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Telematics as a Transformative Agent for the Zimbabwean Auto Insurance Ecosystem

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Abstract

Zimbabwe has witnessed the evolution of Information Communication Technology (ICT). The vehicle population soared to above 1.2 million hence rendering the Transport and Insurance domains complex. Therefore, there is a need to look at ways that can augment conventional Vehicular Management Information Systems (VMIS) in transforming business processes through Telematics. This paper aims to contextualise the role that telematics can play in transforming the Insurance Ecosystem in Zimbabwe. The main objective was to investigate the integration of Usage-Based Insurance (UBI) with vehicle tracking solutions provided by technology companies like Econet Wireless in Zimbabwe, aiming to align customer billing with individual risk profiles and enhance the synergy between technology and insurance service providers in the motor insurance ecosystem. A triangulation through structured interviews, questionnaires, and literature review, supported by Information Systems Analysis and Design techniques was conducted. The study adopted a case study approach, qualitatively analyzing the complexities of the Telematics insurance ecosystem in Zimbabwe, informed by the TOGAF framework. A case-study approach was applied to derive themes whilst applying within and cross-case analysis. Data was collected using questionnaires, and interviews. The findings of the research clearly show the importance of Telematics in modern-day insurance and the positive relationship between technology and insurance business performance. The study, therefore revealed how UBI can incentivize positive driver behavior, potentially reducing insurance premiums for safe drivers and lowering the incidence of claims against insurance companies. Future work can be done on studying the role of Telematics in combating highway crime and corruption.

Keywords

Telematics, Vehicle Tracking Systems, Usage Based Insurance, Digital Insurance, Vehicle Management Information Systems, Intelligent Transportation Systems

1. Introduction

1.1. Research Background

Technology is proliferating in diverse fraternities such as manufacturing, retail, banking, agriculture, health, and insurance sectors. Since the invention of the Internet, the deployment of other technologies has been made possible in insurance through the Internet of Things [1]. [2] identified the various innovative technologies which have been since deployed in insurance and narrates that, "Cloud computing, the Internet of Things (IoT), advanced analytics, telematics, the global positioning system (GPS), mobile phones, digital platforms, drones, blockchain, smart contracts, and artificial intelligence (AI) are providing new ways to measure, control, and price risk, engage with customers, reduce cost, improve efficiency, and expand insurability."

The IoT today has brought a new era of everything connected such as connected homes, connected health, connected lifestyles, connected working and connected cars which have brought pressure to the transformation of insurance business models to be connected, hence connected insurance. Connected insurance has been brought about through innovations like Telematics [3]. Telematics plays a critical role in insurance Customer Relationship Management (CRM) since it facilitates the connection of business to its subjects and allows the accumulation of data pertaining to the distance, speed, driver behaviour and modelling of risk such that insurers can price accordingly. For some reasons, this also helps in customer retention and acquisition of new customers [4].

The vehicle population in Zimbabwe was reported to have soared to above 1.5 million in 2022, rendering the Transport and Insurance domains complex [5]. The increase of vehicle population on Zimbabwean roads has been on the rise since then through cheap Japanese and European imports since the dollarization of the economy till the recent crisis of foreign currency shortages. This is supported by Balasubramaniam [6], who postulates that, "An increase in vehicular usage has been found to be accompanied by a considerable increase in the total number of road accidents". Therefore, there is a need to look at ways that can augment conventional Vehicular Management Information Systems (VMIS) such as Telematics which can enhance existing insurance risk management processes. That is through the reduction of accidents and incorporate Pay As You Drive (PAYD) which is closely aligned to driver behaviour billing. So many issues attached to the driver can lead to road carnage such as obscured driving, environmental catastrophic dynamics, dangerously switching lanes, congested

roads and bribery to law enforcement agencies like police and Vehicle Inspection Department (VID) [6]. Telematics comes in as an ideal technology through online vehicle tracking to curb such road delinquencies.

Telematics is a technology that is traced to be of French origin. The idea of telematics surfaced around the early seventies when it cropped up because of the marriage between Telecommunications (*télécommunications)* and Information Systems (*informatique*). The constructs of Telematics are shown in "**Figure 1**".

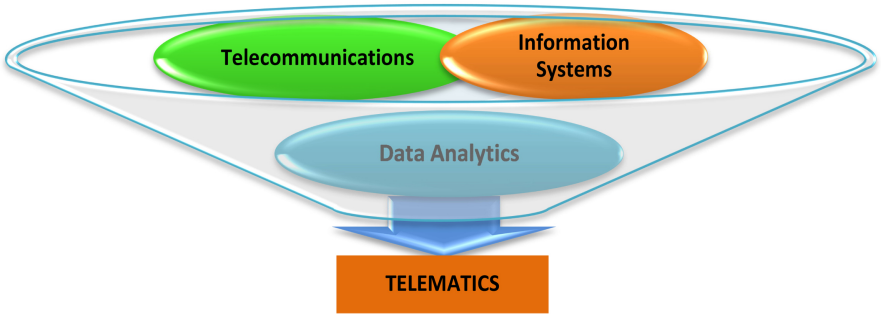


Figure 1. Telematics constructs.

Therefore, Telematics can be defined as a composition of telecommunications, IT systems or software applications, business information and automated control systems directed towards addressing business needs [7]-[9]. From Poland, in the nineties, Telematics started penetrating Europe being adopted by many sectors throughout the entire European Union. Ideally, the transport sector has been no exception to the implementation of telecommunications and IT systems and specifically Intelligent Transportation Systems (ITS) [9].

ITS is a concept that refers to electronic systems and business applications that support advanced data communications, navigation and information processing designed to enhance the performance of existing traditional transport systems by fostering efficiency, safety, and comfort and reducing other negative aspects of the transport environment [10]. [11] focused that, by 2020 almost over 90% of all new cars on the market will be linked to the cloud whereby Intel is assisting organisations involved in the development of telematics systems to take advantage of Intel's computing power and its scalable cloud service in improving safety, security, productivity, and profitability.

The opportunities that Telematics can offer in terms of potential direct returns in business through ITS should not be ignored or underestimated in Insurance. In New Zealand, three ITS technologies which include drones, self-driving vehicles and smart freight and logistics have been forecasted to bring an estimate of almost $2 billion dollars annually between 2018 and 2050 [12] [13]. To that effect, it can be concluded that potential business brought about through telematics should not be ignored. Therefore, this drives the need for insurance companies in Zimbabwe to think seriously about the adoption of telematics solutions to transport business [13].

1.2. Research Objectives

The objective of this study is to comprehensively investigate how Telematics and Internet of Things (IoT) technologies can be effectively integrated into the Zimbabwean insurance sector. Specifically, the study aims to explore how these technologies can enhance existing risk management processes, optimize customer relationship management strategies, and facilitate the development of connected insurance models. By examining the implementation and impact of Telematics and IoT in insurance, the study seeks to provide insights into their potential to transform operational efficiency, reduce risks associated with vehicle usage, and improve overall service delivery in the insurance industry.

1.3. Problem Statement

The rapid advancement of technology across various sectors, including manufacturing, retail, banking, agriculture, health, and notably insurance, underscores the urgent need for Zimbabwean insurers to embrace Telematics and IoT solutions. The escalating vehicle population, driven by affordable imports since the economic dollarization, has compounded challenges within the Transport and Insurance domains. This growth has corresponded with increased road accidents, as documented by Balasubramaniam, highlighting deficiencies in conventional Vehicular Management Information Systems (VMIS) to effectively manage risks associated with driver behaviour and road conditions. Factors such as obscured driving, environmental dynamics, reckless lane changes, traffic congestion, and potential corruption within law enforcement agencies further exacerbate these challenges. Telematics, through real-time vehicle tracking and data analytics capabilities, presents a promising solution to mitigate these risks and enhance safety on Zimbabwean roads. However, the adoption and integration of Telematics into existing insurance frameworks remain fragmented, with technology providers like Econet Wireless offering standalone vehicle tracking solutions that are not fully integrated with insurance service providers. This disconnect underscores the need for a cohesive approach that leverages Telematics to align customer billing with individual risk profiles, thereby promoting safer driving habits and reducing the frequency of insurance claims.

1.4. Importance of the Study

This study holds significant importance as it addresses critical challenges within Zimbabwe's insurance sector, particularly concerning the management of an increasingly complex vehicle population. By exploring the potential of Telematics and IoT technologies, the study aims to provide practical insights and recommendations for insurers to enhance their risk management capabilities. The integration of Telematics into insurance practices not only promises to improve the accuracy of risk assessment and pricing but also enhances customer engagement through personalized services and incentives for safe driving behaviour. Moreover, by adopting connected insurance models facilitated by IoT, insurers

can streamline operations, reduce costs, and expand insurability to previously underserved markets. The study also examines global trends and successful implementations of Telematics and ITS (Intelligent Transportation Systems) technologies, highlighting their transformative potential within the insurance industry. By doing so, it seeks to stimulate discussions and actions among stakeholders, including insurers, technology providers, regulatory bodies, and consumers, towards embracing innovative solutions that enhance road safety and insurance efficiency in Zimbabwe.

2. Literature Review

2.1. Motor Insurance in Zimbabwe

Currently in Zimbabwe there are mainly three types of motor insurance being offered in the industry. The three types include full third-party insurance, Full third party, fire, and theft and lastly, comprehensive insurance cover [14]. In light of all these types, Zimbabwe still lacks Usage Based Insurance (UBI) through telematics. However, in terms of vehicle tracking technology, some organisations like Econet have since started offering a certain degree of telematics technology which can be a starting point for local insurers [15].

2.2. Appreciating the Connected Car Functionality

Telematics has transformed cars from being mere means of transport to platforms of mobile connectivity [16]. The connected car technology has fostered magnificent driver experience through a connected lifestyle whereby they can receive services such as stolen vehicle tracking. The connected car technology allows for vehicle independent services [17]. These services include On-board infotainment and navigation systems. However, there are also services which ae vehicle centred which include, safety and security, diagnostics and inter vehicle communication [18]. Connectivity is thereby a cross-functional phenomenon and allows for cross-business interdependency towards the globalisation of things [19]. Therefore, a connected car exists as a mobile device that is linked to other global entities such as telematics service providers, infotainment service providers, road city infrastructure, regulatory bodies, driver, financial service providers and many other vehicular stakeholder entities [20]. This is illustrated by the diagram "**Figure 2**" that follows as an abstraction of the connected car in Zimbabwe scenario.

2.3. Auto Insurance Industry to Telematics Transition Rationale

- **Competition through Technology Evolution**

Most contemporary insurance service providers are paying close attention to the trends and evolution of technology for them to remain competitive. Telematics is one such technology that organisations are realising to be an excellent technology transforming VMIS [21]. [22] proclaims that almost everything in insurance will be transformed through telematics based on the results of 1998

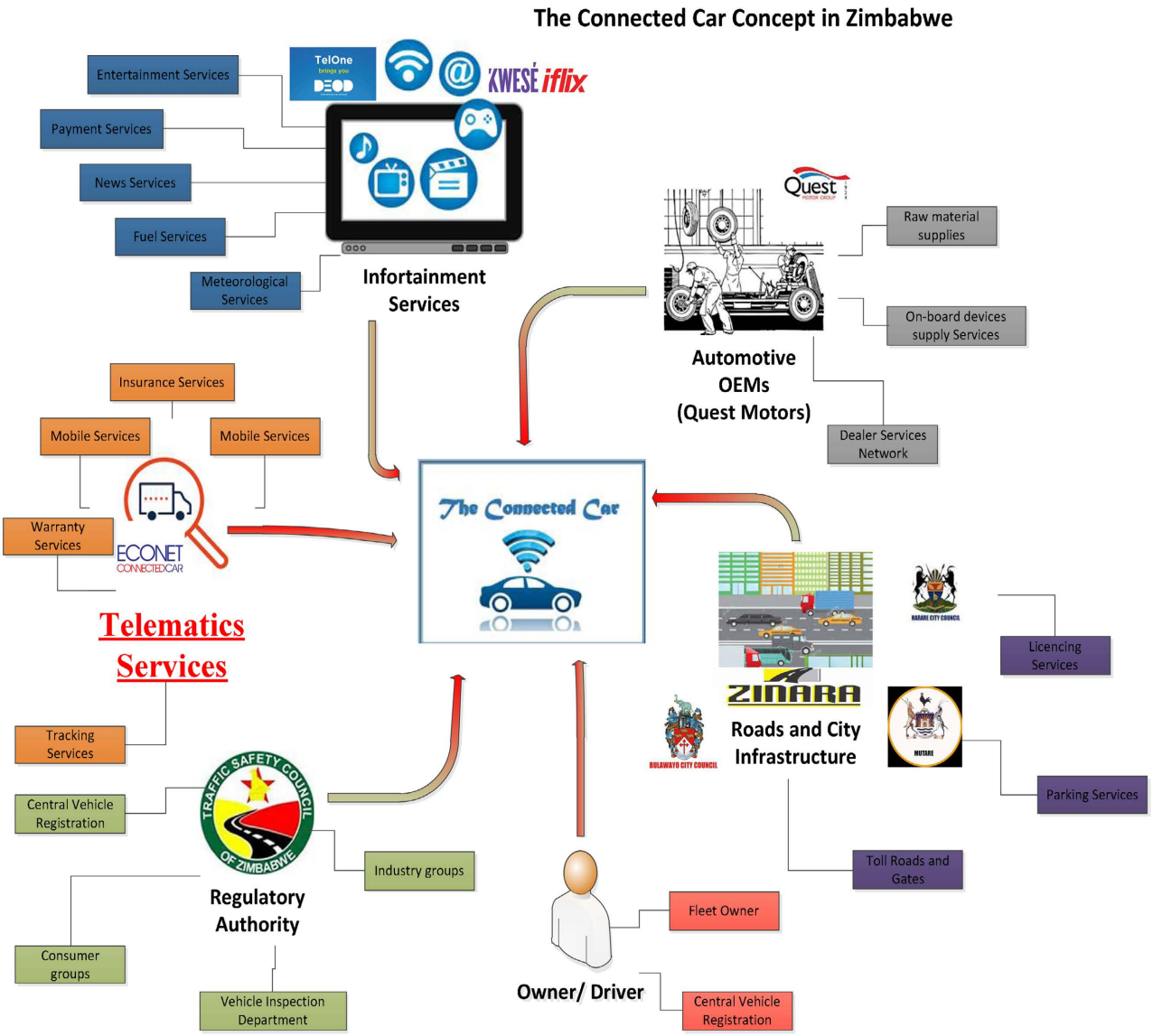


Figure 2. Source author: Connected car big data ecosystem in Zimbabwe.

from an experiment administered by the largest provider of Auto Insurance, a company based in the United States of America (USA) called Progressive Insurance. As a result, Telematics has evolved to be an ideal and fast dominating model to be revisited by all insurers globally. Resultantly, this has now driven most insurance service providers and other automotive related companies globally to look up to telematics as an approach that positively transform risk management in insurance [23].

- **Real Time-Based Business Model**

Telematics changes the existing insurance business models from passive to active models. Insurance model becomes active through Telematics in the sense that the insurer is now connected to the activities of the insured and to some extend in real times. This is the case with vehicle tracking systems which give a complex critical model that incorporates rapid update cycles which are models

which rely on Lidar, radar, cameras and collision avoidance techniques [23]. Ultimately, such technologies thereby lead to the emergence of new models of insurance business through a connected approach which also include Usage based insurance [23] [24].

This model is also referred to as, the Connected Insurance. Connected Insurance is a contemporary business model brought about by the IoT technologies which allow the connectivity of all parties in the Auto Insurance Ecosystem consisting of insurance subscribers, insurers, and other industry players [25] [26]. The graph in **Figure 3** shows how much positive behaviour is contributed from the view of telematics and UBI being in place in motor insurance. Percentage change in behaviour is shown in the vertical axis [27] [28].

2.4. Research Gap

The research identifies several gaps in the integration and utilization of Telematics within the Zimbabwean auto insurance industry. There is a disconnect between the potential benefits of Telematics, such as GPS tracking and real-time accident reporting, and their full integration into insurance operations, particularly in claims management and underwriting. Additionally, there is a need for more robust frameworks to effectively use Telematics data for accurate individual risk assessment and personalized premium pricing. The operational integration of Telematics across the insurance value chain is also lacking, with issues such as standardizing data collection, ensuring data security, and fostering collaboration between technology providers and insurers. Addressing these gaps could significantly modernize the auto insurance sector in Zimbabwe, enhancing risk management, operational efficiency, and customer satisfaction. data collection, ensuring data security, and fostering collaboration between technology providers and insurers.

Addressing these gaps could significantly modernize the auto insurance sector in Zimbabwe, enhancing risk management, operational efficiency, and customer satisfaction.

3. Methodology

The study adopted a scientific approach as it proceeded through assuming a logical methodology in arriving at the findings. Science as an approach to the investigation focussed on studying the relationship between technology and insurance business and obtained new meaning through observing the relationships that exist and discover new possibilities as valid conclusions about the domain investigated rather than merely relying on opinions of the researcher [29].

The study on telematics in Zimbabwean Auto Insurance was administered as a research that hinged upon both desk literature research and exploratory field study. Primary data was obtained from a survey executed on motor insurance service providers, motor insurance subscribers and local technology companies. The researcher conducted interviews with various executives extracted from all

sections of the industry. Questionnaires were dispatched to collect data from motorists and insurance subscribers alike. A case-study approach was applied to derive at themes whilst applying with-in and cross-case analysis and arrived at conclusions.

The Research was inclined upon the Action Research Paradigm [30]. Therefore, the researcher fused the research plan, collection of data, interpretation, action strategy and writing of a solution pro-actively. The research collaborated diverse participants whose relationships were lucid to the domain under study as they made relevant contributions to the evolvement of the enterprise architecture model to telematics in motor insurance. The samples were therefore, selected purposively as the population was stratified, thereby reflecting the general opinions of the insurance industry stakeholders as a whole [31] [32]. The population therefore constituted 10 insurance managers from Zimbabwean insurance companies, 10 telecommunications technology managers, 50 motor insurance subscribers, 10 employees from insurance and pensions regulatory body, Ministry of Transport, Traffic safety Council of Zimbabwe, Zimbabwe National Roads Administration (ZINARA) and 10 law enforcement agents from Zimbabwe Republic Police (ZRP).

A triangulation was adopted in the search for facts through structured interviews, questionnaires and literature scanning. The multi-tiered fact gathering facilitated an understanding of the telematics situation in Zimbabwe [33]. Two focus groups from Technology houses and insurance houses were administered during the stakeholder consultation discussions to find facts. The analysis and design of the domain were enhanced through information Systems Analysis and Design (SAD) techniques such as Entity Relationships (ER) and Data Flow Diagrams (DFD). These enabled me to understand the domain as a system and identify the workflow processes in coming up with a design artefact for Telematics in motor insurance. ER and DFDs enabled participatory action research for the social transformation of the motor insurance business [34].

The domain studied was by nature a complex case study for Zimbabwe which entailed providing a holistic analysis of the ecosystem. Therefore, a case study approach was adopted and analysed qualitatively. The qualitative investigation hence forth, paid attention to a holistic treatment of the telematics insurance ecosystem [35]. Eventually, all the possible relationships and workflows of the architecture and its complexities were explored and designed. Moreover, the theoretical framework on which the study was pivoted on was selected to be informed by The Open Group Architecture Framework (TOGAF) [36], and the Zachman Framework [37]. Both frameworks guided the development of an enterprise architecture for telematics auto-insurance in Zimbabwe. Artefacts were built underpinned on the various themes suggested by the two mentioned frameworks.

A Vehicle Management Information Systems Ontology was adopted as a perspective to the research philosophy. The existence (*Ontos*) of artefacts and

themes of the study (*logos*) in the vehicle tracking and motor insurance domain in Zimbabwe were investigated. Therefore, the status quo of the telematics insurance ecosystem in Zimbabwe was explored. The situation was tested against identified themes that exist in telematics insurance systems in other countries outside Zimbabwe. Moreover, gaps were discovered through the formulation of the "What" questions and deriving the realities to the Zimbabwean situation or problem.

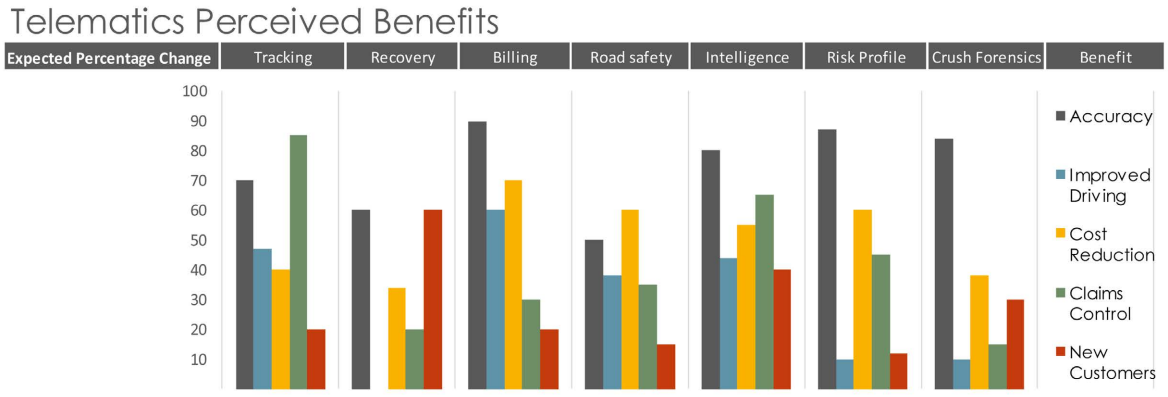
The research was to end with a write up of the model to represent the proposed architecture of the solution [34]. The research was continuously shaped through Interpretivism and Constructivism philosophies since the research was action-based research which demanded understanding of the phenomena through interpretation and then the construction of a solution to the problem at hand. Eventually, a Telematics architecture solution was developed as a proposal to the Zimbabwean motor insurance industry. After the development of the model architecture, the researcher exposed the model to expert review. The model was interrogated and recommendations for improvement were proffered and incorporated in coming up with a fine-tuned proposal model for industrialisation in Zimbabwe.

4. Findings

The findings of the investigation are presented in the subsections that follow.

4.1. The Perceived Contribution of Telematics to Auto-Insurance

"Figure 3" shows the percentage contribution of Telematics to auto-insurance.



Percentage Relationship	Tracking	Recovery	Billing	Road Safety	Intelligence	Risk Profile	Crush Forensics
Accuracy	70	60	90	50	80	87	84
Improved Driving	47	0	60	38	44	10	10
Cost Reduction	40	34	70	60	55	60	38
Claims Control	85	20	30	35	65	45	15
New Customers	20	60	20	15	40	12	30

Figure 3. Source primary data: Telematics contribution.

- **GPS Vehicle Tracking and Navigation:** According to the above graph, Tracking and intelligence offered by telematics systems contribute more to claims management as indicated by the responses of many insurers shown by the red graphical line. GPS technology and other wireless technologies such as Satellite constantly give location identification data that work within remote positions regardless of mobile phone coverage. This feature helps in Tracking physical locations that the vehicle has travelled and in real-time, [38]. GPS navigation offers much needed support for monitoring and detecting the likelihood of an accident occurring. In addition, GPS navigation also provides location addresses and destination identification which is much valued by drivers [39].
- **Theft Trace and Recovery:** From the research, respondents show that the idea that a vehicle can be recovered through telematics does not necessarily change driving behaviour. However, of benefit to the customers is the idea of recovery of vehicles when stolen which attracts them to subscribe telematics insurance. Insurance companies also value telematics when it helps in the recovery of stolen vehicles which assists in salvaging certain claims that would have taken place due to theft [17] [18].
- **Scalable Billing:** Driver behaviour is shaped by how much you will pay for reckless driving according to respondents. Positive behaviour was discovered to emanate from UBI.UBI assists in aligning risk to billing. Most risky drivers will pay more since telematics helps in monitoring driver habits. With telematics the idea of other drivers paying for the recklessness of other drivers is managed. Concepts such as PAYD and PHYD are ideas that rely on current and ongoing information pertaining to an insured vehicle [40].
- **Road Safety Interface:** Road safety is also enhanced due to road dynamics which are foretold through the telematics interface which communicates with the driver during road navigation. The graph shows positive change contributed by telematics with regards to road carnage. The black-box and crash forensics system can predict the likelihood of an accident to occur due to weather patterns. The system is also there to send reports to the insurer and the driver who then is informed to decide on how to drive or whether to drive or not [41].
- **Vehicle Intelligence:** ITS when deployed, act as policing systems that monitor driver performance, speed limits, transport safety and security. Such technology will include highway average speed cameras that can be integrated with e-call services which automatically report or request for emergency attention for rescue. In view of this, drivers are very much positive to the use of telematics but however resent being monitored on speed. Big data from connected vehicles augments actuarial services to determine billing rates which have a higher degree of accuracy [6] [13].
- **Denying and Accepting Risk (Risk Profiling):** Business Intelligence and data analytics component helps in managing risk. Dangerous drivers can be

blacklisted, and good drivers are given rewards accordingly. The graph above shows that risk profiling is one of the highest contributed metrics emanating from telematics since it augments the management of claims and derives accurate safe rates accordingly [3] [7] [12] [21].

- **Claims Management:** The research from the graph above shows that there is an inverse relationship between recovery and claims. This is because, since vehicles can now be tracked and recovered, the probability of having a claim from a stolen vehicle is reduced thereby. False claims are eliminated otherwise reduced. Accidents are reported to the insurer automatically as they happen through crash reports. When vehicle is stolen, tracking technology also helps to salvage the vehicle therefore recovering the loss to a certain extend [14].

4.2. Perceived Relationship between Claims Control and Underwriting New Business

The relationship between insurance claims control and underwriting of new business is shown in "Figure 4".

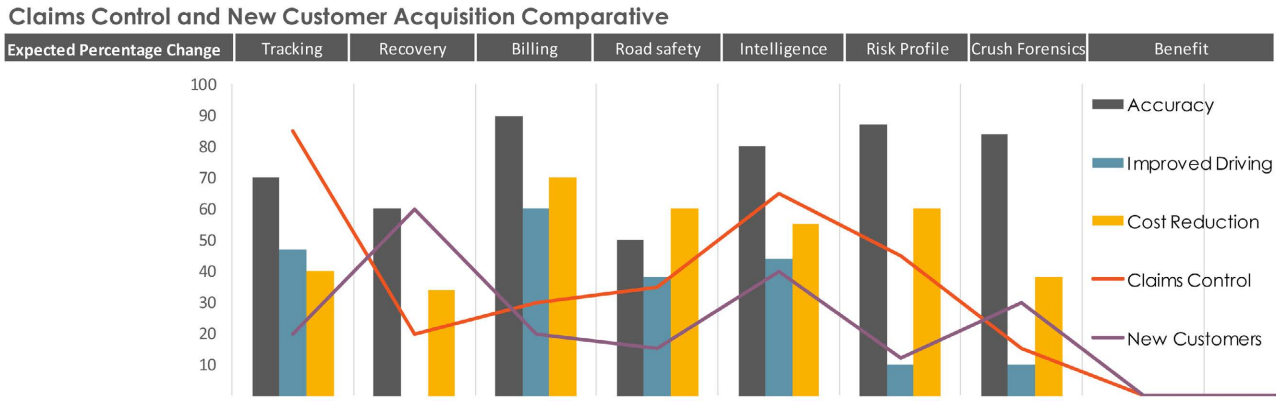


Figure 4. Source primary data: claims Vs new customer underwriting.

4.3. The Value Proposition of Telematics in Zimbabwean Auto Insurance

Considering the research findings, the potential impact that Telematics can have in insurance business, therefore imperative to deduce that Telematics:

- Can reduce the likelihood of risks of insurance claims emanating from vehicle accidents.
- Can help to calculate the revenue charged on premiums according to how a driver drives.
- Can enable to determine the probability of a future fault accident based on distance travelled and data analytics thereby proactively manage or prevent risks and lower claims.
- Can augment vehicle theft recovery by insurers after settling claims through Geographical Information Systems (GIS) data based on location-based services and location enabled devices.

- Can enable to determine the probability of driver behaviour related accident based on distance travelled through PHYD.
- Can help improve driver driving skills since insurance companies can now reward good behaviour through rate undercutting to good drivers.
- Can generally improve the safety of Zimbabwean roads thereby reducing the payments of third-party claims and passenger injury claims from public transport due to road carnage.
- Through PAYD can create accurate prices to charge clients as it bills according to mileage rather than a cast in stone traditional pricing method to all subscribers currently being done.
- Data is compelling and therefore insurers are guided by the data in their risk management strategies especially on pricing.
- Avoiding insurers will miss out on this risk management tool and likely will attract dangerous drivers who avoid being billed according to their poor driving.
- Can help in the acquisition of new customers who are good drivers lured by efficient billing mechanisms such as portrayed by PAYD and PHYD.
- Alters the operational procedures and models of business by replacing legacy systems.
- Enhances customer relationships by offering a direct interface between the insurer and the vehicle over a multichannel platform.

4.4. Telematics in Auto Insurance Proposed Value Chain Model

Figure 5 shows the Telematics insurance value chain.

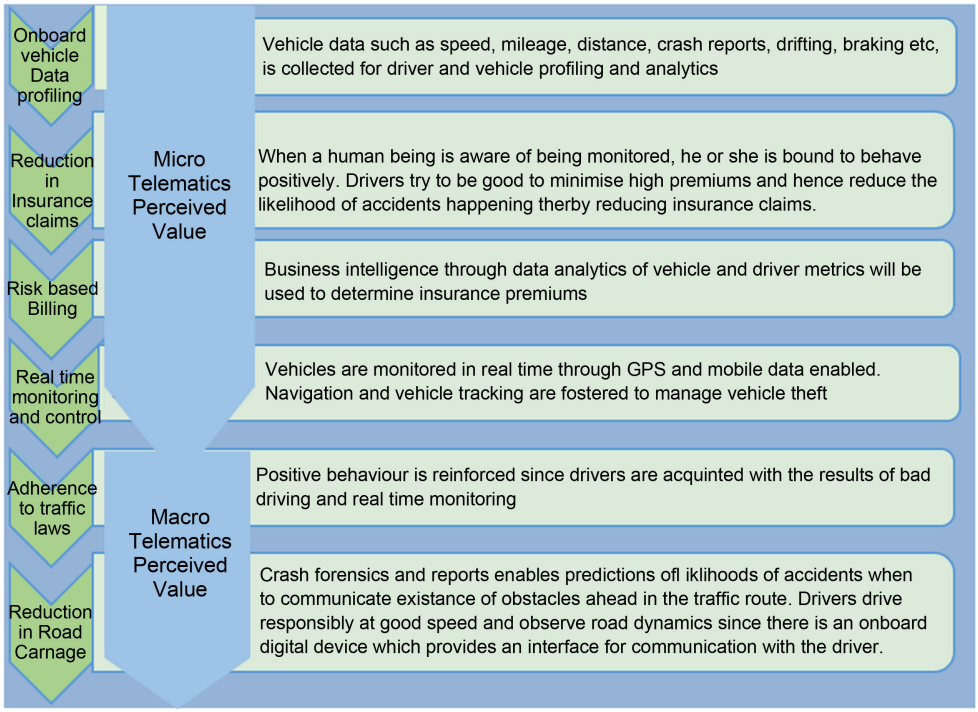


Figure 5. Source author: the Telematics insurance value chain.

5. Recommendations

5.1. The Zimbabwean Auto Insurance Transformation Imperative

The proposed Telematics based insurance architecture is shown in "Figure 6".

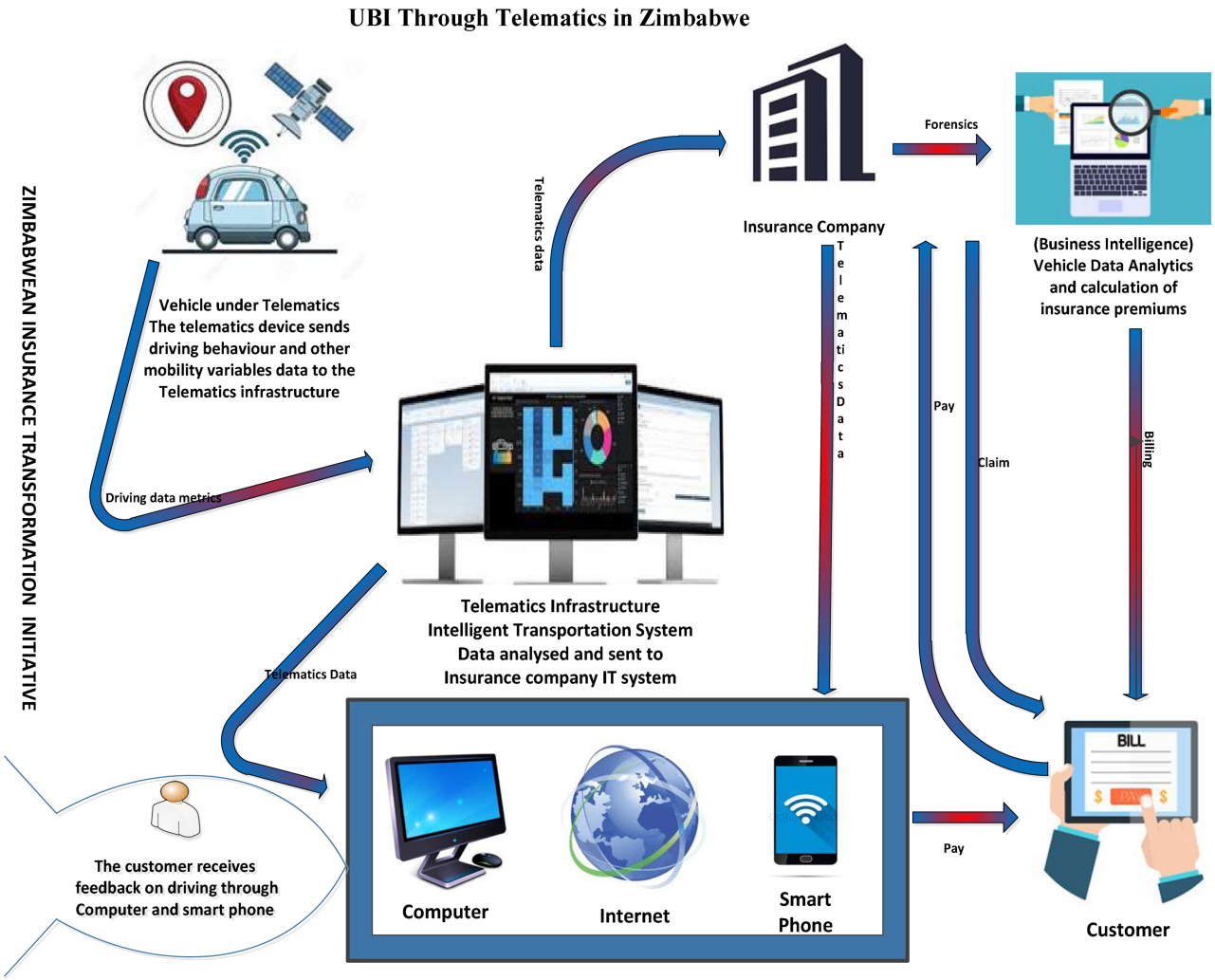


Figure 6. Source: author: proposed Telematics based insurance architecture.

Conceptually, in the proposed model, the idea of Telematics comes because of a fusion of advanced Telecommunications, Data Warehousing and Big Data Mining and Analytics to enable monitoring or tracking of movable entities and accordingly make related decisions. Telematics relies on intelligent and contemporary devices that allow smart mobility. Vehicle telematics entails vehicle automation, data analytics, GPS and navigation systems and wireless communication systems.

Telematics insurance will work through the usage of data obtained from the vehicle on-mounted devices that will continuously capture data on how the vehicle is being driven. The data metrics will include speed variations, distance, drifting, breaking distances, velocity and other variables which shall construct

the risk metrics for insurance billing purposes (UBI). Those metrics will then guide in discriminating charges along with actuarial based billing. The process is summarised in the diagram developed illustrating the proposed Telematics Architecture.

5.2. Information and Data Transmission Architecture

- **Information and data Transmission:** Data is generated from sensors installed in a vehicle (black box) or from mounted on-board diagnostics slot. Actuarial and business intelligence thrives on streams of data that are continuously send from the vehicles through a telematics system which record driving data automatically using wireless connectivity. Telematics makes use of GPS and smart phones to transmit bit streams of data and information globally. Telecommunications company then collects the data and make it available to the Insurance company which then aggregates the data for analytical purposes. Data analytics when carried out provides the ability to develop customised insurance policies or in terms UBI tied to behaviour.
- **Mobile Applications:** Smart phones provide web portals that will act as interfaces and provide a view of driver profiles and visualisation of the driver data analysis. Mobile applications also act as gateways to the servers which house the data.
- **Telematics Operating Systems:** Telematics software can contain between 50 million to 100 million lines of code which is a project that individual companies may fail to achieve considering the amount of effort required. Beyond the driver's eyes and the insurance company exists a telematics operating system such as the In-Vehicle Infotainment (IVI) system which is supported by a few companies globally. Existing developers such as QNX Software and Microsoft Corporation are defending the proprietary approach to telematics software development and are against the idea of establishing an open ecosystem supported by international developers who should be customising and upgrading private systems [42].
- **Telecommunication Technology:** Mainly a mobile terminal called the GPS is used to enable satellite navigation and positioning. The GPS constantly supports vehicle tracking. The GPS does so by way of identifying the true locations of the vehicle or the position coordinates in real time. The coordinates are derived through communication with at least four satellites to determine the position [43].

5.3. Usage Based Insurance through Telematics Matrix

A Usage Based Insurance platform through telematics has been proposed. The solution is perceived to go a long way in reshaping how insurers derive their rates depending on vehicular data generated from on-board diagnostics. The model will also minimise risks that emanate from bad driving habits which lead to road carnage. False claims are eliminated due to crash reports which are sent

to the insurer upon accident occurrence. Real time vehicle tracking that is supported through the GPS can furthermore promote vehicle safety from theft due to the geo coordinates which help in identifying vehicle location.

According to the research, Zimbabwe insurance companies should move to telematics guided billing in line with modern motor insurance practices which rely much on new transport systems variables to be factored in managing risk. This phenomenon is s referred to as User Based Insurance (UBI) or driver-based insurance which is shown in the Telematics adoption matrix shown in "Figure 7".

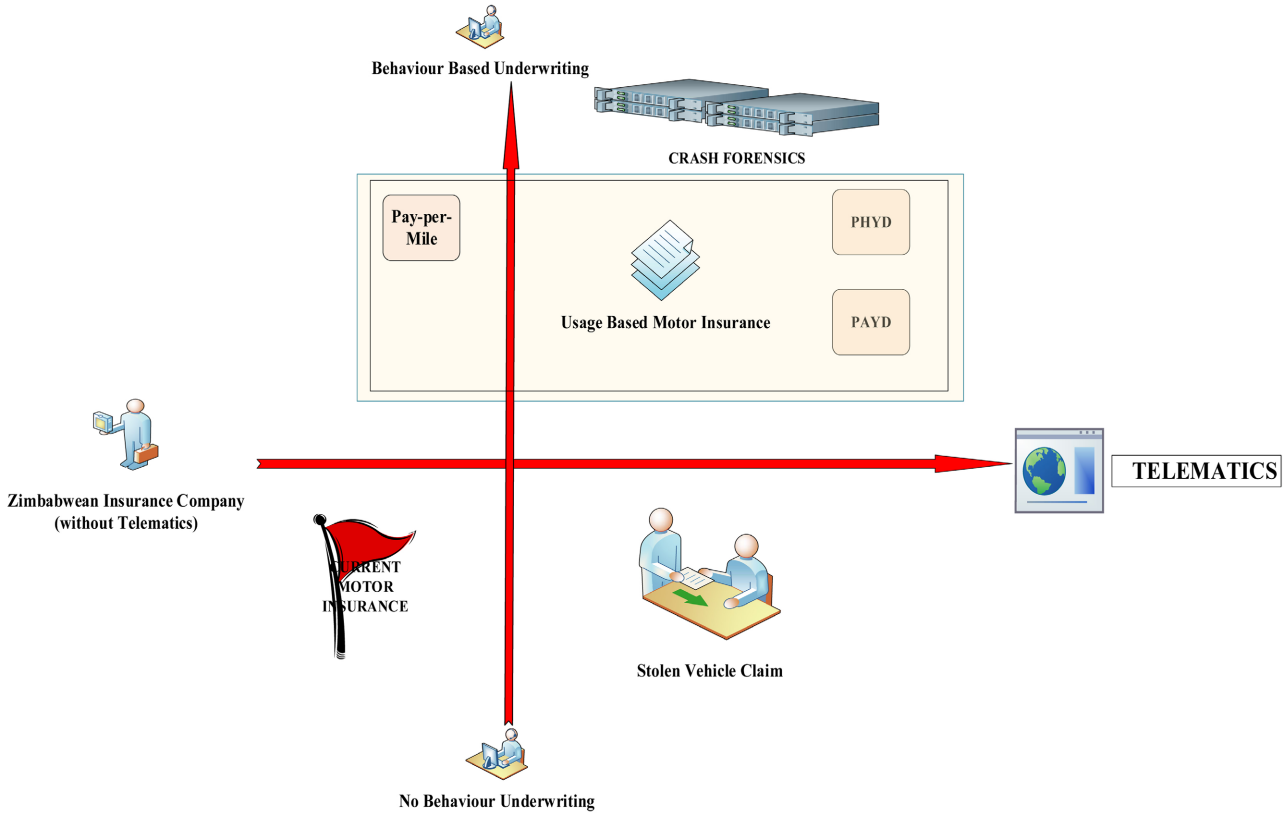


Figure 7. Source author Telematics adoption transformation matrix.

The group of such attributes to the set of information include factors such as the following:

- PAYD or Autometrica: Billing is pinned according to distance travelled. A telematics platform offered by Toyota Motor Corporation relying on mobile data services. On board mounted device continuously transmit data to with the insurer regarding distance travelled thereby allowing billing to be tied to distance and other factors like place and speed of vehicle.
- PHYD or Autometrica: GPS based Mobile Data Services.
- MHYD or Autometrica: GPS based Mobile Data Services.
- PHHYD or Autometrica: GPS based Mobile Data Services.
- Autograph: Based foreseen immediate risk usually within the next 24 hours.

It relies on on-mounted devices on the vehicle diagnostic port. This can also rely on black box technology.

- Crash Repository: Filing of events data and a self-billing insurance. The insurance is derived from the BI (Business Intelligence) emanating from crash forensics an aspect within Intelligent Transportation Systems. Vehicle Tracking-Mobile Data Services through GPS.

6. Conclusion

The main objective of UBI is targeted at aligning customer billing to individual risk magnitude which is a principle lacking in the Zimbabwean motor insurance ecosystem. Some Technology companies like Econet Wireless in Zimbabwe have started offering vehicle tracking solutions but still exist as stand-alone entities detached from insurance service providers a relationship which should be in synergy work together for the purposes of enriching insurance billing metrics. UBI is very essential to drivers and insurance companies. Driver behaviour has the potential to positively change and lead to low premiums to be paid by good drivers. Furthermore, the rate of claims against insurance companies will also be proportionately reduced.

Contribution and Significance of the Study

The study results demonstrate several ways in which Telematics can bridge the identified research gaps in the Zimbabwean auto insurance industry. Telematics contributes significantly to claims management through GPS vehicle tracking and navigation, providing real-time data on vehicle locations and potential accident occurrences. The technology also aids in theft trace and recovery, which, while not directly altering driving behaviour, helps recover stolen vehicles and reduce related claims.

Scalable billing based on driver behaviour, enabled by Usage-Based Insurance (UBI) models such as Pay As You Drive (PAYD) and Pay How You Drive (PHYD), aligns risk with premiums, encouraging safer driving habits. Telematics enhances road safety by providing drivers with real-time alerts and predictive data on road conditions and weather patterns, thus reducing the likelihood of accidents. It also supports vehicle intelligence systems that monitor driver performance and enforce speed limits, contributing to more accurate and fair billing rates.

Furthermore, Telematics assists in risk profiling by using data analytics to identify and reward safe drivers while penalizing risky behaviour, thus optimizing claims management. The overall impact of Telematics is seen in its ability to reduce claims by improving vehicle recovery rates, providing accurate crash reports, and enhancing driver behaviour, leading to lower premiums and better customer acquisition and retention. This integration of advanced technology into insurance practices effectively addresses the gaps in risk assessment, operational efficiency, and customer relationship management.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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