



A pre-launch exploration of customer acceptance of usage based vehicle insurance policy

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KEYWORDS

Usage based premiums;
Motor insurance;
Acceptance intentions;
Structural equation
modelling

Abstract This study was designed against the backdrop of observations that the motor insurance pricing in India requires radical innovations to become more acceptable, fair, and affordable to customers. Customer perceptions about usage based pricing were collected using a structured questionnaire. The model containing critical variables was validated to identify statistically significant linkages among perceived individual benefits, perceived social benefits, perceived value, perceived easiness to understand and acceptance intentions. The perceived risk to privacy was not found to influence the acceptance intentions of the customer. The study concluded that customers are likely to accept the concept of usage based pricing once implemented.

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Introduction

Usage based insurance (UBI) is a recent innovation by auto insurers that more closely aligns driving behaviours with premium rates for auto insurance. The concept requires tracking of mileage and driving behaviours using odometer readings or with in-vehicle telecommunication devices. This driving data is used to determine the policyholder's vehicle insurance premium. However in India, till date, the motor vehicle insurance premium is being calculated as per the guidelines issued by the Tariff Advisory Committee (TAC) based on factors such as Insured's Declared Value

(IDV) of the vehicle, cubic capacity, geographical zones, age of the vehicle, and so on, without considering usage of the vehicle, which actually determines the extent of risk. This paper was an attempt to introduce the new concept of insurance pricing and to investigate what the customer feels about such a pricing policy.

Todd Litman (1997), founder of the Victoria Transport Policy Institute, a Canadian independent research organization, dedicated to developing innovative and practical solutions to transportation problems opined that usage based insurance will help to achieve several public policy goals including fairness, affordability, road safety, consumer savings and choice, and reduced traffic problems. Previous studies have indicated that increased annual mileage tends to increase annual crash risk provided both driver and road characteristics are same (Edlin, 1999; Litman & Fitzroy, 2005). Annual crash risk is the product of per-mile crash risk and annual mileage. Although higher-risk drivers are more prone to crash compared to lower-risk drivers, reduction in mileage reduces collisions in both cases (Litman, 2005). There is a general perception in the industry that the current lump-

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sum pricing of auto insurance is inefficient and inequitable because low-mileage drivers subsidise insurance costs for high-mileage drivers, and low-income people who drive less are in a disadvantageous position (Brohoff & Noel, 2008). Drivers with identical characteristics such as age, gender, location, and driving safety record pay nearly the same premiums irrespective of their usage. In an attempt to make auto insurance premiums more rational and acceptable to customers, many companies are developing usage based pricing models. The newsletter published by M/s J.K Risk Managers and Insurance Brokers Ltd (2011) reported that three private sector insurers – Bajaj Allianz, ICICI Lombard and Bharti AXA General Insurance are in the process of developing pay-as-you-drive (PAYD) policies, setting the premiums in accordance with the number of miles driven and that ICICI Lombard has even launched a pilot project by installing devices to track the distance travelled, road conditions, and the driving time on a set of private and commercial vehicles. Industry experts view that more and more insurance companies may introduce such pricing innovations in the vehicle insurance sector in the future. In light of these developments, this article attempts to explore customers' perceptions and their intention to accept the concept of usage based premium calculation for motor vehicles.

Literature review

Even though it is widely recognised that vehicle miles travelled (VMT) is an important factor in crash risk, auto insurance policies do not use mileage as a major risk factor in setting premiums (Keri Funderburg et al, 2003). A more usage based PAYD insurance is a relatively new concept for pricing auto insurance premiums. Under this concept, an insurance company would allow customers to purchase insurance on a per-km basis, rather than as a fixed yearly premium, using verified mileage information. The per-km rate for an insured motor vehicle would be based on recognised risk factors, such as driving record, age, gender, location, and vehicle characteristics. Therefore, a driver with a history of accidents would pay more per-km than a driver with a perfect record, all else being equal. The key difference from current insurance policies is that the cost of coverage would effectively relate to how much a vehicle is driven, and thus account premiums as a variable cost rather than a fixed cost. William Vickrey proposed PAYD in the late 1960s in order to make insurance fairer and more efficient (Vickrey, 1968). During the 70s and 80s, PAYD pricing was advocated as a way to make insurance pricing more equitable (Butler, 1992) and as an energy conservation strategy (Wenzel, 1995). Pay-as-you-drive pricing has been promoted as a way to reduce congestion, accidents, energy consumption, and pollution emissions (Vonk, Janse, Dings, & Essen, 2003; Funderberg, Grant, & Coe, 2003; Parry, 2005; Hagerbaumer, 2004).

Usage based pricing increases the actuarial accuracy significantly (Litman, 2005) by incorporating mileage among other rating factors such as driver experience, type of vehicle etc, to reflect the exact risk of an individual vehicle for making pricing fairer and more economically efficient. Vehicle speed is commonly seen as the most important determinant of crash risk (Salusjarvi, 1981) and crash severity (Joksch, 1993). Increased mileage and speed are

associated with increased crash risks, and are therefore better suited to determine the level of the insurance premium (Bolderdijk and Linda Steg, 2011). Even though usage based insurance pricing was found to have insignificant relation with driver behaviour (Bolderdijk and Linda Steg, 2011), its ability to offer external benefits, such as reduced traffic congestion, road and parking facility costs, consumer costs, pollution emissions, and savings in fuel (Litman, 2005) has been empirically tested. A major advantage of usage based pricing lies in its ability to motivate users to reduce mileage and thus save money by way of reduced premiums.

In order to incorporate mileage into pricing, two approaches are used. In the basic approach premiums are calculated based on average annual mileage declared by the customer. Mileage data can be collected from odometer readings at the start and end of the policy term, counter verified by the insurance company or by authorised third parties such as insurance brokers and service stations. Another approach, called instrumented PAYD, uses various technologies including GPS to track when and where a vehicle is driven, so premiums can be calculated based on mileage and other parameters such as road conditions, risky terrains, and timings of usage. This approach requires installation of tracking equipment in the vehicle, and this can raise privacy concerns (Litman, 2011) thereby adversely affecting customer perceptions.

The Indian non-life insurance sector has been dominated by motor insurance (third-party and own-damage) which constituted 43% of total gross written premium in FY2011. Historically, non-life insurance sector tariffs in India have been regulated by the Insurance Regulatory and Development Authority (IRDA). However, the sector has been progressively detariffed, with prices of all policies except third party motor vehicles insurance being deregulated in 2008. Even now the Tariff Advisory Committee (TAC) continues to act as regulator. The flexible pricing was permitted in various business segments except the third party motor vehicle insurance segment, which constitutes around 35% of the total motor insurance market. The continuous losses incurred in the third party segment forced the regulator to increase the provisioning on third party motor insurance pool to 153% of loss ratio and all insurance companies need to contribute their share to the pool. Also, a hike in premium for third party liability insurance on commercial vehicles are likely to be considered as an immediate step in the direction of bridging the gap between the actual and the estimated claim ratios to some extent.

The relation between customer loyalty and profitability equations of service firms was established in previous researches. Studies underlined that an increase in customer retention results in higher profits for organisations and help them to sustain in highly competitive markets, especially in service industries such as banking and insurance (Fornell & Wernerfelt, 1987; Reichheld & Sasser, 1990). Both academics (Slater, 1997; Woodruff, 1997) and consultants (Laitamaki & Kordupleski, 1997) have recommended that service firms should aim for customer retention by assuring superior customer value delivery because customer value is a key antecedent of customer retention. Customer value can be conceptualised as a trade-off between quality (benefit) and cost (price) (Bolton & Drew, 1991). In the opinion of Monroe (1990), value is "the trade-off between the quality

and benefits [consumers] perceived in a product relative to the sacrifices they perceive by paying the price” (p. 46). Considering price and benefits as two component drivers of value perception, perceived benefits from purchase of a service product will lead to customer satisfaction. The role of prices in satisfaction development was studied in detail in previous studies (Voss, Parasuraman, & Grewal, 1998; Fornell, Johnson, Anderson, Cha, & Bryant, 1996). Fairness of the price emerges as a key determinant of satisfaction and developer of acceptance intentions of the financial product. The customer switch over tendency due to poor price perceptions has also been reported in previous studies (Keaveney, 1995; Mittal, Ross, & Baldasare, 1998).

Price elasticity, or customer’s sensitivity to price changes, can affect the demand as well as post purchase satisfaction of products and services. Price is the amount of money charged for a product or a service and forms the sum of all the values that customers give up in order to gain the benefits of having or using a product or service. Customer perceived value (CPV) is the difference between the benefits that customers are likely to get and the price that the customers are willing to pay. Three critical considerations which determine the pricing policy includes company perspective, customer perspective and competition perspective (Hinterhuber, 2003). Shipley and Jobber (2001) consider pricing as a continuous process to adapt to the changes in environmental conditions, marketing strategy, and customer needs. Hence the pricing policy requires selection of contemporary trends capable of capturing the perceptions of the customer.

The critical question about whether the customer will accept a new product or a new pricing policy has been a consideration in the firm’s decision to implement innovative practices. The theory of planned behaviour postulates that behavioural intention influences behaviour and stimulates actions (Fishbein & Ajzen, 1980). Acceptance intentions are behavioural intentions to perform a definite action and are likely to be influenced by perceptions about use and easiness to use (Davis, 1989), beliefs about compatibility, privacy and security (Chau & Hwa, 2001), and personal innovativeness (Rogers, 2003). The research model in this study was developed based on the above observations.

Theory development

The model of intention, adoption, and continuance (MIAC) (Cheung et al., 2003) is considered to illustrate the three stages in the acceptance of a new technology or application. Similarly, the technology acceptance model (TAM) proposes that the constructs of perceived usefulness and perceived ease of use are two significant factors which are instrumental in the development of a behavioural intention to use a new technology or application. The positive behavioural intentions followed by perceptions about value and privacy will determine the acceptance decisions. Prolonged satisfaction leads to a continuance in usage of a new technology or application. The extension of these theories was considered in developing the theory related to this study.

Perceived usefulness demonstrates the extent to which a person believes that using a particular application will result in usefulness or relative advantage when compared to other similar applications, while perceived ease of use explains the

extent to which a person believes that using a particular system will result in easy execution of the task to be performed (Davis, 1989). Empirical evidence demonstrating the ability of the constructs perceived usefulness and perceived ease of use in explaining acceptance intentions of the customer in various contexts are available in the literature.¹ Hence, in this study, both these constructs were considered relevant. However, modified versions of these constructs were developed to demonstrate the acceptance intentions of a new premium pricing policy in the motor insurance sector.

The constructs perceived usefulness and perceived ease of use need to be defined from a different perspective to capture the domain of interest in this study. The usefulness of usage based insurance pricing can be estimated from the individual benefits to the customer as well as social benefits which indirectly influence the customer acceptance to such pricing. Customers will accept a new policy or application, only if, they perceive that adopting it will provide better combined benefits than existing policies. Reducing the usage of the vehicle would result in the individual benefits of consumer savings, economic efficiency, added affordability, progressiveness, and a feeling of fairness (Litman, 2005), which may result in a reduced insurance premium. Such an effort from many customers will reduce traffic congestion, increase feelings of safety, reduce pollution, conserve energy, and offer access to more free space for parking (Litman, 2011) and so on. These are the likely social benefits to customers for adopting usage based pricing strategy. A clear understanding of the terms and conditions of any contractual agreement such as insurance policy statement enhances the acceptance intentions of the customer. A perception of transparency and simplicity is bound to create a feeling that the terms and conditions in the policy statements are easy to understand and this ultimately influences customer acceptance intentions. The factors which affect transparency and simplicity, and ease of understanding the concept behind usage based premiums, include monitoring of usage, calculation of premium, wordings of the policy agreement, and clarity of terms and conditions. Perceived value and perceived privacy risk are two other constructs which were assumed to have an influence on the acceptance intentions of the customer. Perceived value is a subjective concept which varies from customer to customer (Kortge & Okonkwo, 1993) and is considered the trade-off between benefits to and sacrifices by the customer (Zeithaml, 1988). The benefits are combination of economic, technical, and social aspects while sacrifices are based on monetary considerations (Anderson, Jain, & Chinagunta, 1993). Customers are likely to be motivated by high perceived value (Dodds & Monroe, 1985) and hence it forms an important factor in consumers’ purchase decisions. According to utility theory, the probability of purchase intention increases when consumers acquire more benefits from a product than they pay for it (Dickson & Sawyer, 1990). Hence the construct of perceived value was considered relevant in the context of the study.

¹ These studies include Gefen and Straub (1997) on e-mail adoption, Johar and Awalluddin (2011) on E-commerce adoption, Chen et al. (2002) on the virtual store context, Koufaris and LaBarbera (2002) on Internet consumer behaviour, Amoako-Gyampah and Salam (2004) on ERP implementation, Dahlberg et al. (2003b) on mobile payment adoption studies, and Cheah et al. (2011) on mobile banking adoption.

The usage based premium calculation requires monitoring of the usage of the vehicle, which can effectively be performed through Internet enabled electronic devices. A major concern in this regard was loss of privacy regarding the travel data of the customer who opts for usage based premium pricing. Privacy risk has been identified as a key factor inhibiting an individual's acceptance of Internet-delivered electronic services (Featherman & Pavlou, 2003). Hence, in this study, perceptions of the customers with regard to privacy concerns were also considered. Favourable perceptions related to individual benefits, social benefits, ease of understanding, value acquisition and perceived privacy risk are likely to influence acceptance intention among customers which may converge in purchase behaviour as explained in the theory of reasoned action (Fishbein & Ajzen, 1980). The following theoretical model (as illustrated in Fig. 1) was conceptualised as capable of explaining the acceptance intentions of customers with regard to usage based pricing policy for insurance premiums. The paths between each of the latent constructs were assumed as hypotheses to be tested in this study.

The following hypotheses were proposed to be tested in this study to draw meaningful conclusions about consumer behaviour related to usage based pricing policy.

H1. There exists a significant relation between perceived direct benefits and acceptance intentions regarding usage based pricing policy

H2. There exists significant relation between perceived indirect benefits and acceptance intentions regarding usage based pricing policy

H3. There exists significant relation between perceived easiness to understand and acceptance intentions regarding usage based pricing policy

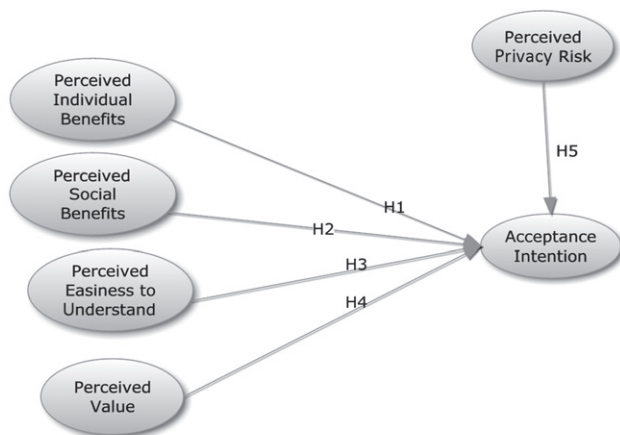
H4. There exists significant relation between perceived value and acceptance intentions regarding usage based pricing policy

H5. There exists significant relation between perceived privacy risk and acceptance intentions regarding usage based pricing policy.

Explanation of variables and their measurement

Broadly speaking, the focus of research study lies in identifying the relationships between constructs proposed for study and how these constructs are measured. A construct is a conceptual term used to describe a phenomenon of theoretical interest to the researcher, and one that is not directly measurable (e.g. customer satisfaction, trust, and so on). A measure is a quantifiable assessment of the degree to which the respondent believes in the existence of the construct. The data reflecting the respondent's agreement or disagreement is collected by means of questionnaire surveys in most studies.

This study focuses on the analysis of relationships between variables which are abstract and not directly measurable. Hence the concept of latent variables (LV) was adopted to explain the variables of interest. Latent variables can be considered "hypothetical constructs invented by a researcher for the purpose of understanding



H1- H5: hypotheses 1-5

Figure 1 Research model.

Table 1 Definitions of constructs used in the study.

Construct	Definition
PIB Perceived individual benefits	Degree to which a person believes that adopting a new policy or application would impart benefits to his/her requirement
PSB Perceived social benefits	Degree to which a person believes that adopting a new policy or application would impart benefits to society in general
PEU Perceived ease of understanding	Degree to which a person believes that the contents of a new policy or application offers simplicity and transparency in understanding
PV Perceived value	Degree to which a person believes he/she is gaining more than the sacrifices he/she makes (price the person pays) by adopting a policy or application
PPR Perceived privacy risk	Degree to which a person believes that adopting a new policy or application would generate risk to his/her privacy
AI Acceptance intention	The extent of favourable intentions developed in an individual due to the impact of various perceptions

a research area” (Bentler & Bonnet, 1980, p. 420). Since LVs are unobservable and cannot be directly measured, researchers use observable and empirically measurable indicator variables (also referred to as manifest variables, MVs) to estimate LVs in the model. The connections between the constructs and indicators or measures are referred to as epistemic relationships or “rules of correspondence” (Bagozzi, 1984). Two basic types of relationships exist in causal modelling, namely, reflective and formative. Constructs are usually viewed as causes of indicators, meaning variation in a construct leads to a variation in its indicators. Such indicators are termed ‘reflective’ because they represent reflections or manifestations of a construct. The formative indicators are viewed as causes of constructs as a construct is formed or induced by its indicators (Edwards & Bagozzi, 2000). According to Chin (1998) the choice between measuring latent constructs with formative or reflective indicators should be based on the research objectives, theoretical justification, and empirical conditions. The major constructs used in this study were

- Perceived individual benefits (PIB),
- Perceived social benefits (PSB),
- Perceived easiness to understand (PEU),

- Perceived value (PV),
- Perceived privacy risk (PPR),
- Acceptance intention (AI),

Table 1 defines the constructs used in the context of the study.

The indicators used for measuring various constructs except perceived value, explain different facets of the construct and hence omitting one indicator would amount to omitting some part of the analysis. Also, high correlations among indicators are not expected and internal consistency is not implied (Jarvis, Mackenzie, & Podsakoff, 2003). These assumptions related to indicators helped to comfortably consider the constructs as formative. The construct of perceived value was assumed to be reflective in nature. The details are furnished in Table 2.

Research methodology

The research was conducted in two phases. The first phase was explorative in nature, ending with finalisation of the theory to be tested. A preliminary study was conducted at this stage by way of interviews with focus groups to identify specifically the relevant indicators to be considered for measuring the

Table 2 Details of indicators used to measure constructs.

Construct	Indicators (survey questions)
PIB Perceived individual benefits	Usage based pricing will provide me an opportunity to save money by limiting my usage Usage based pricing will increase economic efficiency as users will be motivated to control their unnecessary usage Usage based pricing will make insurance more affordable to customers of all income groups Usage based pricing is more progressive as users will benefit from their efforts to limit usage Usage based pricing is more fair and justifiable because low users will be paying less premium than those who use their vehicles more
PSB Perceived social benefits	Usage based pricing will reduce traffic congestion as users will tend to reduce usage Usage based pricing will increase the feeling of safety on the roads Usage based pricing will reduce air pollution Usage based pricing will help in preservation of fuel resources Usage based pricing will increase parking space in the areas meant for parking
PEU Perceived ease of understanding	The conditions mentioned in the policy statement should be clear and easily understandable The method for calculation of premium should be well explained The contents should be in simple language for easy understanding The monitoring of usage should be done without any confusion regarding procedures
PPR Perceived privacy risk	I feel insecure if someone comes to know about my travel history I would prefer to maintain secrecy about places visited by me during my travel I feel my safety will be at risk if my travel plans are revealed to others I may have accidents if I feel that someone is closely watching me
PV Perceived value	I feel that usage based pricing will offer more value for my money The benefits of usage based pricing exceed the expenditure for availing insurance I believe that the usage based pricing policy will properly reward my efforts aimed at limiting my usage of the vehicle
AI Acceptance intention	I feel the concept is relevant and worth trying I feel such innovations are the need of the hour to satisfy low usage customers I feel usage based pricing is better than existing premium rating methods

Table 3 Validity/reliability criteria adopted in this study.

S. no	Consideration	Guideline (WarpPLS 3.0)	
		Reflective constructs	Formative constructs
1	Cronbach alpha coefficient	>0.7	NA
2	Composite reliability	>0.7	NA
3	Average variance extracted	>0.5	>0.5
4	Convergent validity	<i>p</i> values associated with the loadings be lower than 0.05; and that the loadings be equal to or greater than 0.5; cross loading less than 0.5	VIF<5:all indicator weights should be with $p < 0.05$
5	Discriminant validity	The square root of the average variance extracted should be higher than any of the correlations involving that latent variable	The square root of the average variance extracted should be higher than any of the correlations involving that latent variable
6	Effect sizes of path coefficient	Effect sizes (f-squared) of 0.02, 0.15, and 0.35, respectively for small, medium, or large effect (Cohen, 1988).	
7	Predictive validity	Positive higher value of Stone-Geisser Q-squared coefficients	

variables in the study. A major observation made by the focus group was considered relevant in the questionnaire design. The focus group suggested that a detailed introduction to the study and the purpose of including each question or set of questions should be provided in the questionnaire in a noticeable manner. They also suggested that the respondents be met with in person and their responses may be collected after clarifying all doubts about the purpose of the study. This step was undertaken mandatorily in order to avoid misinterpretation of the questions, and possible biased results.

Data from 213 respondents were collected using a structured questionnaire. The questionnaire was designed in three parts. The first part explained the purpose of the study. The second part included questions to elicit details related to the demographic profile and current vehicle usage of the respondents. The third part was divided into different sections and each section contained a detailed explanation about the inclusion of each set of questions. The questions were designed as closed – ended questions, where the respondents were expected to make their response on a 5 point Likert scales, varying from strongly disagree to strongly agree. The respondents were from the southern Indian state of Kerala. The population included all individuals owning a two or four wheeler. A simple random sampling strategy was adopted to select the sample. A total of 248 persons were met with in person, and 213 usable responses were obtained.

Data analysis

To analyse causal relationships between constructs used in the study, the structural equation modelling (SEM) approach was adopted. Structural equation modelling is a statistical technique used for testing and estimating

causal relationships based on statistical data and qualitative causal assumptions. The SEM technique can be divided into two parts. The measurement model is the part which relates measured indicators to latent variables. The structural model is the part that relates latent variables among one another. The estimation of the model requires calculating of the parameters related to both measurement model and structural model using appropriate estimation methods. Analysis of the research model was done using the Partial Least Square (PLS) based software, Warp PLS 3.0. The choice of Partial Least Square Analysis was justified on two counts. The first was that PLS can accommodate both reflective and formative scales easily, compared to

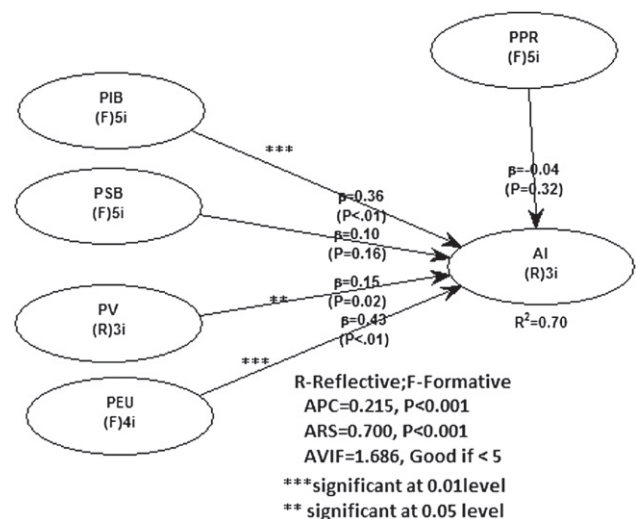
**Figure 2** Estimated model.

Table 4 Details of critical considerations regarding validity.

S. no	Construct Criterion	PIB	PSB	PV	PEU	PPR	AI
1	Cronbach alpha coefficient	0.834	0.909	0.943	0.799	0.431	0.938
2	Composite reliability	0.885	0.932	0.964	0.870	0.666	0.960
3	Average variance extracted	0.610	0.733	0.898	0.629	0.449	0.890
4	Full Collinearity VIF	2.737	1.346	1.183	3.180	1.159	3.337
5	Effect sizes of Path Coefficient (for paths ending at 'AI' Construct)	0.279	0.043	0.074	0.332	0.011	na
6	Convergent validity	Established as 1. all 'p' values <0.05; loadings >0.5; cross loadings <0.5 for reflective measures 2. VIF< 5; 'p' values < 0.05 for indicator weights of formative measures					
7	Discriminant validity	Established as square root of average variance extracted was found higher than any of the correlations involving that variable					
8	Predictive validity	Established a Q-squared coefficient of 'AI' construct was obtained as 0.703, a higher positive value close to '1' after estimation					

covariance structure analysis. The second aspect was that PLS does not require any a priori distributional assumptions and a relatively small sample size is acceptable (Chin, Marcolin, & Newsted, 2003). The major features of Warp PLS 3.0 include model fit indices, 'p' values for path coefficient and latent variable coefficients to assess reliability and validity considerations. Warp PLS 3.0 evaluates both measurement model as well as structural model simultaneously. The PLS regression algorithm with boot strapping method of re-sampling was used for estimation of the model that maximises the variance explained in the latent variable scores by the latent variable indicators. The estimates included path coefficients with 'p' values, indicators' weights, loadings, and factor scores.

The validity and reliability criteria vary depending on the nature of the construct. The guidelines are shown in Table 3. For evaluation of measurement indicators, the loading/weights of the indicators should be more than 0.5 and the corresponding 'p' should be less than 0.01 after estimation, or else the indicator was not considered relevant and was removed and re-estimated to obtain a valid model. Causality assumptions were verified only on the basis of a valid model.

The pre-processing of data as part of Warp PLS 3.0 analysis confirmed the quality of data for further analysis

Table 5 Distribution of customer preference towards criteria for premium calculation.

Considerations	Count	Percentage
Age of driver	6	2.8
Registration as private or public	15	7.0
Engine capacity of vehicle	17	7.9
Geographical terrain of use	24	11.2
Value of vehicle	34	15.9
Past driving history	42	19.7
Usage (total km driven in a year)	75	35.2
	213	100

with regard to missing values, zero variance and so on. The estimated model with path coefficients and corresponding 'p' values are illustrated in Fig. 2. The validity of the model was evaluated with various fit indices. It was recommended that the 'p' values for both the average path coefficient (APC) and the average R-squared (ARS) be lower than 0.05. In addition, it was recommended that the average variance inflation factor (AVIF) be lower than 5 (Kock, 2010). It was found that all three fit criteria were met and the model had an acceptable predictive and explanatory quality as the data was well represented by the model.

All the factor loadings of the reflective indicators were found to be more than 0.5 with 'p' < 0.01. The formative indicators were with VIF < 5 and 'p' < 0.01. The composite reliability, Cronbach alpha and average variance extracted (AVE) were above the threshold limits. The model emerged as one with satisfactory value for R-squared and Q-squared being indicators for predictive validity. The square root of AVE for all constructs was found to be more than any of the correlations involving that latent variable. All these observations confirmed the reliability and validity of the constructs making it suitable to draw conclusions on causality (Table-4).

Findings and conclusions

In this study out of five hypotheses tested using structural equation modelling, three were found significant. The perceived social benefits as well as perceived privacy risks were not found to have significant relation with customer acceptance intentions. The significant observations from the analysis are:

- Acceptance intentions of the customer are significantly linked to perceived individual benefits, perceived easiness in understanding policy terms and perceived value on acceptance.
- The perceived ease of understanding ($\beta = 0.43$) and perceived individual benefits ($\beta = 0.36$) appear to be a stronger predictor of acceptance intentions than

perceived value ($\beta = 0.15$) which was significant only at 0.05 level.

- Acceptance intentions are not influenced by perceived privacy risk or perceived social benefits.
- All the indicators used to measure the various constructs used in the study were found relevant as corresponding 'p' values after estimation were found to be less than 0.05.
- Of the different factors, 35.2% of the respondents considered usage as the most important factor in deciding insurance premium, whereas 19.7% believed that past driving history should be treated as the most important factor in deciding insurance premium. The third important factor emerged as the value of the vehicle (15.9%) (Table 5).

On usage monitoring, 44% of the respondents preferred usage monitoring by voluntary disclosure followed by cross checking using conventional methods by insurance companies, whereas 40% preferred monitoring using Internet enabled electronic devices such as GPS fitted in the vehicle.

The study could establish strong linkages among perceived individual benefits, perceived easiness in understanding policy conditions and perceived value in developing acceptance intentions regarding usage based pricing strategy. However, it was found that apart from usage, various other factors were also considered important by customers in deciding the insurance premiums. These factors include past driving history, geographical terrain of usage, nature of registration, value of the vehicle and so on. Hence an ideal pricing strategy should give weightage to factors other than usage. This study identified that usage based pricing is likely to be accepted by the customers, if implemented.

The responses to various considerations for deciding premiums are provided in Table-5. The chi-square test for association confirmed that a statistically significant relation exists between preferred criteria for premium calculation and approximate usage as well as income levels of the respondents. Preferred usage emerged as major criteria for premium calculation for 54.6% of the respondents where approximate usage was less than 7500 km per year, whereas 81% of respondents preferred past driving history as preferred criteria where approximate usage was more than 7500 km per year. With these observations in the backdrop, the study proposes the following pricing model for deciding premiums.

Annual Premium = Loading factor* Annual usage* Premium per kilometre of usage (say Rs 0.5/km driven), which can be decided as per Traffic Advisory Committee guidelines in consultation with industry pioneers. The loading factor varies depending on various parameters related to vehicle, driver and usage conditions. The computation of loading factor considering relevant parameters is an area which may be considered for further research.

Limitations of the study

This research was conducted within a localised setting to identify the acceptance intentions of the customers of usage based premium calculations. The responses were mostly collected from private owners of vehicles, and not

from owners of public carriers. Hence results cannot be completely relevant or consistent when extended to all sections of customers. The study was restricted to a specific geographic area in a single state, Kerala, and therefore extrapolating the results to all of India may prove to be insignificant. A larger and more representative sample may give a broader representation to the measurement of customer perceptions. The prior perceptions are likely to be changed in the course of real experience and hence the relevance of the study may be for a limited period. Further, the general limitations of this study include the shortage of time, lack of customer awareness about real yardsticks for judgement, possible bias of respondents and the unpredictable behaviour of respondents on being approached to fill the questionnaire.

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