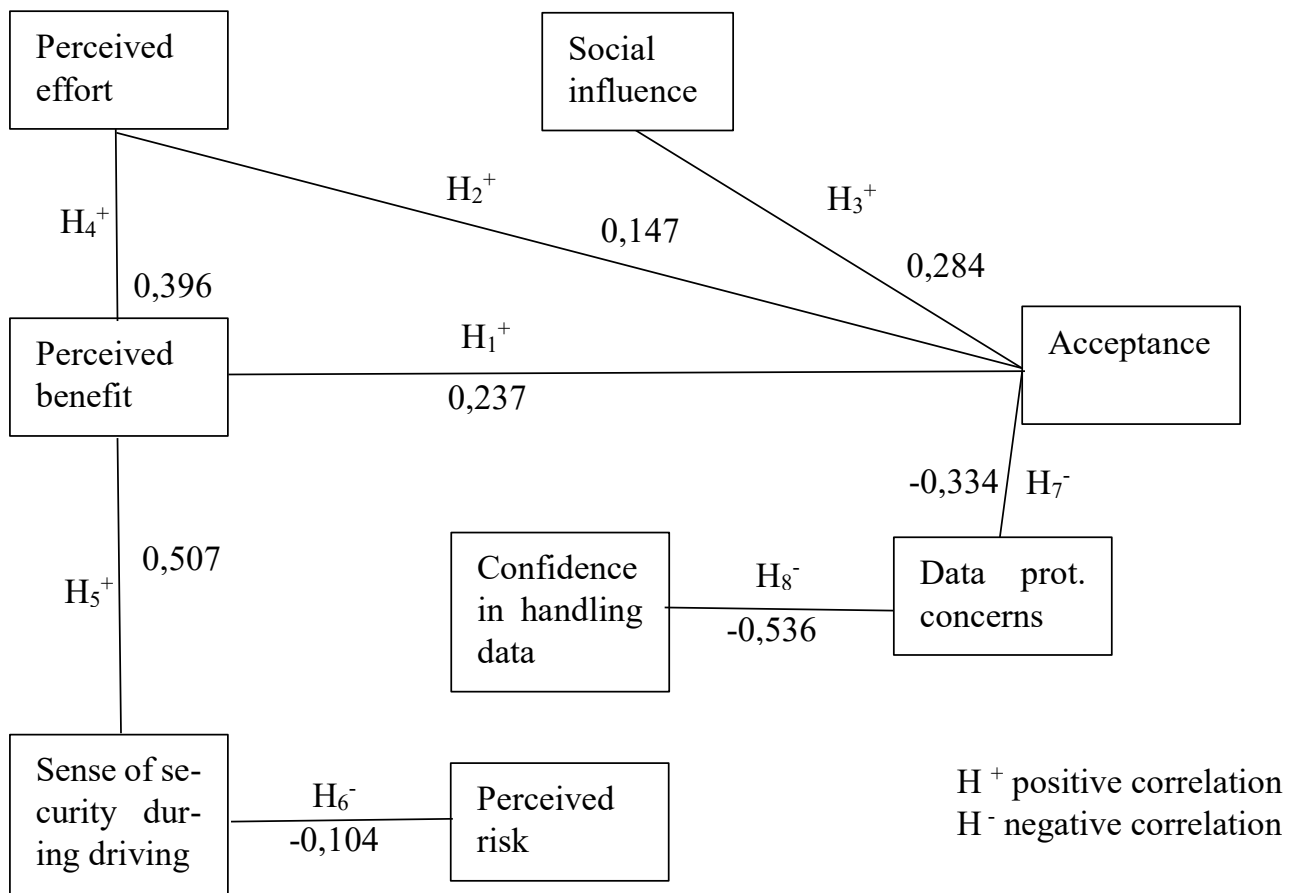
Up to now, there are no known theory studies on eCall services. As a consequence the aim of this study was to identify the acceptance factors of eCall services and to analyse how well car sellers are informed and are informing customers about eCall and data protection in vending consultations.

### **3 The Acceptance Study**

#### **3.1 Study Design**

In the first study a theory based model has been developed with the aim to clarify the current level of acceptance of the eCall service. The used acceptance model is based on the “Unified Theory of Acceptance and Use of Technology” (UTAUT) [11]. However, it was necessary to modify the model: the constructs Behavioural Intention as well as User Behaviour have been eliminated since by law eCall will be used on a long term. In addition, it was necessary to extend the construct of Acceptance being the main construct. Since the construct Performance Expectancy has a direct influence on the intention of Acceptance it was kept in the model. As a result, the model provided empiric results based on data received from 174 persons that took part in the associated online survey during the summer 2017. About 55% of the participants where women while 45% were man.

The system of hypothesis used – represented in figure 2 – was causally analysed using Smart-PLS with the aim to verify the cause-effect relation.



**Fig. 2.** Model used to analyse the acceptance of eCall including path coefficients

The PLS algorithm has three stages: In stage I for each latent variable - based on used data - values are estimated. These latent variables are used in stage II to estimate the size of effect of the structural model [12]. Each latent variable is the result of a linear combination of indicators. In the next step the iterative estimation of latent variables is done by optimising the estimated values using internal and external approximations. As a result the residual variance of the measurement and structural model is minimised. This procedure is repeated until a converging value is achieved [13]. In stage II the structural equation model with manifest variables is estimated [12]. As a result path coefficients are being identified. Using mean values and constants finally the linear regression function can be estimated.

The quality criteria used for analytical modelling using causalities are complying with the standard. They lead to a sound model.

## 3.2 Results of the Acceptance Study

Although car emergency services are supposed to be known by customers, only one third of the participant have heard of the eCall Service.

The perceived effort has an influence on the user perception of eCall and as a consequence has an impact on the acceptance of emergency call systems/services. The use of the system will be free of charge for the normal user. Two out of three users assume that there will be no costs associated with the use of eCall. This has a positive impact on the acceptance of eCall.

More than 60 % of those surveyed would feel much safer if eCall is available in their car. The feeling of safety has a strong positive influence on the perceived benefit of an eCall-System and thus has an indirect influence on the acceptance of the system. The feeling of safety is generated by trust into the reliability of the system. Tests showed customers that an emergency phone call to the emergency call centre could be setup during a couple of seconds making sure that the rescue operation is initiated immediately. First tests in Austria showed that the response time of the emergency units was reduced by 40-50% compared to the normal response time without eCall. The variation depends on the area of operation. The live-test proved that already 20 seconds after the accident the relevant data was received by the emergency call centre [10].

Trust in handling data has a direct influence on the concerns regarding data protection and as such has an influence on the acceptance of eCall systems. Almost 50 % of the surveyed participants do not trust that the system is protecting their data from third parties. They are afraid that their data is used as well for other aims. About 28% of the participants are afraid that by sharing all their data, they will result in a fully “transparent” driver. Nevertheless, the European Parliament rejected the deactivation possibility for the eCall system. As such, building up trust and transparency regarding the collection and use of data is necessary. Users need to be informed in a timely manner about the collected data and their use. There needs to be a differentiation between eCall system and private TPS emergency call systems. Private emergency call systems as well as additional services provided by car manufacturer are not falling under der regulation of eCall systems/services and as such are able to collect permanently data.

## 4 Mystery Shopping Study and Discussion

### 4.1 Study design

This second study had the aim to analyse the quality of consulting during the vending process with emphasis on eCall and data protection. Therefor non-representative Mystery Shopping Study was conducted in summer 2018. During this period 18 consultations with car dealers with the aim to buy a new car were carried out. The test buyer

logged the consultations. In the next step an analysis showed how good car sellers/consultants were informed about eCall und data protection and how good they informed potential customers about it.

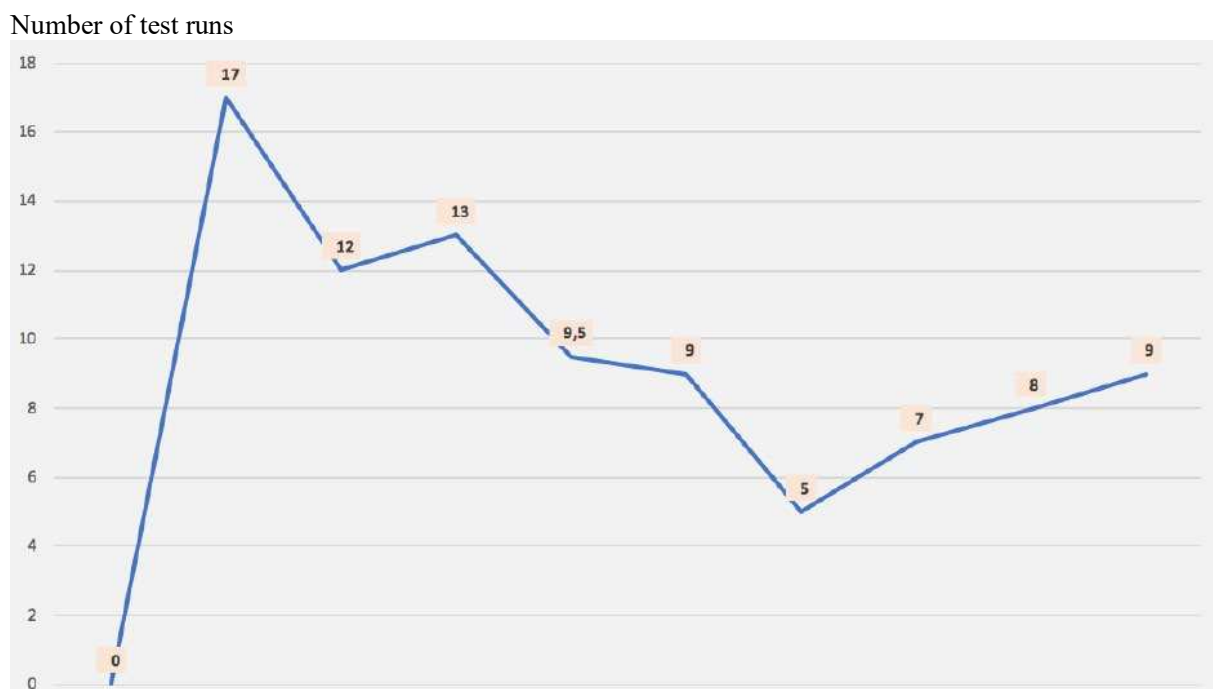
One of the aims was to find out if car sellers/consultants could differentiate between EU-eCall und TPS-eCall systems. It was of interest if they knew which type of data sets were stored by each system. As the EU-eCall has a minimal data set specified by law, it was of also interest to see if they knew what data is collected and stored by the TPS-eCall systems. The car dealers involved where not informed about the mystery shopping as this might have influenced the results.

Central questions addressed were:

- For a specific car: is the implemented emergency call system the required eCall system or is it a TPS-eCall system of the car manufacturer?
- Does the car provide additional services that are connected with the eCall software? If available, how are these services working?
- What happens with the collected data? Is data forwarded to a third party? If yes, who is this third party?
- Has the user the option to deactivate TPS-services?

## 4.2 Results and Discussion of the Mystery Shopping Study

Overall we can confirm that the consulting quality related to eCall has potential for optimisation. Some seller/consultants declared that they did not have any training about eCall systems. The consulting quality provided by different persons has a high level of fluctuation as you can see in the summative evaluation in Fig. 3.



Criteria1 Criteria2 Criteria3 Criteria4 Criteria5 Criteria6 Criteria7 Criteria8 Criteria9 Criteria10  
**Fig. 3.** Achieved positive responses to the 10 criteria during all mystery shopping's

The results of the relevant criteria are discussed below. Approximately half of the consultants were able to explain the eCall-System well (criteria 6). Approx. 66% were able to find the eCall emergency button (criteria 3). But none of the consultants addressed the topic eCall by themselves (criteria 1). Asked by the Mystery Shoppers about Connected-Services information about additional services was provided. However, none of them addressed the emergency call topic. Concluding this means that customers are expected to have a basic knowledge about emergency calls. In many discussions consultants mixed up the EU-eCall System with the TPS-eCall of the manufacturer. In one of the Mystery shopping's wrong information was given about the inability to switch off the eCall system.

The necessity for data protection trainings related to emergency call systems has been identified as well. Only four out of eighteen consultants knew what data is collected by the eCall system (criteria 7).

While some consultants did not reveal many information related to the aims and goals of data protection, others responded honestly to the questions (criteria 8). Asked about what happens with the collected data, some salespersons argued that data is used for guarantee handling and customer retention as well as forwarded to the manufacturers insurance for evaluation (criteria 9). Two salespersons think that car manufacturers generate user driving profiles and that drivers' profiles are already "transparent".

One of the salespersons argued that the customer has no right to disagree to the data protection agreement. Refusing customers the right of disagree with the data protection agreement would constitute a clear offence against GDPR. In none of the consultations a clear statement about which data is collected, processed or even forwarded to a third party was received. The same applies to the third parties by which data might be processed.

## 5 Conclusions and Outlook

The benefits of eCall (especially the safety aspect) outweigh the concerns regarding data protection and informational self-determination. When it comes to personal safety drivers are happy to share their personal data. From this perspective it makes sense to support the promotion of this system to all drivers.

But car dealers need to support this process as well, e.g. by training salesman and consultants on the topics eCall and data protection. This might be the right response to the increasing requirement for more specific information of customers. In addition it makes sense to increase the data protection awareness of consultants and sales persons. Data protection audits will help to make sure that processes are GDPR compliant. The availability of information about data collected, processed and stored in these services will help to achieve transparency and as such generate customer trust, since achieving trust is very important.



It will be interesting during future research to analyse the impact of the suggested changes on acceptance.

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