

Using the structural equation modeling in investigating the effect of perception of innovation and customer engagement on customers' perceived value and behavioral tendencies through customer value co-creation behavior in tire industry

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(Communicated by Ehsan Kozegar)

Abstract

This research aims to identify the impact of customer perception of innovation and customer involvement on the customers' perceived value and behavioral tendencies through the creation of shared value in the statistical community of tire sales agents in the country with an applied purpose and correlational research method. The evidence was collected using a closed-ended questionnaire from 650 samples using the stratified random sampling method, and validity with construct indices and validity with the internal consistency method were investigated and supported. Descriptive analysis using central tendency and dispersion indices and inferential analysis using structural equation modeling has been done. The fit indices of the model have supported the compatibility of the conceptual model with the supporting theoretical model and the structural part of the model from the twelve hypotheses of the research in a positive and meaningful way. The results indicate that increasing customer perception of innovation and involvement leads to increased perceived value, customer behavioral tendencies, cooperative behaviors, and customer citizenship. Participatory and citizenship behaviors of customers also increase the customers' perceived value and behavioral tendencies. Also, the indirect effect of customer perception of innovation and customer involvement on the customers' perceived value and behavioral tendencies through cooperative behaviors and customer citizenship has been supported. Therefore, tire manufacturers can provide a competitive advantage and success in the tire industry by planning to improve model structures.

Keywords: Customer perception of innovation, Customer involvement, Cooperative behaviors, Citizenship behaviors, Perceived value and customer behavioral tendencies
2020 MSC: 62M20

1 Introduction

Production of rubber and products made of rubber is a large and diverse industry. The rubber industry is an important resource-based industry sector in the world. It has seen continuous and strong growth over the years. Due

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to the extensive use of rubber in tire and non-tire applications, the current scenario as well as the future of the rubber industry is tied to the global economy. Tires are the most prominent rubber items both in terms of importance and volume of production [31]. Therefore, it is necessary to develop new technologies to further investigate the performance of this valuable by-product, not only for use in low and medium value applications, but also in high value applications [13]. Considering the contribution of tires in the economic cycle and other parts of social life and considering the importance of innovation in this industry, dealing with this strategic product, the trend of significant increase in its detailed study demands. Currently, the knowledge-based economy is driven by intense competitive pressures and the ever-increasing power of the market and customers, which have become more powerful with the ubiquitous presence of the Internet and related information technologies. In this situation, the two themes of customer participation through value co-creation and continuous innovation are mentioned as promising sources of sustainable business success [52]. When customers realize that a new product or service is better than other existing products, they will be more willing to collect product-related information, participate in marketing activities, and interact with industry services [24]. Also, customer perception of innovation has a positive relationship with customer citizenship behaviors [22]. On the other hand, when customers conclude that innovative services and products can satisfy their needs and interests, the values of these services and products increase [11]. Economic development directly depends on innovation, which is considered as new products, new processes or methods of production, new markets or even new sources of supply. The concept of innovation has been widely investigated and improved [8]. Today, identifying the behavior of consumers is of great importance for managers of organizations. Due to the increase in competition in the markets and the increase in the demand for diversity among consumers, the need for new products and services is growing significantly. Innovation and the supply of new products play an important role in the growth and profitability of companies, and the key to the success and profitability of a company's new products is to identify consumers who are potentially the primary buyers of market products. On the other hand, in order to create new markets and change the dynamics of value in the competitive market, companies need to develop new products. Innovative consumers are an important part of the market for marketers, and revenue from new products adopted by innovative consumers is essential for many companies. Despite the high importance of paying attention to consumer innovation for marketers and increasing research in the field of innovation, most of the studies conducted in the field of innovation acceptance have been from the point of view of organizations and not consumers. Therefore, research on the effect of consumer perception of innovation on new product acceptance is important. Customer engagement allows businesses to participate in and influence the conversation around their brand. Customer engagement increases brand loyalty and influences customer discussion and purchase behavior. Users who value big brands interact with them by 'liking', 'sharing' and 'commenting' on social media. Consumers increasingly access digital and social media platforms as a means of expressing opinions and interacting with companies [37]. Customer engagement has a positive relationship with customer participation and customer citizenship behavior [50].

Customer value Cocreation Behaviors an emerging paradigm suggests a shift from a firm-centered perspective to a demand-centered, interactive process that seamlessly engages partners and resources for a mutually beneficial collaboration. The Customer value Cocreation Behavior paradigm seeks mutual value propositions among its stakeholders, where actors can create value by collaborating with or influencing others. This paradigm shows the shifting boundaries, where consumers perform the simultaneous roles of providing companies' value in the form of cocreation activities and in the form of their purchasing activity [40]. Many brands are currently investing in building their brand communities to involve customers in the value creation process, so identifying the drivers of customer engagement is of great importance for both research and practice [4]. There are fewer studies in the research background that examine the effects of co-creation behavior sub-dimensions on perceived value [29], and relatively few studies on the relationship between citizenship behavior and perceived value, for marketing innovation management, identifying differences in the impact Each sub-dimension of value co-creation behavior is more important than each sub-dimension of perceived value and behavioral tendencies. In the research conducted on the relationship between value co-creation behavior and perceived value, many researchers including: [7, 44, 48], have found that value co-creation behavior has a positive effect. It has significance on the customer's perceived value. That is, customers can obtain a unique consumption experience based on satisfying their demand through cocreation, thereby increasing perceived value. Based on the proposed literature and background, the main research question is: "what is the role of value co-creation of customers in the relationship between the perception of innovation and customer engagement with the customer's perceived value in the tire industry?"

2 Literature review and research model development

This research has investigated the relationships between different concepts. Each of the concepts consists of several components. In this section, the literature of the variables is discussed first, then the background of the research, and

finally the development of the research model and hypotheses.

2.1 Research literature

The concepts of perception of innovation and customer engagement are independent variables, Customer value Cocreation Behavior with the two main components of customer cooperative behavior and customer citizenship behavior are mediating variables and perceived value and behavioral tendencies are dependent variables of the research.

- **Innovation and customers' perception of innovation:** scientists have defined innovation in different fields in the past. In the case of manufacturing companies, innovation refers to the company's openness to new ideas, which reflects the level of the company's culture. Innovation is defined as the willingness and ability of a company to adopt, imitate or implement new technologies, processes or concepts and to launch a brand of innovative and unique products or services [50]. Also, innovation is the organization's capacity to introduce processes, products or defined ideas. Innovation is a multi-step process in which managers transform ideas into new products, services or processes to differentiate themselves from other market competitors [6]. Innovation is necessary for companies to survive and surpass competition in the market, in response to changing customer demands and lifestyles, and to take advantage of opportunities caused by technology and markets, structures and renewed dynamics [8]. In a broader sense, innovation means change or novelty [42]. Innovation describes companies that have the ability to adopt new ideas, services or processes, and promotions in order to successfully advance, compete, and differentiate themselves among similar businesses. Based on goals and perspectives, experts, managers, and customers may view innovation differently. The firm-centered view of innovation focuses solely on technical and functional perspectives or performance, while the consumer-centered view is deeply interested in the methods a company uses to deliver and create new experiences [22]. In the last two decades, these perspectives usually emphasize a single component of innovation (product, service, or technology) versus a more comprehensive approach to innovation that includes components such as processes, plans, and programs [22].
- **Customer engagement:** The construct of customer engagement has evolved and been redefined over time, creating different definitions, concepts, and arguments used to define the construct. However, to date there is no single conceptualization in the literature. Despite the lack of agreement on the definition of the concept, some aspects seem consistent throughout the literature. The first is that customer engagement is an attempt to differentiate consumer attitudes and behaviors that go beyond purchasing behaviors. The second case is related to the role of the consumer in this concept, who is considered active, involved and co-creator, as opposed to the mere recipient of initiatives from companies [1]. When discussing brand communities, the term "engagement" is used to describe the nature of specific participant interactions and/or interactive experiences. However, despite the increasing use of these terms, marketing researchers have paid relatively little attention to the theoretical development of the concept of "engagement" and "consumer engagement" in brand communities to date. The process of sharing information, knowledge, and personally relevant experiences in a Online community reflects customer engagement through active participation by actor, behavioral or cognitive dimensions. Most engagement research in marketing implicitly or explicitly assumes that customer engagement is an actor-specific characteristic and discusses issues such as "propensity to engage" as part of the actor's propensity. Actors' conflict in terms of interaction and exchange occurring in shared institutional logics and simultaneously creates and maintains such logic. Customer engagement helps businesses achieve their goals such as sales growth, cost reduction, better customer experiences, higher profitability, and customer loyalty [15]. It can also be considered strategically to achieve a long-term competitive advantage and a tool to create and maintain effective customer relationships [37]. Chapman and Dilmeri that experienced managers use the concept of customer engagement in different ways to describe how companies interact with customers. Engagement is used as a synonym for a company's "go-to-market" approach. That is, what channels are used to interact with customers, how resource-intensive this approach is, and what process is applied to create exchanges and interactions before and after the purchase. As a result, examining the active interaction between brands and customers can help to understand the value [4].
- **Value co-creation behavior:** The concept of value co-creation is the interaction between companies and customers to create value and is defined as the value creation process between companies and customers, which is widely recognized by many researchers [46]. It was believed that the traditional concept of value derives from the tangible characteristics of goods. However, more recent research has highlighted the importance of the customer in adding value to the brand. This newer concept of service logic marketing prevails, which is claimed to be a new paradigm because the concept can be applied to both services and goods. The dominant

service logic is an innovative but already well-established market approach that explains the creation of value through exchanges between configurations of actors [4]. Value co-creation is attracting increasing attention for organizations seeking competitive advantages. By successfully managing value co-creation, organizations can improve their market performance, strengthen their relationships with stakeholders, improve productivity and efficiency, and reduce costs and risk. To better benefit from value co-creation, it is necessary to understand how to create partnerships and influence different participants [30]. In the literature and theoretical background, value co-creation was introduced with different dimensions. Some researchers have focused on the effect of role ambiguity on value co-creation behavior and have proposed two new dimensions, customer participation behavior (in-role) and customer citizenship behavior (out-of-role), which emphasize its effects. Customer citizenship behavior is a voluntary behavior beyond the role that is required for customers to provide services. In contrast, customer engagement refers to mandatory or explicitly required role behavior, while customer citizenship refers to voluntary or unspecified behavior that benefits the business and exceeds customer role expectations. Customer engagement behavior includes four indicators including information seeking, information sharing, responsible behavior, and personal interaction, and customer citizenship behavior includes four indicators including feedback, support, assistance, and tolerance, which have been widely recognized by subsequent studies on co-creation of value [49].

- **Perceived value:** The concept of perceived value is derived from the theory of consumer behavior. Perceived value usually refers to the consumer's overall evaluation of the desirability of a product based on the perception of the products received and the cost given in marketing. Perceived value can be considered as the customer's subjective beneficial judgment of the "costs" and "benefits" resulting from the purchase behavior when extending the concept to the domain of products. That is, it is important whether the behavior is economic or not and that it can bring the expected material and spiritual benefits [49]. The dimensions of measuring perceived value are not uniform due to differences in the characteristics, demands and expectations of customers [12]. Prebensen and Xie [35] created a six-dimensional scale including quality value, economic value, novelty value, knowledge value, emotional value, and social value, which is widely used in research. Quality value refers to customers' perception of the quality of products or services. Economic value refers to customers' perception of return value. New value is a value attribute that customers derive from a product or service that is surprising and new. Knowledge value means that a customer can learn from a product or service and satisfy their thirst for knowledge. Emotional value is the emotional utility that customers get from a product or service, and the social value of utility is equivalent to the customer's social identity of a product or service and increasing the customer's self-image. The concept of perceived value originates from the theory of consumer behavior, which considers the emotions and attitudes of consumers to understand their willingness to purchase certain products in a competitive environment. Perceived value not only includes the price of the product, but also includes various psychological factors that influence consumers' decision to purchase a particular product. Perceived value consists of several dimensions and a single index scale cannot fully express the concept of perceived value. Many researches have proposed some shared dimensions of perceived value, such as functional value, cognitive hedonic value, and epistemic value. Zhang, Liu, Zhang and Pang proposed a five-dimensional model including social value, emotional value, functional value, epistemic value, and conditional value, which provides a solid foundation for creating a scale of perceived value. Results have shown that multiple value dimensions perform better than a single value dimension when explaining consumer choice [55]. In addition, from the point of view of experiential marketing, the consumer's perceived value has a situational nature [9].
- **Behavioral tendencies or intention:** This refers to the motivational factors that influence a certain behavior in which the stronger the intention to perform the behavior, the more likely it is to perform the behavior. Intention plays an important role in valid behavioral psychology models such as: reasoned action, theory of planned behavior, social cognitive theory, integrated theory of behavior, and integrated model. Much empirical and observational evidence developed over several decades suggests that behavioral intentions are malleable and that changes in intention are often followed by changes in behavior. Intention is considered the closest mediator of behavior because it is the construct most likely to predict intentional behavior. Although scholars have become increasingly interested in studying behavioral intention, they lack consensus on how to measure behavioral intentions, resulting in fundamentally different approaches [10]. Positive attitude of customers towards the product is a symbol of positive influence on purchase intention. In the research of Wang and Sun [45], three aspects of consumer behavior intention: word-of-mouth advertising, revisit and purchase intention have been investigated. Specifically, Zeithaml, Berry and Parasuraman [53], five dimensions of behavioral intention: saying positive things about the company or brand (positive word of mouth), recommending the brand or company to other consumers, willingness to pay more, loyalty or repurchase, and spending more. It has stated for the brand

or company. In addition, in several studies, willingness to recommend, positive word of mouth and repurchase intention have been used to measure customer behavioral intentions [14].

2.2 Research background

Various researches have been conducted in the field of concepts and relationships between them. Although each research has studied only two or more variables, in this part of the research, a number of researches and their results are mentioned.

Paringan and Novani [34] investigated the effect of customer perceptions of innovation and customer participation on value co-creation behavior, according to the results of structural equation modeling with partial least squares of customer interaction and perceived innovation on both dimensions of Customer value Co-creation Behavior, i.e. customer participation and behavior. The citizenship of the customer is affected. In the research of Xu, Tan, Lu, Li and Qin [49], the effect of dimensions of customer participation and customer citizenship behavior of Customer value Co-creation Behavior on six components of perceived value including: qualitative value, economic value, novelty value, knowledge value, emotional value and social value in a positive and meaningful way it is supported. Xie, Tkaczynski and Prebensen [48] investigated the impact of value co-creation on perceived value and customer satisfaction and concluded that customer participation is more important than their satisfaction in influencing their perceived value during the experience. Deng, Lu, Lin and Chen [7] investigated the effect of Customer value Cocreation Behavior on perceived value, and the findings have shown that Customer value Cocreation Behavior has positive effects on tourists' perceived value. Yen, Teng and Tzeng [50] investigated the effect of customer perceptions of innovation and customer participation on Customer value Cocreation Behavior and concluded that customer engagement and perceived innovation affect both dimensions of Customer value Cocreation Behavior, i.e. customer participation and customer citizenship behavior. Kim, Tang and Bosselman [22] investigated the effect of customers' perception of innovation on value co-creation behavior in hotel and tourism businesses, and the evidence collected from customers showed the positive effect of customers' perception of innovation on value co-creation behavior and its two dimensions, customer participation and supported customer citizenship behavior. Prebensen and Xie [35] investigated the effects of Customer value Cocreation Behavior on perceived value and consumer satisfaction. According to the results, co-creation includes physical and psychological (mental) participation, and the results of the study have shown that psychological co-creation has a positive and significant effect on the perception of value. Hong, Lin, and Hsieh, [19] investigated the effect of consumer innovativeness on perceived value and continued intention to use. Findings have shown that consumer innovativeness is related to their continuance intention through hedonic value and utilitarian value. Specifically, consumer innovativeness has a positive correlation with hedonic value and utilitarian value, and both hedonic value and utilitarian value have shown a positive correlation with continuance intention. These results indicate that the intention to continue buying depends not only on perceived values, but also on consumer innovativeness.

2.3 Model development and research hypotheses

Previous studies on the relationship between companies and consumers used social exchange theory [36]. The basis of this research is the investigation of brand-consumer relations using the theory of social exchange and dominant services. According to the social exchange theory, people make rational decisions to participate in a social exchange based on their perception of costs and benefits. An ongoing exchange relationship can be economic, social, or a combination of social and economic benefits and costs. Customers now partner with marketers and create exchanges through a co-creation process based on dominant service and communication marketing perspectives. Consumers exchange cognitive, emotional, social, economic and physical resources with marketers [28]. In the following, the relationships between the studied variables are mentioned based on the literature and background, and the development of the model and the statement of the hypothesis are discussed.

Relationships of perception of innovation with Customer value Cocreation Behavior, customers' tendencies and perceived value: practical innovation of companies has a strategic role during the process of Customer value Cocreation Behavior with the help of customers. Because innovation increases knowledge and information exchange between product providers and customers, it can help increase co-created value. Past studies have shown a positive relationship between innovation and Customer value Cocreation Behavior with the help of customers from the perspective of the logic governing services. Companies publish their innovative products and services on social networks to stimulate customers' emotional engagement and encourage actual customer engagement behaviors and information seeking about companies [50]. The degree of acceptance of a company's product and service innovations can be determined by examining their innovation from the customer's perspective [56]. According to a previous study, customers will be more interested in learning about new inventions when they interact with providers during the

process of products and services [23]. Research by Paringan and Novani [34] also showed that perception Customers of product innovations lead to increased participation and improved citizenship behavior of customers. The study of Hong, Lin and Hsieh [19] has supported the positive impact of innovation perception on perceived value and behavioral intentions. According to Hong, Lin and Hsieh, [19] when the customer thinks that the product or service is very innovative, they are more inclined to use the product or service. The study of Senbabaoglu's [39] indicates the positive effect of service innovation on overall quality, customer loyalty and perceived customer value. Therefore, the following hypotheses are proposed based on previous studies.

1. First hypothesis: customers' perception of innovations has an effect on customers' cooperative behavior.
2. Second hypothesis: customers' perception of innovations has an effect on customers' citizenship behavior.
3. The third hypothesis: customers' perception of innovations has an effect on customers' perceived value.
4. The fourth hypothesis: customers' perception of innovations has an effect on customers' behavioral tendencies.

Relationships of customer engagement with the tendencies and tire customers' perceived value:

customer engagement requires social interactions in which the accessible value of the consumer depends on the information and social position of the brand community [51]. In this regard, both the consumer and the marketer must believe that the customer engagement is fair in order to continue. The basics of the relationship between the service provider and the customer have changed over time, especially since the emergence of the network society. Academics and marketing practitioners have long been interested in how businesses can leverage customer engagement strategies, which can lead to Customer value Cocreation Behavior [28]. Customer engagement is the process of developing a deeper relationship with customers, with the aim of achieving customer loyalty [17]. Customers' roles have changed from passive recipients to essential co-creators of customer values as well as key contributors to company value and performance [26]. According to Solem [41], customer participation is the key factor in customer value Cocreation Behavior. According to Liu and Jo [27], more committed customers will behave differently because they are more interested in finding information, positively recommending services, and being more active in value creation. When customers are involved in the process of products and services, they can share insights with providers that may increase their opinions about the benefits of the service. Therefore, if customers are directly involved in the service process with providers, they will be encouraged to actively participate in value creation. In addition, customer engagement in services increases the likelihood that the service will be positively recommended to others [32]. As customers are more engaged with the service, they gain more experience. They are more willing to play a more active role in providing ideas and suggestions for further improvement to providers [33]. According to Zhang, Guo, Hu and Liu [54], customer participation can improve the value cocreation of customer due to increased profit and customer value. In the research of Kartanegara and Keni [21], the effect of customer engagement on customer satisfaction and loyalty is supported. Touni, Kim, Haldorai and Rady [43] concluded during the study that customer engagement has an effect on the perceived value of revisit intention. Based on this, the following hypotheses have been proposed:

1. The fifth hypothesis: customer engagement has an effect on customers' cooperative behavior.
2. Sixth hypothesis: customer engagement has an effect on customers' citizenship behavior.
3. The seventh hypothesis: customer engagement has an effect on customers' perceived value.
4. The eighth hypothesis: customer engagement has an effect on customers' behavioral tendencies.

Relationships of value co-creation behavior with customers' intentions and perceived value:

Some studies have investigated the relationship between customer cooperative behavior, customer citizenship behavior and perceived value. Customer cooperative behavior helps provide more intangible psychosocial benefits such as opportunities for self-presentation, attention from others, and situational awareness or increased feelings of social support [49]. These psychosocial benefits and feelings of social support satisfy customers' demand for social value. In addition, by actively participating in services, customers can directly invest resources to shape their desired brand consumption experience and create a higher level of customization, thus more opportunities to obtain a higher level of quality and there is economic value. In addition, feeling more in control over the service process and the final outcome enables customers to experience emotional value such as enjoyment and pleasure [3]. Customer citizenship behavior, an opportunity to help other like-minded customers and show empathy with others, increases the hedonic and aesthetic aspects of customers' understanding of the value of the experience [48]. According to the research results of Kamali, Zarea, Su and Soltani [20], the Customer value Cocreation Behavior significantly affects the satisfaction, loyalty and behavioral tendencies of users. Based on these empirical backgrounds, it is expected that value co-creation has an effect on customers' perceived value and behavioral tendencies in the tire industry, and the following hypotheses have been proposed:

1. Ninth hypothesis: cooperative behavior of customers has an effect on the customers' perceived value.

2. 10th hypothesis: customers’ cooperative behavior has an effect on customers’ behavioral tendencies.
3. 11th hypothesis: The citizenship behavior of customers has an effect on the customers’ perceived value.
4. The twelfth hypothesis: the citizenship behavior of customers has an effect on the customers’ behavioral tendencies.

3 Research methodology

This research has been done with the philosophy of positivism and correlation method and with the aim of investigating the role of customer perception of innovation and customer engagement on perceived value and behavioral tendencies through Customer value Cocreation Behavior in the tire industry. The statistical population of the research is made up of tire sales agents in the country and the statistical sample of the research is made up of people who were working as one of the sales agents at the time of data collection, i.e. the winter of 2022. The evidence has been collected using a questionnaire and through proportional sampling. The research questionnaire was taken from the researcher’s qualitative study through a multi-stage process and was provided to the sales representatives through email and the necessary evidence was collected. The collection of evidence lasted from January 5 to February 17. The entire research process is anonymous and used only for academic research. To ensure the randomness of the samples as well as the representativeness of the statistical sample and its similarity to the society, the questionnaires were randomly sent to the representatives of different cities. In order to estimate the sample size, the number of questions in the questionnaire is referred to, and according to the rule of 5 to 15 times the number of items in the questionnaire, and according to the number of eighty items, the minimum required sample is four hundred people, in this research seven hundred questionnaires were distributed and six hundred and Fifty healthy answer sheets have been analyzed, and the number of samples used in this research satisfactorily meets the needs of the research. The research questionnaire consists of two parts. In the first part, three characteristics of questionnaire completers, including age, education and years of business activity, have been questioned. In the second part, a five-point Likert scale, from "strongly disagree" (1) to "strongly agree" (5), was used to measure the perception of innovation, engagement, participation behavior, citizenship behavior, and perceived value. The items of the questionnaire before the implementation were based on the evaluation of fifteen people and based on the indicators of the content validity ratio and content validity index and were confirmed in a preliminary validity and face validity study. Validity and reliability have been supported based on the evidence collected with different indicators (Tables 1 and 2). In order to produce reliable results, factor analysis and structural equation modeling have been used to estimate the theoretical model and to judge the validity and validity of the model constructs, various indicators of internal consistency and construct validity have been used. Descriptive statistics have also been used to analyze individual characteristics and research variables by referring to the indicators of changes, central tendency and dispersion. The analysis process has been operationalized with Imus software and maximum likelihood method.

The structural equation model is one of the new statistical methods and one of the most powerful multivariate analysis methods, and its main application is in multivariate subjects. Multivariate analysis refers to a series of analysis methods whose main feature is the simultaneous analysis of several independent variables with several dependent variables. Structural equations are from the multivariate regression family, which allows researchers to test a set of regression equations simultaneously [38].

$$n_t = \beta_1 + \beta_2 m_t + \beta_3 g_t + \varepsilon_{1t} \tag{3.1}$$

The model should be named according to the number of parameters of the model and the parameters should be entered into the model:

$$n_t = \beta_{11} + \beta_{12} m_t + \beta_{13} p_t + \varepsilon_{2t} \tag{3.2}$$

$$n_t = \frac{\{(\beta_1 \beta_{13} - \beta_{11} \beta_3) + \beta_{13} \beta_2 g_t - \beta_3 \beta_{12} m_t - \beta_3 \beta_{14} n_{t-1} + (\beta_{13} \varepsilon_{1t} - \beta_3 \varepsilon_{2t})\}}{\beta_{13} - \beta_3} \tag{3.3}$$

$$p_t = \frac{\{(\beta_1 - \beta_{11}) + \beta_2 g_t - \beta_{12} \beta_{12} m_t - \beta_{14} n_{t-1} + (\varepsilon_{1t} - \varepsilon_{2t})\}}{\beta_{13} - \beta_3} \tag{3.4}$$

$$erf(x) = \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2} dt. \tag{3.5}$$

$$n = \max(n_1, n_2)$$

where:

$$\begin{aligned}
 n_1 &= \left[50 \left(\frac{j}{k} \right)^2 - 450 \left(\frac{j}{k} \right) + 1100 \right] \\
 n_2 &= \left[\frac{2}{2H} \left(A \left(\frac{\pi}{6} - B + D \right) + H + \sqrt{\left(A \left(\frac{\pi}{6} - B + D \right) + H \right)^2 + 4AH \left(\frac{\pi}{6} + \sqrt{A} + 2B - C - 2D \right)} \right) \right] \quad (3.6)
 \end{aligned}$$

where:

$$\begin{aligned}
 A &= 1 - p^2 \\
 B &= \text{parcsin} \left(\frac{p}{2} \right) \\
 C &= \text{parcsin}(p) \\
 D &= \left(\frac{\delta}{z_1 - \alpha/2 - z_1 - \beta} \right)^2
 \end{aligned}$$

where j is the number of observed variables, k is the number of latent variables, p is the estimated Gini correlation for a normal random vector of variables, δ is the predicted effect size, α is the corrected type I error rate, β is the type II error rate, and z is a standard score.

$$F(x; \mu, \sigma^2) = \frac{1}{2} \left[1 + \text{erf} \left(\frac{x - \mu}{\sigma\sqrt{2}} \right) \right], \quad (3.7)$$

where μ is the mean, σ is the standard deviation, and erf is the error function. Now the same steps can be done using software.

- Goodness of model fit tests

As their name suggests, goodness-of-fit tests are used to determine whether a particular distribution is well-fitted. Calculating goodness-of-fit statistics also helps to rank the fitted distributions according to how well they fit the data.

- The first index- RMESA

$$RMESA = \frac{\sqrt{(X^2 - df)}}{\sqrt{df(N - 1)}} \quad (3.8)$$

- The second index- GFI

$$GFI = 1 - \frac{F(S, \sum(\hat{\theta}))}{F(S, \sum(\cdot))} \quad (3.9)$$

- The third index – AGFI

$$AGFI = 1 - \frac{k(k + 1)}{2d} (1 - GFI) \quad (3.10)$$

4 Research results

Descriptive and inferential analyzes have been done to analyze the data. The characteristics of the statistical sample and the research variables (components) are based on frequency indicators, frequency percentage, central tendency and dispersion in a descriptive manner and the evaluation of the conceptual model with structural equation modeling and preliminary test set has been done inferentially and multivariate analysis.

Descriptive analysis: The statistical sample of the research includes 650 people, in terms of age, about 5% are less than 30 years old, about 25% between 31 and 40 years old, about 40% between 4 and 50 years old, and about 30% more than 50 years old. About 40% have a diploma or lower, about 25% have an associate degree, about 31% have a master’s degree, and about 5% have a master’s degree. About 10% less than 6 years, about 15% between 6 to 10 years, about 25% between 11 to 15 years, about 30% between 16 to 20 years and about 20% have a history of more than 20 years. Independent variables include: product innovation with a mean of 3.226 and a standard deviation of 0.726, innovation in providing goods and services with a mean of 3.084 and a standard deviation of 0.795, innovation in product advertising activities with a mean of 3.352 and a deviation of Standard 0.611 and variance 0.373, customer

identification with a mean of 3.636 and a standard deviation of 1.013, customer enthusiasm with a mean of 3.195 and a standard deviation of 0.898, and customer attention with a mean of 3.366 and a standard deviation of 0.886. 0 is in the upper limit of the average and customer attraction with a mean of 2.852 and a standard deviation of 0.922 and a variance of 0.851, customer interactions with a mean of 2.926 and a standard deviation of 1.044 is below the average of the measurement scale. Mediating variables include: information search with a mean of 2.733 and a standard deviation of 0.929, information sharing with a mean of 2.946 and a standard deviation of 0.926, responsible behaviors with a mean of 2.984 and a standard deviation of 1.106, personal interactions with mean 2.858 and standard deviation 0.951, feedback with mean 2.906 and standard deviation 0.966, support with mean 2.754 and standard deviation 0.940, help with mean 2.847 and standard deviation 1.086 below mean and tolerance with mean of 3.048 and standard deviation of 0.962 is in the average range of measurement scale. Dependent variables include: qualitative and functional value with an average of 3.225 and standard deviation of 1.063, emotional value with an average of 3.064 and standard deviation of 0.836, price value with an average of 3.302 and standard deviation of 0.954, social value. with a mean of 3.222 and a standard deviation of 0.976, cognitive value with a mean of 3.475 and a standard deviation of 0.954, convenience value with a mean of 3.273 and a standard deviation of 0.891, the tendency to buy with a mean of 3.292 and a deviation of the criterion is 0.919 and the tendency to advertise with an average of 3.167 and a standard deviation of 1.064 is in the upper limit of the average of the measurement scale (part of Table 1).

Inferential analysis: In the inferential analysis, a series of multivariate analyzes on distribution, exploratory factor analysis, confirmatory factor analysis, and structural equation modeling has been used and necessary analyses.

Investigations and preliminary tests: To analyze the normality of the data, the skewness and kurtosis of the distribution are referred to and the investigations have shown that, while the univariate distribution of the item is in the proposed range, the multivariate distribution based on the Merdia index is also of the required value for Support is normal. If the single-variable skewness is greater than the absolute value of 2 and the skewness is greater than the absolute value of 7, there may be serious problems. In this research, the skewness and elongation values are smaller than the threshold values. In order to avoid the common method bias, Harman's single-factor test and the method of controlling the potential error variable of the experiment and the results have shown that there is no common method bias and the data are suitable for further analysis. Exploratory factor analysis with principal components has shown that the data structure is good and valid. In this model, rotation was done with Varimax method and twenty-four components were extracted and the items of each variable were converged together. The Kaiser-Meyer-Olkin adequacy value with a value of 0.883 and higher than 0.70 and a significance level of less than 0.05 for Bartlett's test of sphericity test supports the suitability of the research data for exploratory factor analysis. Also, the first-order confirmatory factor analysis has supported the fit of the model from the fact that the factor loading of all the items is higher than 0.50 and the coefficients and various fit indices are significant. Also, with the second-order factor analysis, the relationship of each of the sub-components with the assumed main component has been observed in a positive and significant way. The reliability and validity of all research components have been confirmed based on various indicators. The large composite validity of the mean variance and the large mean variance of the constructs of 0.50 indicate an acceptable level of convergent validity. The root of the extracted variance of each construct is greater than the correlation of that construct with other constructs, and the maximum common variance is smaller than the mean of the extracted variance, indicating an acceptable level of diagnostic validity of the constructs. In addition, the construct validity of all items has been supported based on factor loading. The reliability of the survey instrument has been confirmed by the internal consistency method of evaluation. The combined reliability coefficients and the maximum reliability coefficients of all model constructs are greater than 0.70 (part of Table 1).

Table 1: Validity coefficients based on internal consistency and convergent validity and divergent validity of the constructs studied in the research

The studied components of the research	Validity and reliability						Indicators of central tendency and dispersion				
	Construct	CR	AVE	MSV	MaxR	ECO	Mean	Standard deviation	Variance	Skewness	Kurtosis
Product innovation	PROD	0.87	0.54	0.46	0.88	0.25	3.226	0.726	0.527	-0.214	-0.184
Innovation in providing goods and services	SERV	0.90	0.60	0.46	0.90	0.33	3.084	0.795	0.632	-0.205	-0.316
Innovation in advertising activities	PROM	0.89	0.57	0.46	0.90	0.32	3.352	0.611	0.373	-0.339	0.368
Identification	IDE	0.81	0.68	0.14	0.81	0.25	3.638	1.013	1.027	-0.577	-0.232
passion	ENT	0.77	0.62	0.16	0.79	0.24	3.195	0.898	0.806	-0.060	-0.458
Attention	ATT	0.87	0.70	0.15	0.88	0.28	3.366	0.886	0.785	-0.290	-0.369
attraction	ABS	0.88	0.71	0.11	0.89	0.21	2.852	0.922	0.851	0.298	-0.723
Interactions	INT	0.89	0.73	0.06	0.94	0.22	2.926	1.044	1.089	0.198	-0.947
Information search	SEE	0.86	0.67	0.06	0.86	0.19	2.733	0.929	0.864	0.080	-0.719

To share information	SHA	0.82	0.60	0.11	0.82	0.19	2.946	0.928	0.861	0.277	-0.499
Responsible behaviors	RES	0.90	0.75	0.12	0.91	0.25	2.984	1.106	1.222	-0.070	-1.010
Personal interactions	INTE	0.88	0.71	0.06	0.88	0.17	2.858	0.951	0.905	-0.399	-0.592
Feedback	FEE	0.93	0.80	0.14	0.93	0.21	2.906	0.966	0.933	-0.051	-0.613
favoritism	ADV	0.94	0.83	0.15	0.94	0.13	2.754	0.940	0.883	0.275	-0.628
help	HEL	0.84	0.73	0.15	0.86	0.17	2.847	1.086	1.180	0.115	-0.736
Tolerance	TOL	0.84	0.72	0.14	0.85	0.14	3.048	0.962	0.925	-0.080	-0.417
Quality and functional value	FUN	0.92	0.80	0.17	0.93	0.27	3.225	1.063	1.129	-0.074	-1.088
Emotional value	EMO	0.79	0.56	0.09	0.80	0.26	3.064	0.836	0.698	0.267	-0.441
valuable value	ECO	0.74	0.58	0.11	0.74	0.76	3.302	0.954	0.910	-0.193	-0.603
Social value	SOC	0.91	0.77	0.11	0.92	0.24	3.222	0.976	0.953	-0.226	-0.512
Cognitive value	EPI	0.85	0.74	0.10	0.93	0.26	3.475	0.954	0.910	-0.241	-0.477
Convenience value	CON	0.83	0.71	0.15	0.87	0.29	3.273	0.891	0.795	-0.388	-0.278
Willingness to buy	RI	0.90	0.69	0.20	0.91	0.26	3.292	0.919	0.844	-0.257	-0.542
Tendency to positive word of mouth advertising	WOM	0.90	0.76	0.17	0.90	0.30	3.167	1.064	1.131	-0.095	-0.914

Structural equation modeling results: This model consists of different parts. The fit indices have supported the concordance of the conceptual model of the research with the theoretical model. Comparative fit index with a value of 0.973, fit index with a value of 0.882, relative fit index with a value of 0.825, Tucker-Lewis fit index with a value of 0.972, normed-fit index with a value of 0.890, relative normed-fit index with a value of 0.854, they are all greater than the value of the proposal threshold and the root mean square error of approximation with a value of 0.021, the root mean square of the residual with a value of 0.04 and the normalized chi square with a value of 1.284, all three are lower than the value of the proposal threshold in the background.

According to the results of the measurement part of the model, the standardized effectiveness factor of all twenty-four components of the model on the assumed items are positive and larger than the significant value of 0.60 (between 0.663 and 0.964) and the test statistic (963 9.587 to 37.587) is greater than the critical value of 1.96, which indicates the existence of necessary factorial validity for each of the items in measuring the components.

Another part is related to the relationships between the main constructs and the components. The effectiveness factor of customer perception of innovation on all three components: innovation in product, innovation in advertising activities and innovation in providing goods and services (0.788 to 0.835); The effectiveness factor of customer engagement on all five components: identification, attraction, attention, enthusiasm and interactions (0.350 to 0.591); The effectiveness factor of customers' citizenship behaviors on all four components: feedback, favoritism, tolerance and help (0.535 to 0.683); The effectiveness factor of customer participation behaviors on all four components: information search, personal interactions, responsible behaviors and information sharing (0.358 to 0.640); The effectiveness factor of the customer's perceived value on all six components: qualitative value, convenience value, price value, emotional value, cognitive value and social value (0.374 to 0.510) and the effectiveness factor of behavioral tendencies on both components: the tendency to buy and Inclination to oral advertising is (0.623 and 0.661) and the results are positive and significant in all cases (test statistic greater than 1.96).

According to the structural part of the model, the coefficients of all tested paths are positive and in all test statistics, they are greater than the critical value of 1.96, which is supported by all twelve tested hypotheses. The effectiveness factor of the customer's perception of innovation on the customer's participation behavior with the value of 0.389, on the customer's citizenship behavior with the value of 0.204; It is positive and significant on the customer's perceived value as 0.257 and on behavioral tendencies as 0.208 (test statistic greater than 1.96) (supporting the first to fourth premises). The effectiveness factor of customer engagement on customers' participation behaviors is 0.316, on customers' citizenship behaviors is 0.328; It is positive and significant on the customer's perceived value with a value of 0.383 and on behavioral tendencies with a value of 0.354 (the test statistic is greater than 1.96) (supporting the fifth to eighth premises). The determination coefficients indicate that 0.245 of customer citizenship behaviors and 0.428 of customer participation behaviors are explained by customer perception of innovation and customer engagement. The effectiveness factor of customer participation a behavior on the customer's perceived value is 0.305 and on behavioral tendencies with a value of 0.402 and the effectiveness factor of customer citizenship behaviors on the customer perceived value is 0.135 and on behavioral tendencies with a value of 0.151 in a positive way. It is significant (the test statistic is greater than 1.96) (the support of the ninth to the twelfth premises). The determination coefficients indicate that 0.848 behavioral tendencies and 0.807 customers perceived value are explained by customer perception of innovation, customer engagement, customer participation behaviors and customer citizenship behaviors.

Table 2: The effectiveness factors and the main affecting and affected constructs test in the structural section

Hypothesis	Affecting construct and abbreviation	Affected construct and abbreviation	Effectiveness factor	t-statistic	Error probability	The result of the hypothesis
The first hypothesis	INNO Perception of innovation	CPB cooperative behaviors	0.389	3.212	0.001	Positive support
The second hypothesis	INNO Perception of innovation	CCB Citizenship behaviors	0.204	2.044	0.041	Positive support
The third hypothesis	INNO Perception of innovation	CPV perceived value	0.257	2.743	0.006	Positive support
The fourth hypothesis	INNO Perception of innovation	BI Behavioral tendencies	0.208	2.084	0.037	Positive support
The fifth hypothesis	CE Customer engagement	CPB cooperative behaviors	0.316	2.487	0.013	Positive support
The sixth hypothesis	CE Customer engagement	CCB Citizenship behaviors	0.328	2.884	0.004	Positive support
The seventh hypothesis	CE Customer engagement	CPV perceived value	0.383	3.329	* * *	Positive support
The eighth hypothesis	CE Customer engagement	BI Behavioral tendencies	0.354	2.965	0.003	Positive support
The ninth hypothesis	CPB Cooperative behaviors	CPV perceived value	0.305	2.972	0.003	Positive support
The tenth hypothesis	CPB Cooperative behaviors	BI Behavioral tendencies	0.402	3.435	* * *	Positive support
The eleventh hypothesis	CCB Citizenship behaviors	CPV perceived value	0.135	2.105	0.035	Positive support
The twelfth hypothesis	CCB Citizenship behaviors	BI Behavioral tendencies	0.151	2.224	0.026	Positive support

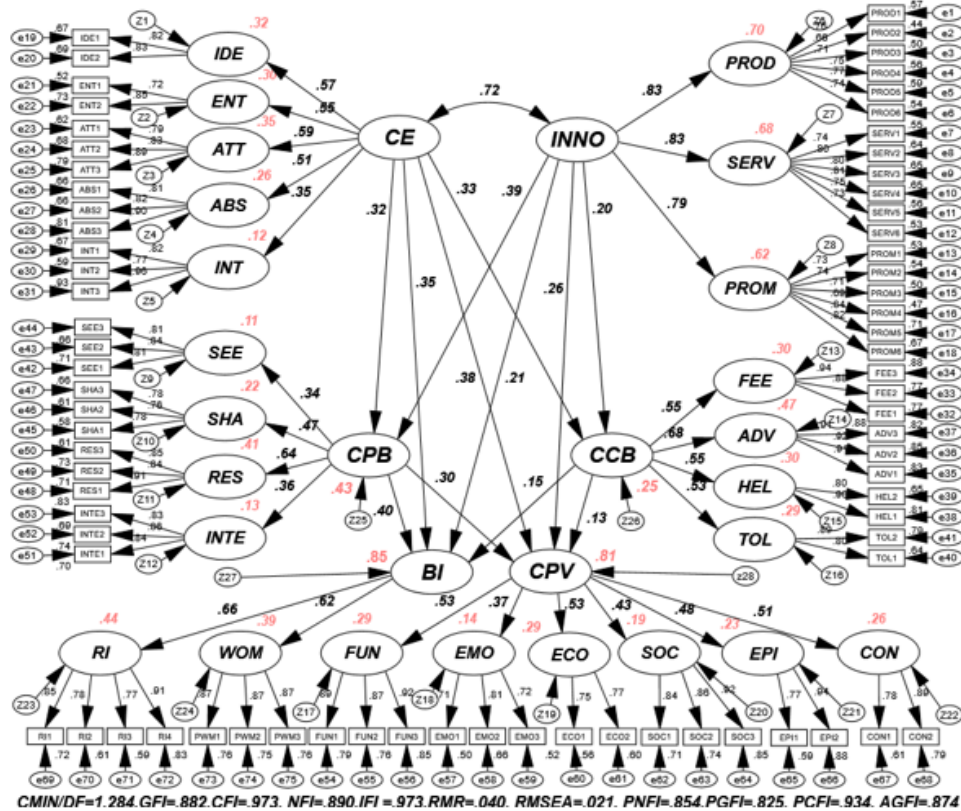


Figure 1: Impact coefficients of constructs on items and constructs on constructs in the structural equation model

According to the bootstrap results, the coefficient of indirect effect of customer engagement on the customer’s perceived value of the value cocreation behaviors of customers is 0.141 and on behavioral tendencies is 0.177 and the coefficient of the indirect effect of the customer’s perception of innovation on the customer’s perceived value through value creation behaviors Customers share with a value of 0.146 and on behavioral tendencies with a value of 0.187, which in four cases the level of significance is less than 0.05 and the significance of the indirect effectiveness factor is supported.

5 Discussion and conclusion

This research has investigated how the perception of innovation and customer engagement through the mediating role of participation behaviors and citizenship behaviors (value co-creation) affect the customers' perceived value and behavioral tendencies in the tire industry. To examine the issue, the theory of social exchange and dominant services is referred to, and by selecting a sample group from among the tire sales agents in the country and collecting evidence through a questionnaire and using the correlation method and the structural equation modeling approach, the conceptual model has been tested.

According to the results of the first to fourth hypothesis, the increase in customers' perception of tire manufacturers' innovation leads to an increase in customers' cooperative behaviors, citizenship behaviors, perceived value, and behavioral tendencies. This result is in accordance with the expectation of the research and in line with the findings of studies done by Paringan and Novani [34], Senbabaoglu [39] and Hong, Lin and Hsieh [19]. Therefore, tire customers' perceived value, behavioral tendencies, cooperative behaviors, and citizenship behaviors in Iran are not independent from customers' perception of tire manufacturers' innovation, and customers' perception of tire manufacturers' innovation is strong and positive.

According to the results of the fifth to eighth hypothesis, the increase of customer engagement towards tire manufacturers leads to an increase in customers' cooperative behaviors, citizenship behaviors, perceived value, and behavioral tendencies. This result is in accordance with the expectation of the research and in line with the research findings of [2, 5, 16, 18, 21, 23, 25, 43, 47]. Therefore, tire customers' the perceived value, behavioral tendencies, cooperative behaviors of customers, and citizenship behaviors in Iran are not independent of customer conflict with tire manufacturers, and the engagement of customers with tire manufacturers is strong and positive.

According to the results of the ninth to twelfth hypothesis, the increase in the customers' cooperative behavior and the citizenship behavior towards tire manufacturers leads to an increase in the customers' perceived value and the behavioral tendencies. This result is in accordance with the expectation of the research and in line with the research findings of [20, 48, 49]. Therefore, the tire customers' perceived value and behavioral tendencies in Iran are not independent from customers' the cooperative behaviors and the citizenship behaviors toward tire manufacturers, and the customers' cooperative behaviors and the citizenship behaviors toward tire manufacturers are strong and positive.

Based on the evidence collected from the statistical community, the results can be explained by the theory of social exchange and dominant services. According to the theory of social exchange, the main factor in the relationship between customers and manufacturing companies is the satisfaction of the interests and personal interests of the parties. Interests between customers and companies can strengthen relationships. Interactions between customers and companies can be compared to economic exchanges where customers are satisfied when they receive a fair amount in return for paying a fee. Therefore, cost-benefit analysis plays a central role in the process of social exchange. According to the framework of dominant services, organizations operate in a dynamic environment where their life depends on interaction with other actors in this field. For success in this field, value co-creation is a key element that can be achieved in interaction with customers and stakeholders. The logic of service dominance is a framework for explaining the way of Customer value Cocreation Behavior through the exchange process in an economic structure. Therefore, in the studied statistical population, customers' perception of innovation and customer engagement has the ability to generate customer value Cocreation Behavior, which leads to the customers' perceived value and behavioral tendencies. Finally, this study has shown that the customers' perceived value and behavioral tendencies towards the products of tire manufacturers reduce their role limitations, and both the cooperative behavior of customers and the citizenship behaviors of customers increase the customers' perceived value and behavioral tendencies towards manufacturers.

Based on the findings of the research, a number of practical suggestions are provided to the tire manufacturers. The first recommendation is related to customer engagement, which increases cooperative behavior, customer citizenship behaviors, customer perceived value, and customer behavioral tendencies. Tire manufacturing companies are suggested to provide valuable incentives such as identification and reward programs to encourage customer participation and loyalty. In order to increase the customer's passion for the brand, companies must create a unique and clear identity of the brand that the customer wants. In order to maintain customer focus on the brand, companies must provide relevant, important and interesting information to customers. In order to facilitate the attraction and attention of customers, tire industry managers must ensure that advertisements, positive news and information related to the tire brand are easily accessible by customers. Participating in corporate social responsibility programs and building a user-friendly website are part of the methods that can be used to attract, attract and motivate customers. In addition, tire manufacturing companies need to develop social media platforms or communities to help customers interact. Companies should create opportunities for interactions or incentives such as reward schemes or identification to promote customer interaction and participation. This type of social interaction helps to keep consumers engaged. Creating passion and excitement

leads customers to the producer. The passion and excitement of consumers with a brand name can attract and retain customers by improving social recognition and brand credibility. Tire manufacturers should try to take advantage of the perceived situation to accelerate the enthusiasm of customers. Therefore, the management and marketing of the tire industry should capitalize on the positive effect that customer engagement has on the Customer value Cocreation Behaviors and customers' behavioral tendencies.

The second recommendation is related to customers' perception of the manufacturer's innovation, which increases cooperative behavior, customer citizenship behaviors, value perceived by customers, and customers' behavioral tendencies. Tire manufacturing companies are suggested to focus on innovation in product, innovation in providing goods and services, and innovation in advertising activities. Although all three dimensions of customer perception of innovation are important for customer perception of innovation, product innovation has the strongest effect. Therefore, managers and marketers should consider increasing the tendency of customers to participate in value creation by focusing on innovative technology and providing innovative and value-added products to enhance customer experience. In this regard, there is a need to focus on the features: variety in size, improvement in design, use of methods to reduce costs, including fuel, in accordance with environmental standards, increasing safety and braking power, product quality and product stability, reducing the need for equipment and supplies. Such as tire chain and suitable raw materials are recommended to improve durability. Innovation in providing goods and services is the second important dimension of customer perception of innovation. Therefore, managers and marketers should introduce innovative solutions in providing goods and services or services with added value so that customers are encouraged in the direction of value creation. In this regard, attention and focus on creating an effective platform for faster access to products and services, using the latest technologies to provide products and services, creating a platform for improving communication with customers, creating a platform for saving time, creating a platform for saving costs and providing Beneficial and needed services of customers, creation of appropriate distribution system or channel according to the needs and demands of the target market and their empowerment are recommended and suggested. Finally, innovation in advertising activities is another dimension of customer perception of innovation that should be taken into consideration. In this context, effective advertising programs to introduce and provide products and services, newer and more specialized communication platforms to communicate with customers, use new reward programs for customers, organize diverse and innovative events for customer participation, introduce new production processes, introduce product categories and channels Distribution, effective marketing activities and development of informational and cooperative networks are suggested.

The third recommendation is related to the cooperative behavior of customers, which increases the value perceived by the customer and the customers' behavioral tendencies. Tire manufacturing companies are suggested to focus on the dimensions of responsible behavior, information sharing, personal interaction, and information search in order to increase the value perceived by the customer and customers' behavioral tendencies. Manufacturing companies should develop more interactive information sharing strategies. In addition, there is a need to promote more responsible behavior among customers by creating a sense of ownership and communication to make co-creation more effective. In this regard, helping to collect information, publishing customer experience, helping brand officials and employees, informing about the advantages of new products and services, informing about the disadvantages of new products and services, providing appropriate information when needed, fulfilling responsibilities In relation to business, providing correct answers to customers' questions, adhering to moral conscience in business, trusting employees and brand officials, enjoying interaction with employees and brand officials, enjoying interaction with other customers, including feasible solutions. It is recommended.

The fourth recommendation is related to customer citizenship behaviors, which increases the value perceived by the customer and the customer's behavioral tendencies. It is suggested to the tire manufacturing companies that the tire manufacturing companies focus on the dimensions of brand favoring, brand assistance, brand feedback and brand tolerance in order to increase the value perceived by the customer and customers' behavioral tendencies. In this regard, the desire to provide useful ideas to improve new products and services, share personal experience of new products and services, inform the company and employees about problems and shortcomings, recommend the brand to friends and relatives, and defend the brand. In case of unjustified objections from the brand, pointing out the positive points about the brand's goods and services when recommending them, helping customers in case of problems, providing advice to the company if needed, hoping to eliminate defects in new goods and services. brand. And patience is recommended in case of problems in the process of providing services and new goods.

It is suggested to the future researches to repeat and compare the research model in production products and services in order to expand the generalizability of the findings in presenting and validating the results. It is also recommended that the relationships presented in this research should be studied with experimental methods, that repetition and expansion and experimental findings are clearly needed. Focusing on the aspects highlighted in this

research and examining them in detail is another suggestion of the research to future researches. It is also recommended to examine the role of other important factors of customer relationship marketing such as customer experience, special brand value, participation, and satisfaction, relationship with personal brand, customer support and financial performance as antecedents or consequences.

Despite the appropriate and sufficient contributions in this research and efforts to control the factors that distort the research results, the results and findings have limitations in some cases, including the cross-sectional nature of the research, the lack of control over the role of different personality traits in the activities of Customer value Cocreation Behavior, and the engagement of customers and the study. The drivers and consequences and the Customer value Cocreation Behavior in customers are based on descriptive criteria.

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