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THE IMPACT OF PRODUCT INNOVATION, ENVIRONMENTAL RESPONSIBILITY AND PRODUCT INVOLVEMENT ON RELATIONSHIP QUALITY IN THE AUTOMOTIVE INDUSTRY

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Abstract

This paper aims to contribute to the literature on relationship quality from brands to customers by analyzing how this construct is impacted by product innovation, environmental responsibility and product involvement. These influences were explored in the German automotive industry, using multiple linear regressions. Results reveal a positive relation between these factors and relationship quality. Given the limited number of existing research in this area, this thesis is significant in helping to understand the dynamics as well as providing insights for managers operating in the German automotive sector.

Keywords

Relationship Quality, Environmental Responsibility, Product Innovation, Product Involvement, Automotive Industry

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1. Introduction

"For over a century the car has been changing the world. Now the world is changing the car" (Berylls 2023). This quote from the consulting firm Berylls illustrates the impact of megatrends such as "dynamic technology & innovation", "globalization & future markets", "climate change & ecosystem at risk", and "sustainability & global responsibility" on the automotive industry (Krys and Fuest 2018; Krys, Born, and Geering 2023). These trends are shaping the business model of automotive brands and need to be considered in corporate strategies. The automotive industry is a major contributor to climate change and faces an era of profound changes and disruptive challenges, particularly in terms of *environmental responsibility* (Proff et al. 2023). Studies indicate that positive consumer perceptions of product sustainability result in actual purchases (Bar Am et al. 2023). Given the increasing importance of sustainability, vehicle manufacturers must take greater responsibility for environmental protection (Jursch 2023).

Car manufacturers are experiencing a dynamic market situation characterized by growing environmental awareness, technological progress and increasing competition (Jud and Wrann 2023; Malorny 2023; Jursch 2023). In Germany, a country with a long automotive history, the established car industry is facing several major challenges (Knafl 2015). The transformation to battery powered vehicles is a complex process characterized by technological backlogs and the need for cooperation with Chinese partners (Tyborski 2023; Backovic 2023). Chinese companies are entering the German market not only through cooperation agreements, but also by launching their own vehicle models (Bessinger 2022). Despite the established nature of German brands, this represents a threat to German automakers and a potential demand for *product innovation* (Jud and Wrann 2023). The historical success of European original equipment manufacturers could lead to a false sense of security and underestimate the challenges ahead in terms of electrification, software development and competitive market dynamics (Cornet et al. 2023).

In fact, Chinese manufacturers take a different approach to setting new trends in vehicle design by focusing on infotainment systems and viewing cars as interchangeable consumer goods to be replaced every few years, rather than long-term purchases. Nevertheless, the car remains a symbol of status, increasingly defined by its technical capabilities. As a result, customers have higher expectations for digital features in their cars (Dahlmann 2023). However, Mc Kinsey states that while engineering excellence once defined competition between car manufacturers, the industry's new battleground is now centered on customer experience (Grüntges et al. 2021). As so, it is important to analyze *product involvement* to approach customers correctly.

In response to these trends, the German automotive industry has to find ways of retaining customers to obtain competitive advantage. This involves strengthening the *relationship quality* with existing customers to facilitate brand success (Peppers and Rogers 1995). Although firms focus primarily on acquiring new customers, they pay less attention to their existing customer base. The literature shows that to compensate for the loss of a single existing customer, a company might need to acquire three new customers (Bough, Ehrlich, and Schiff 2023).

Therefore, a noticeable shift in this strategy has unfolded, as it is suggested to focus on strengthening the relationships with current customers and to use *relationship quality* as a strategic tool (Fanderl 2023; Hilman, Abd Ghani, and Hanaysha 2013). Given these trends, it is interesting to understand how advances in technology, commitment to sustainable practices and the depth of consumer engagement with their vehicles, shape the strength of customer-brand relationships. By analyzing these elements in a unified framework, the study aims to provide actionable insights for automotive brands, enabling them to improve their strategies to meet evolving consumer expectations, thereby maintain their customers and strengthen their market position. According to the current state of research, these aspects have not been analyzed in the context of relationship quality, but it is recommended that they be examined (Shankar

and Yadav 2020). The aim of the paper is to examine "the impact of product innovation, environmental responsibility and product involvement on relationship quality in the automotive industry". The structure of the paper is to first explain the concepts *relationship quality*, *product innovation*, *environmental responsibility*, and *product involvement* with the current state of research. This results in three hypotheses which are analyzed. Subsequently, the methodological approach is detailed to ensure the transparency and replicability of this study. Finally, the results are presented and discussed including theoretical and practical contributions, limitations, and a future outlook.

2. Literature Review

2.1. Relationship Quality

Many companies consider their brands to be their most valuable assets, critical to gaining competitive advantage and generating profits. This success of a brand depends on its ability to maintain its added value by building long-term relationships based on knowledge and familiarity, which allows consumers to connect with the brand and the company (Şahin, Zehir, and Kitapçi 2011). "The strength and overall evaluation of the relationship between a firm and its customers" is defined as relationship quality (Hilman, Abd Ghani, and Hanaysha 2013, 479). Studying brand relationships offers the advantage of understanding how brands affect customers and how they meet their needs (Breivik and Thorbjørnsen 2008). The concept of relationship quality has emerged as a focal point among academics and business professionals due to its ability to improve business performance (Hanaysha and Abdul-Ghani 2016; Nammir, Marane, and Ali 2012). This transformation not only contributes to customer retention, but also functions as a strategy for attracting new ones, ultimately leading to enhanced profitability (Fanderl 2023). Marketing is increasingly focused on creating and sustaining mutually satisfying, long-term relationships with consumers that cannot be imitated by competitors and influence their buying behavior (Chen and Myagmarsuren 2011; Buttle 1996). Creating high

quality customer relationships is one of the most valuable resources for an company (Ford and Hkansson 2006). In previous academic work, the evaluation of relationship quality has been approached through various dimensions. Trust, commitment, and satisfaction are most known as the core elements for conceptualizing or measuring relationship quality in the academic literature (Hilman, Abd Ghani, and Hanaysha 2013).

Brand trust is defined as “the willingness of the average consumer to rely on the ability of the brand to perform its stated function” (Chaudhuri and Holbrook 2001, 82). This trust is pivotal in establishing customer relationships (Moorman, Zaltman, and Deshpande 1992). To secure competitive and economic advantages it is essential for organizations to foster brand trust by positively influencing customer perceptions (Delgado-Ballester and Munuera-Alemán 2005; Hanaysha 2015). Brand trust is characterized by the belief that a brand has good intentions towards the interests of the consumer and ensures that it delivers on its value promise in a consistent manner, even in challenging situations (Delgado-Ballester & Munuera-Alemán, 2005). *Brand commitment* is also curcial in determining the strength of a successful relationship between a brand and its customers (Morgan and Hunt 1994; Hanaysha 2015). It is defined as "an enduring desire to maintain a valued relationship" (Moorman, Zaltman, and Deshpande 1992, 316) with a brand and refers to the consumer's ultimate willingness to have a relationship, which includes beliefs, attitudes and behaviors towards the brand (Şahin, Zehir, and Kitapçi 2011). Brand commitment is a critical element of relationship marketing that contributes to long-term relationships, enhances a company's competitiveness and is likely to reduce the switch to another brand (Fournier 1998; Raju, Unnava, and Montgomery 2009). Also, it positively influences buying behavior and positive word-of-mouth (Odekerken-Schröder, De Wulf, and Schumacher 2003; Fullerton 2005; Dam 2020). The third dimension of relationship quality is *brand satisfaction*. This construct is crucial, because without it the quality of the brand relationship cannot be maintained (Hyun 2010). Brand satisfaction can be defined as “the

outcome of the subjective evaluation that the chosen alternative (the brand) meets or exceeds the expectations" (Bloemer and Kasper 1995, 314). As a result, it impacts customer's behavioral intentions, willingness to pay, positive word-of-mouth and repurchase behavior (Anderson, Fornell, and Lehmann 1994; Erciş et al. 2012; Homburg, Koschate, and Hoyer 2005).

Relationship quality is influenced by several factors. Research already analyzed the influence of advertising (Hanaysha 2015; Hilman and Hanaysha 2015), market orientation (Tan, Mavondo, and Worthington 2011), learning orientation (Tan, Mavondo, and Worthington 2011), product quality (Hanaysha and Abdul-Ghani 2016; Hanaysha, Hilman, and Abdul-Ghani 2014), country of origin (Hanaysha 2015), service quality (Hanaysha and Hilman 2015a), innovation (Hanaysha 2015; Hanaysha and Hilman 2015b) and promotion (Pi and Huang 2011). It is noted that customers' brand perceptions may differ depending on the country and that future studies should explore other variables as well (Hilman, Abd Ghani, and Hanaysha 2013; Hanaysha 2015; S.-B. Kim and Kim 2016). Thereby, it is suggested to analyze variables such as CSR, innovation and involvement (Shankar and Yadav 2020). This is a gap in the literature which is in need of further research. This is the reason why the current study examines product innovation in the context of the dynamic market scenario in Germany and explores the relevance of product involvement and environmental responsibility.

2.2. Product Innovation

Innovation is widely acknowledged as a crucial factor in the continuous development of any business. Product innovation is defined as "a new technology or combination of technologies introduced commercially to meet a user or a market need" (Utterback and Abernathy 1975, 639). Therefore, innovation facilitates organizational alignment with changes of the environment, market fluctuations and consumer preferences (Tohidi and Jabbari 2012). From an internal point of view, product innovation is dependent on the experience, knowledge, skills, resources and available technologies of the organization (Rainey 2009). From an external

point of view, it is a product or service that consumers perceive as either new or significantly improved (Adam and Cornescu 2019). Consumers want excellent products and services that offer outstanding value, superior utility, high quality and assured performance (Rainey 2009). To fully consider the concept of innovation, it is essential to understand the roles and perspectives of both the organization and the customer (Adam and Cornescu 2019; Rainey 2009). Customers' product preferences and needs change frequently, influencing their purchasing decisions. These choices are driven by how they perceive a brand's offering, particularly in terms of innovative features and unique product design such as the case of automotives (Moon, Miller, and Kim 2013; Hanaysha, Hilman, and Abdul-Ghani 2014). In large companies that have successfully established reputable brand names worldwide, innovation is becoming a standard approach to build positive customer perceptions (Hanaysha, Hilman, and Abdul-Ghani 2014). This can be accomplished through marketing communication leading to a notable effect on consumers' perception of the innovativeness and assists in retaining and acquiring customers (Demirbag Kaplan 2009; Dibie, Unanam, and Bassey 2019). Thereby, it has to be noted that in the past brands have suffered because of their inability to communicate their innovations to consumers (Nørskov, Chrysochou, and Milenkova 2015). It is well known that product innovation is a key strategic factor that can provide a competitive advantage for a company, but this is often short-lived as competitors tend to imitate successful innovations (Öztürk and Can 2015; Kuncoro and Suriani 2018). In general, it enhances the overall performance of the company, leading to increased profits and growth (Hashi and Stojčić 2013; Kingsland 2007). Product innovation is a key success factor for various brands and will therefore be further analyzed in this paper.

By understanding the relationship between product innovation and relationship quality, organizations can strategically align their innovation efforts with the goals of building relationships, securing a competitive advantage and ensuring long-term profitability and brand

success. The state of research on the specific influence of product innovation on relationship quality is underdeveloped with only a few studies, especially in the German market. In the Asian market product innovation significantly impacts relationship quality in the automotive industry (Hanaysha and Hilman 2015b; Hanaysha 2015; Hanaysha and Hilman 2015a). There are also studies who analyzed the impact of product innovation on the dimensions of relationship quality: brand trust (Dimyati 2011; Simbolon and Sukresna 2021; Adiwijaya et al. 2021; Hanaysha, Hilman, and Abdul-Ghani 2014) and brand satisfaction (Nemati, Khan, and Iftikhar 2010; Dimyati 2011; Hu and Huang 2011). The studies mentioned are most from Asia and there is no study known that has analyzed this impact in the German market (Appendix A). Analyzing relationship quality is important in this market, given the significant economic role of the automotive industry and its current challenges, as highlighted in the introduction. Therefore, the following first hypothesis is analyzed:

H1: Product innovation positively impacts relationship quality.

2.3. Environmental Responsibility

Corporate Social Responsibility (CSR) and innovation have gradually emerged over the past decade as crucial factors in business competencies. Companies should do more to address issues like equality, poverty and climate change. Those who see these challenges as opportunities for innovation will be the successful brands of the future (Rexhepi, Kurtishi, and Bexheti 2013). Therefore, CSR has become increasingly important for business professionals, politicians and academics in the field of management (Tilt 2016; García-Piqueres and García-Ramos 2020; Alvarado-Herrera et al. 2017). According to the German Federal Ministry of Labour and Social Affairs CSR refers to the responsibility of companies for their impact on society, encompassing ecological, social and economic aspects (BMAS n.d.). Ecology is the fundamental element on which the other two areas are built and is therefore given priority (Kromp-Kolb 2019). For the analyzed industry the environmental responsibility is a crucial

aspect, which is why this research focusses on this facet of CSR (DesJardins 1998). To meet environmental demands, companies have learned to integrate new business strategies with CSR initiatives (Almeida and Coelho 2019). In order to minimize ecological damage, companies have managed to control the environmental impact of production. However, this environmental awareness has also urged companies to increase product innovation by creating a unique position, consequently achieving a competitive advantage (Skordoulis et al. 2020; Anthony and Benedetto 2017). In this context, some authors acknowledge a link between CSR and innovation, while others argue about challenges to find a suitable theory to proof this association (Ratajczak and Szutowski 2016; Gallego-Álvarez, Prado-Lorenzo, and García-Sánchez 2011). Market surveys suggest that there is a positive relationship between the CSR actions of a firm and the reactions of its customers to the firm (Creyer and Ross 1997; Moisescu and Gică 2020; Bhattacharya and Sen 2004). Evidence shows that how customers perceive a company's CSR affects their intention to continue buying its brand (Wang et al. 2021). Bhattacharya and Sen (2004) demonstrate that consumers can have a sense of attachment or connection to companies that engage in CSR initiatives. Therefore, businesses are using CSR initiatives as a strategic tool to improve their brand image (Shankar and Yadav 2020).

Research on how CSR, especially environmental responsibility, affects the quality of relationships is limited and it was analyzed in the Banking and Hospitality industry (Shankar and Yadav 2020; S.-B. Kim and Kim 2016; Mei 2019; Aljarah et al. 2020). Also, the state of research regarding CSR and its impact on the dimensions of relationship quality are more developed in Asia (Aljarah et al. 2020). It has been proven, that CSR has impact on trust (Dawood 2019; Huo et al. 2022; Khan and Fatma 2023; S.-O. Kim, Lee, and Lee 2021) and satisfaction (Pérez, del mar García de los Salmones, and Rodríguez del Bosque 2013; Dawood 2019) (Appendix A). These considerations lead to the following second hypothesis:

H2: Environmental responsibility has a positive influence on relationship quality.

2.4. Product Involvement

Understanding the depth of a customer's connection with a product is critical as consumer preferences shift towards more personalized and emotionally engaging experiences. As the importance of a product differs to each individual, consumers have different perspectives and affinities towards products. Investigating how these various bonds are developed, maintained and influenced is of great interest not only to academic researchers in consumer behavior, but also to practitioners in the field, such as marketing managers (Hanzaee, Khoshpanjeh, and Rahnama 2011). To describe how people interact with a product category, consumer research experts often refer to the construct of involvement (Zaichkowsky 1985b; Hanzaee, Khoshpanjeh, and Rahnama 2011). “The object of involvement may be a product, service, a situation, or an advertisement” (Zaichkowsky 2009, 2). Product involvement the importance or worth of a product category to an individual, which is taking into account the needs, goals and characteristics of the individual (Coulter, Price, and Feick 2003; Higie and Feick 1989; Ferreira and Coelho 2015). A person who is more involved would be more willing to engage with the brand in its free time and might be interested in specific product events organized by the brand. If the product involvement is low, a brand should not be considered relevant to costumers as all brands should deliver equivalent levels of satisfaction (Ferreira and Coelho 2015; Bronnenberg and Vanhonacker 1996). But involvement does not mean that a person must be an expert on the product (Zaichkowsky 1985a). It is suggested to target highly involved customers as they are probably more satisfied customers (C. J. Liang and Wang 2007).

The impact of product involvement has not been analyzed on relationship quality. However, research suggests that product involvement has a positive impact on two dimensions of relationship quality: commitment (Coulter, Price, and Feick 2003) and satisfaction (C. J. Liang and Wang 2008; 2007; Yang, Hlee, and Koo 2019) and trust (C. J. Liang and Wang 2008). Also, product involvement can have influence on brand loyalty (Ferreira and Coelho

2015; Hanzaee, Khoshpanjeh, and Rahnama 2011). This indicates that involved consumers to a product take fewer brands into consideration and are more likely to purchase the same brand repeatedly (Belonax and Javalgi 1989; Ferreira and Coelho 2015). With an opposite perspective, there are studies who state that product involvement has no significant impact on brand commitment (Warrington and Shim 2000) (Appendix A). Acknowledging that existing studies are generally outdated, have contradictory findings and none have specifically investigated the impact of product involvement on relationship quality in the automotive industry, the study introduces the following hypothesis to address this gap:

H3: Product involvement positively impacts relationship quality.

2.5. Research Model

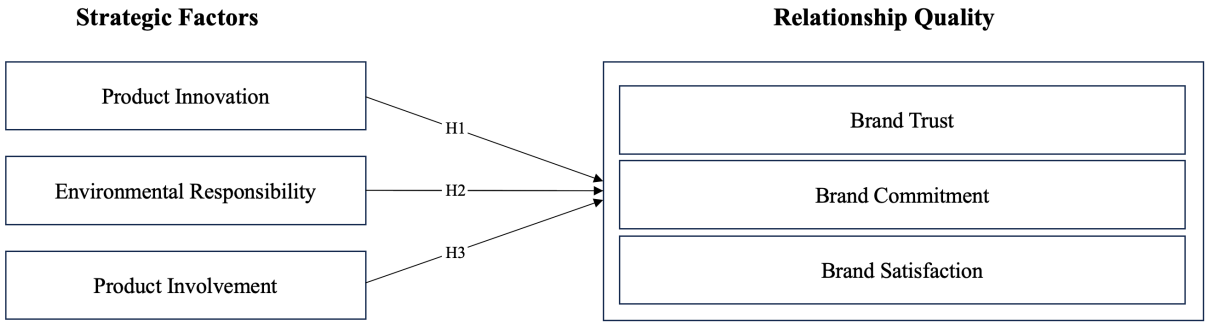

Figure 1. Conceptual framework

The provided model synthesizes three strategic factors: environmental responsibility, product involvement, and product innovation with their impact on relationship quality. On the one hand, the influence of each factor on relationship quality is tested according to the hypotheses. On the other hand, it is analyzed whether their combined effect improves relationship quality.

3. Methodology

3.1. German Car Industry

There are several reasons why the automotive industry was chosen for this study. Generally, most adults own cars and are eligible for the study. Also, this study is designed to add a practical and theoretical contribution by giving valuable insights on the automotive

industry. On the one hand, the automotive industry has been shown to be particularly suitable for analyzing relationship quality and product innovation (Hanaysha and Hilman 2015b). Additionally, while consumers may use a car regularly, giving minimal consideration to the product and perceiving the vehicle as primarily an appliance, alternatively, consumers may exhibit extensive engagement with cars, such as automobile enthusiasts who subscribe to car newsletters and belong to car clubs. This indicates that car product involvement is exceedingly varied (Bloch 1981). Also, as already mentioned above, environmental responsibility is an important aspect in the automotive market (Tahssili and Shahhoseini 2023).

On the other hand, relationship quality, product involvement, environmental responsibility and product innovation are current topics in the car industry. This industry is one of the main drivers of the German economy (Schott n.d.). As already mentioned, German automotive market is highly competitive. German carmakers are challenged to find effective strategies to compete with foreign car brands entering the German market. In the automotive sector, the creation of brand trust and equity is particularly important for manufacturers seeking competitive advantage (Hanaysha 2015). This importance is due to experiential and relational facets of automotive brands. Managing and developing brand trust therefore becomes vital in the context of durable products like automobiles, which involve significant profit margins and contribute to brand success (Şahin, Zehir, and Kitapçi 2011). In general, brand satisfaction, brand trust, and brand commitment are very important, as they play a decisive role in shaping the overall success of automotive brands (Şahin, Zehir, and Kitapçi 2011).

3.2. Sample

The survey was conducted anonymously using an online questionnaire via the SoSci Survey platform version 3.5.00. As this is an exploratory analysis, the survey was published in the form of posts on social networks such as LinkedIn, Instagram and Facebook using snowball sampling. The survey was also distributed in the social environment through messaging services

such as WhatsApp and Microsoft Teams. Participant data was also generated through internal company forums and platforms such as SurveyCircle. The researcher was aware that this could generate a greater number of younger participants, but decided for this method due to its effectiveness in collecting data. The survey was available during three weeks in November 2023. The sample size required for the study was calculated using the G*Power program version 3.1.9.6 prior to data collection, which is a commonly used approach. The G-Power analysis determines a required sample size of N = 159 for this work (Appendix B). This sample size is determined based on a discriminatory power of 1 - b = .80, an alpha error of α = .05 and an effect size of d = .05.

3.3. Questionnaire and Scale Development

The survey started with an introductory text that directly addressed the participants and motivated them to complete the survey. The exact topic of the thesis is not mentioned in this introductory text so that the participants are not biased. Participants are also assured that the survey is anonymous and confidential and that the results cannot be traced back. Honest answers and a low level of social desirability are therefore expected. In addition, the survey specifies that participants must be fluent in English, over 18 years of age and have a valid driving license. The introductory page is followed by questions on socio-demographic information about the participant's gender, age group, profession and country of primary residence. The survey continued with sections on the constructs. All scales in the survey have been adapted from previous research (Appendix C). First, product involvement was measured using the established 10-item scale of Zaichkowsky (1994) (α = .900). Second, product innovation was measured with the six items of Hanayhsa and Hilman (2015b), which were already used in the same context by analyzing the automotive industry in Malaysia (α = .910) (Hanaysha, Hilman, and Abdul-Ghani 2014; Hanaysha 2015; 2016; Ahmad, Ullah, and Naheed 2020; Hanaysha and Hilman 2015a). Third, the study continued with relationship quality

measured by a total of 10 items across the three dimensions: brand trust, brand commitment and brand satisfaction (α = .965) (Hanaysha 2015; Hanaysha and Hilman 2015c). The items also did not require any adaptation, as they are already established in the automotive industry and have been employed in various studies (Hanaysha and Hilman 2015a; Hanaysha, Hilman, and Abdul-Ghani 2014; Hanaysha and Abdul-Ghani 2016; Ok et al. 2011). In the end, environmental responsibility was assessed by using five items of Fatma (2016) (α = .881). Therefore, the items used indicated a good to excellent internal consistency. All the constructs were measured using a seven-point Likert scale (1 = completely disagree, 7 = completely agree). The scale was metric and considered to be an interval scale. This scale level is characterized by a fixed number of response categories at equal intervals and has a risk of answering with a tendency towards the middle (Döring and Bortz 2016). Nevertheless, the scale was used for this study because it has been applied successfully by the mentioned researchers for the respective construct as it has shown to have high validity and reliability (Hanaysha 2015; Fatma, Rahman, and Khan 2016; Zaichkowsky 1994; Hanaysha and Hilman 2015b; 2015c). In addition, it allows the comparison with results from other studies in this field (Cooper and Schindler (2006). In the end of the survey respondents had the option to indicate whether they owned a car to gain more information for an exploratory analysis. After providing the mandatory details, participants were invited to leave additional comments for the researcher.

3.4. Pre-test

A pre-test was carried out before the survey was sent to the participants. The pre-test was heterogeneous, with ten people from both business and non-business backgrounds taking part. The trial phase lasted four days: 28.10.2023 to 31.10.2023. On the one hand, suggestions were made regarding the correct grammar and clarity of some items. On the other hand, the layout and order of the items were checked. After the pre-test, the questionnaire was adapted accordingly.

4. Results

A total of 347 valid cases were recorded using the questionnaire. Following exclusion criteria, such as primary residency in Germany, 43 cases were removed from the sample. It was not filtered between car owners and non-car owners, as the results indicate the same and this study is about the impact on relationship quality and not the specific relationship between customers and a specific brand (further information in 4.5. Exploratory Analysis). The sample size is therefore N = 304, meeting the required sample size of N = 159 as calculated by G*Power. The sample consists of 136 female participants and 168 male participants. The participants' age groups can be categorized as follows: 42.2 % were between 18 and 25 years old, while 26 % belonged to the age group of 26 to 35, and 10.2 % were between the ages of 36 and 45. The 46 to 55 age group was comprised of 9.5 %. Data collection was conducted on 10.2 % of the 56 to 65 age group and 1.6 % of those aged over 66 (Appendix D & E).

4.1. Reliability Analysis

The focus of this study is relationship quality (Mean (M) = 5.61, Standard Deviation (SD) = 0.47), which serves as the dependent variable for the individual hypotheses. To evaluate the internal consistency of the scale used, Cronbach's alpha was calculated for reliability analysis. The internal consistency is good with Cronbach's alpha for positive affect $\alpha = .88$. The additional constructs serve as independent variables of the overall model. The values for environmental responsibility ($M = 4.67$, $SD = 1.22$, $\alpha = .91$) and product involvement ($M = 5.44$, $SD = 1.11$, $\alpha = .90$) indicated excellent internal consistency. The product innovation variable ($M = 4.84$, $SD = 1.31$, $\alpha = .89$) yielded a good internal consistency based on the calculated Cronbach's alpha value.

4.2. Validity Analysis

The content validity of the questionnaire was confirmed by the fact that the items of the questionnaire were derived from reputable literary sources. As the items are based on sound

theoretical foundations and empirically validated studies, it is assumed that they are an accurate representation of the intended construct and guarantee content validity. The pre-test involving ten selected participants from the automotive industry's target demographic contributed to the verification of face validity and provided valuable feedback for the final selection of items. However, it is important to critically consider that face validity, while valuable for initial item selection and refinement, does not provide empirical evidence of the questionnaire's ability to measure the constructs in question (Chiang, Jhangiani, and Price 2015). The internal validity was confirmed by the comparison of the correlations between the constructs with the Cronbach's Alpha values of each individual construct, where it was observed that all correlations were below the corresponding Alpha values. It should be noted, that while the Cronbach's Alpha is a measure of a scale's internal consistency, it may not fully represent the one-dimensionality of the construct (Nunnally 1978). As criterion-related validity was not explicitly assessed, future studies may seek to establish this form of validity by comparing the questionnaire's outcomes with external criteria known to be indicators of the constructs measured. In addition, the convergence of the items towards the construct they are intended to measure would be enhanced by further validation through confirmatory factor analysis to substantiate the structure of the scale (Klinke 2016).

4.3. Correlation Analysis

In order to identify any multicollinearity, the correlations between the independent variables were assessed and found to be absent. A detailed presentation of the descriptive statistics and intercorrelations of the independent variables can be found in Table 1.

Table 1. Mean, Standard Deviation, Cronbachs Alpha and Correlation among the independent variables

Constructs	M	SD	α	1	2
1 Product Innovation	4.84	1.31	.89		
2 Environmental Responsibility	4.67	1.22	.91	.600	
3 Product Involvement	5.44	1.11	.90	.485	.400

Note. N = 304, M = Mean, SD = Standard Deviation, α = Cronbach's Alpha, the scale ranges from 1 (completely disagree) to 7 (completely agree)

4.4. Multiple Linear Regression

The multiple linear regression "is the appropriate method of analysis when the research problem involves a single metric dependent variable presumed to be related to two or more metric independent variables" (Hair et al. 2010, 17). In this case the single dependent variable is relationship quality and the three independent variables are environmental responsibility, product involvement and product innovation. To perform this analysis correctly various assumptions need to be evaluated. The calculations for this assessment were carried out in SPSS. The linear relationship between the variables is fulfilled (Appendix F, G & H). The Cooks distance and leverage values were used to confirm that there were no outliers (Appendix I, K, L & M). Thereby, the Cooks distance values were less than the threshold value of 1 with a maximum of .06 and the leverage values were less than the threshold value of .20 with a maximum of .06 (Huber 1981). It was verified that all residuals fall within a range of plus or minus 3 standard deviations. Additionally, the inspection of the scatterplot corroborated the absence of autocorrelation, presenting a random pattern. To rule out multicollinearity, a correlation analysis was performed, revealing that all independent variables have a correlation coefficient of ≤ 0.70 (Table 1). Furthermore, the Variance Inflation Factor (VIF) values were below 10, and the tolerance levels above 0.1. These findings satisfy the criteria for excluding multicollinearity in the data set, indicating that each predictor contributes unique information to the regression model. However, the independent variables take away variance explanation from each other. While they are not highly correlated enough to distort the regression estimates, they are not entirely independent (Appendix N).

Additionally, the homoscedasticity assumption of the residuals was examined. The scatterplot revealed that the residual distribution is not shaped as a wedge. This suggests that there is no evidence of heteroskedasticity in the models (Appendix O). Further, confirmation

of normal distribution of the residuals was successfully achieved (Appendix P & Q). In conclusion, the prerequisites have been satisfied enabling evaluation of the hypotheses.

Using multiple linear regression, the influence of the independent variables environmental responsibility, product involvement, and product innovation on the dependent target variable relationship quality was measured. The significance level was set at $\alpha = .05$. The analysis, considering Cohen (1988), shows the following results: Environmental responsibility ($p = < .001$, $b = .248$) shows a weak positive statistically significant relationship with relationship quality. Therefore, H1 can be confirmed. Product involvement ($p = < .001$, $b = .193$) has a weak positive statistically significant effect on the target variable relationship quality. In result, H2 can also be confirmed. Product innovation ($b = .435$, $p < .001$) demonstrates a moderate statistically significant effect on relationship quality. H3 is also confirmed. The adjusted R^2 indicates an explained variance of 53.3%. According to Cohen (1988), this constitutes a large amount of variance explained. The overall model is statistically significant ($F(3, 300) = 116.376$, $p < .001$). The regression analysis yielded the following equation for predicting relationship quality:

$$RQ = 2.728 + 0.166 * ER + 0.142 * PV + 0.274 * PI + \varepsilon$$

RQ = Relationship Quality, PV = Product Involvement, ER = Environmental Responsibility,
PI = Product Innovation, ε = Error term, representing the residual effects unexplained by the model

In this equation, 2.728 represents the intercept, which is the expected value of relationship quality when all independent variables are equal to zero. The coefficients 0.166, 0.142, and 0.274 represent the expected change in relationship quality for a one-unit increase in product involvement, environmental responsibility, and product innovation, respectively, while holding other variables constant.

4.5. Exploratory Analysis

In the exploratory analysis, the regression equation was subjected to further scrutiny by incorporating interaction terms. The specific interaction terms added were product innovation multiplied by environmental responsibility, product innovation multiplied by product

involvement, and environmental responsibility multiplied by product involvement. However, the inclusion of these interaction terms led to distortion in the model due to multicollinearity. Consequently, it became evident that none of the interaction terms provided a substantial enhancement to the model's explanatory power. Notably, the inclusion of these terms caused a significant increase in the p-values, casting doubts on the model's overall statistical validity. This assessment was made after methodically evaluating the impact of each interaction term on the improvement of the model (Appendix R, S & T).

In addition, the model was tested considering only drivers that drive their own car, which yielded almost the same results. Environmental responsibility ($p = < .001$, $b = .245$) and product involvement ($p = < .001$, $b = .201$) revealed a weak positive statistically significant relationship with relationship quality. Product innovation ($b = .456$, $p < .001$) demonstrates a moderate statistically significant effect on relationship quality. The adjusted R^2 indicates an increased explained variance from 53.3% to 58.9%, which also explains a large amount of variance. The overall model is statistically significant ($F(3, 214) = 105.153$, $p < .001$).

5. Discussion

5.1. Theoretical Contribution

This study demonstrates that exploring brand relationships provides valuable insights into how brands influence customers and cater to their needs as already suggested by Breivik and Thorbjørnsen (2008). The research enhanced the theory by examining the concept of relationship quality for the German automotive market. The regression analysis examines the influence of three factors (environmental responsibility, product innovation and product involvement) on relationship quality in the German automotive market. The study has three main contributions: Firstly, it highlights the impact of environmental responsibility from the wider range of corporate social responsibility. Environmental responsibility has a weak positive impact on relationship quality, as also mentioned in the literature (Aljarah et al. 2020; Shankar

and Yadav 2020; S.-B. Kim and Kim 2016; Mei 2019). It is shown that the results in the automotive industry seem to indicate similar outcomes to those in the banking sector (Shankar and Yadav 2020; Mei 2019) This study adds depth by showing how environmental CSR is perceived in a market known for environmental awareness. The younger sample in this study may be more sensitive to ecological concerns, which could explain their higher responsiveness to environmental responsibility. The different geographical contexts in the literature and this study suggest a broader applicability of the impact of CSR on relationship quality.

Secondly, the study extends the investigation of product innovation's role in relationship quality to the German automotive industry, building on existing research that has primarily focused on Asia. This factor was found to have the greatest positive significant influence on relationship quality in this study, which is consistent with the current state of research (Hanaysha 2015; Hanaysha and Hilman 2015b; Ellitan, Sindarto, and Agung 2023; Dimyati 2011). This leads to the conclusion that in the Asian and German market product innovation has an impact on relationship quality and cultural and temporal differences can be neglected.

Third, the results highlight the importance of product involvement as a strategic factor influencing relationship quality. Regarding product involvement the state of research is indistinct. This paper leads to the statement that there is a weak positive relationship between product involvement and relationship quality. This is consistent with statements made by several authors (Coulter, Price, and Feick 2003; Ferreira and Coelho 2015; C. J. Liang and Wang 2008; 2007; Yang, Hlee, and Koo 2019). Therefore, the quality of the relationship with the brand should improve if the customer is highly involved with the product. Targeting this group should be a priority, as this seems to be consistent across industries.

Furthermore, the correlation analysis showed that all factors are independent. However, the correlation between environmental responsibility and product innovation was 0.6, which was still beneath the value for multicollinearity but relatively high, indicating a moderate

positive association. This suggests that they are still independent factors but also indicate a meaningful connection where advancements in one are likely to be associated with improvements in the other. It has been suggested in the literature that the two factors may be correlated, but the authors disagreed with each other (Ratajczak and Szutowski 2016; Gallego-Álvarez, Prado-Lorenzo, and García-Sánchez 2011). Especially in the automotive industry this value is not surprising since innovations such as sustainable engine technologies could enhance the perception of a company's environmental responsibility. However, product innovation encompasses a broader spectrum, including advancements in technological features and design.

5.2. Practical Contribution

Analyzing brand relationship offered insights on the impact of brands on customers and their effectiveness in satisfying customer needs. Product innovation, environmental responsibility and product involvement all influence relationship quality. Considering these factors when crafting strategies could lead to a higher competitive advantage. Therefore, all these three strategic factors should be considered in marketing campaigns so that customer perceptions are improved, paving the way for a better relationship quality with consequences over customer attraction and retention.

Environmental responsibility seems to have a positive impact on relationship quality. Therefore, companies must continue to further minimize ecological damage and control the environmental impact of production. Brands should therefore continue to focus on renewable raw materials, recycling and reducing emissions. Survey respondents indicated that it was difficult for them to assess the extent of the company's commitment to sustainability. Companies could improve this with even more commitment and better communication of their achievements in this area.

However, a greater influence was recognized to the product innovation construct. A high perception of product innovativeness of the car brand led to higher brand relationship quality.

It is known that customers want excellent products with outstanding value particularly in terms of innovative features and unique product design such as the case of automotives (Moon, Miller, and Kim 2013; Hanaysha, Hilman, and Abdul-Ghani 2014; Rainey 2009). Therefore, companies have to invest on research and development. This does not only include engine technology as electric cars but also interior and exterior product design. Also new trends must be considered, and German cars should include product features, focusing on infotainment systems to compete with the new competition from Asia (Dahlmann 2023). It is recommended that market research is conducted to identify and establish new trends in order to achieve a long-term competitive advantage. This should be highlighted in marketing communication to achieve a notable effect on customers perception as indicated by Demirbag and Kaplan (2009). Thereby the trend of viewing cars as interchangeable consumer goods to be replaced every few years, rather than long-term purchases, must also be addressed. By considering product innovation as a strategic factor, German automotive brands should be able to better retain their customers and be competitive (Dibie, Unanam, and Bassey 2019; Kuncoro and Suriani 2018). Those who see these challenges as opportunities for innovation will be the successful brands of the future (Rexhepi, Kurtishi, and Bexheti 2013).

Understanding the relation between product involvement and relationship quality helps automotive companies to tailor their marketing and sales strategies to target highly involved customers effectively. Due to the fact that technological and functional attributes are copied fast across different brands, it becomes challenging for a brand to stand out based solely on these functional attributes. This is where product involvement becomes a critical differentiator. By focusing on aspects that enhance product involvement, a brand can differentiate itself based on how customers feel and relate to their cars. This could mean focusing on design elements that evoke certain emotions or creating unique customer experiences as events, clubs and interactive marketing to target involved customers. Thereby stronger relationships can be

enhanced as this is more than just practicalities of the product. Especially established German brands can leverage their well-known history to enhance product involvement in the German market, which can be a strong counterpoint to the technological prowess of new entrants. For example, they can highlight their history in museums as in the BMW World or with exclusive events. Limited special editions for highly involved customers could add value to the car and help it to continue to be a status symbol. In the face of new, technologically advanced competitors, this multifaceted approach can help German automotive brands maintain and even strengthen their market position by appealing to a broad spectrum of consumer preferences. In this context, strengthening the relationship with existing customers is essential.

5.3. Limitations and Future Outlook

The study, which focuses on the German automotive sector and uses an online survey approach, provides valuable insights. However, it is important to critically recognize the limitations of this research. First, the snowball system was applied to distribute the survey, and as a non-probabilistic technique can undermine the generalization of the findings. The sample size of N=304 exceeds the required minimum but might not sufficiently represent the population. Despite its effectiveness in collecting data, the self-selected nature of the participant pool raises concerns about the representativeness of the sample. Additionally, it is possible that measuring the actual behavior of individuals could yield different results. Longitudinal measures assessing the quality of consumers' relationships would be particularly interesting in this context. As a result of the exploratory analysis a younger audience participated, which leads to the possibility of bias for example in regard to environmental responsibility. To increase the comprehensiveness and relevance of the findings, future studies should consider a larger and more diverse group of participants. In addition, future studies can evaluate specific customer groups of brands and compare premium brand drivers as Porsche to non-premium brand drivers as Mazda. Also, the survey model was quantitative. This provides the opportunity for future

studies to enrich the results and reliability with a qualitative method, such as interviews. In addition, the survey was conducted in English, targeting a predominantly German-speaking population. This decision was made to maintain the validity of the scales, which were originally developed in English. However, this approach may have introduced limitations in terms of comprehension and response accuracy. There may also be other biases on the part of the participants. This can be conscious or unconscious, for example, answering items according to social desirability or answering with a tendency towards the middle. It should also be taken into account, that this study reflects the customer's perspective and does not take into account the viewpoint of the companies, which should be considered to fully grasp the concept of innovation (Adam and Cornescu 2019). Also, potential misunderstandings in the data collection process, such as respondents misinterpreting questions could have affected the results. The use of scales from previous studies raises questions about the internal consistency of the measurement instruments. The scales might be interpreted differently in a different sample or culture and could measure what they claim to measure differently. The absence of control variables in the study could mean that certain external factors that could affect the outcomes were not taken into account. In addition, the study indicates the possibility of confounding factors that were not considered. These unaccounted confounders might have influenced the results. Also, the variables analyzed were not perfectly normally distributed and the distribution of residuals in the study was not perfectly rectangular, suggesting potential issues in the model fit or the assumptions underlying the linear regression analysis.

Furthermore, the study focuses on specific variables as product innovation, environmental responsibility, and product involvement, which left other potentially impactful factors unexplored. Incorporating additional variables, such as for example product quality, advertising and country of origin also in regard to the Chinese competition, might provide a better understanding of the various components that shape relationship quality. These variables

have been shown in the literature to have a significant impact on enhancing brand equity (Hanaysha 2015; Hilman and Hanaysha 2015). Also, a comparative analysis of how customers perceive local and foreign automotive brands could lead to highly relevant results regarding the current market situation. In doing so, future studies could uncover additional layers of complexity and interdependencies that shape consumer perceptions in the automotive industry.

In addition, this study focuses on in depth local insights of the German automotive market. This might limit the generalizability of the results and future studies can adapt this research framework across diverse markets, producing an increased understanding and comparability of the automotive industry. The rapid technological changes and specific market dynamics in the automotive industry in Germany could limit the transferability of the results to other sectors as the service industry or different time periods due to the cross-sectional design of the study. The study focused on an industry that is considered as a contributor to climate change. Accordingly, future research could focus on more climate-friendly sectors. Such a shift would not only diversify the understanding of relationship quality across industries but also provide insights into the varied impacts of climate change. Furthermore, this research focused on durable products which might lead to different results in comparison with fast moving consumer goods.

5.4. Conclusion

This thesis demonstrates that product innovation, environmental responsibility, and product involvement significantly enhance relationship quality in the automotive industry. Reflecting on the statement “now the world is changing the car” (Berylls 2023), this research highlights how these factors resonate with the current megatrends affecting the industry, including technological innovation, sustainability, and changing consumer behaviors. Focusing on these strategic elements is essential for the automotive sector to build deeper relationships with customers and gain competitive advantage.

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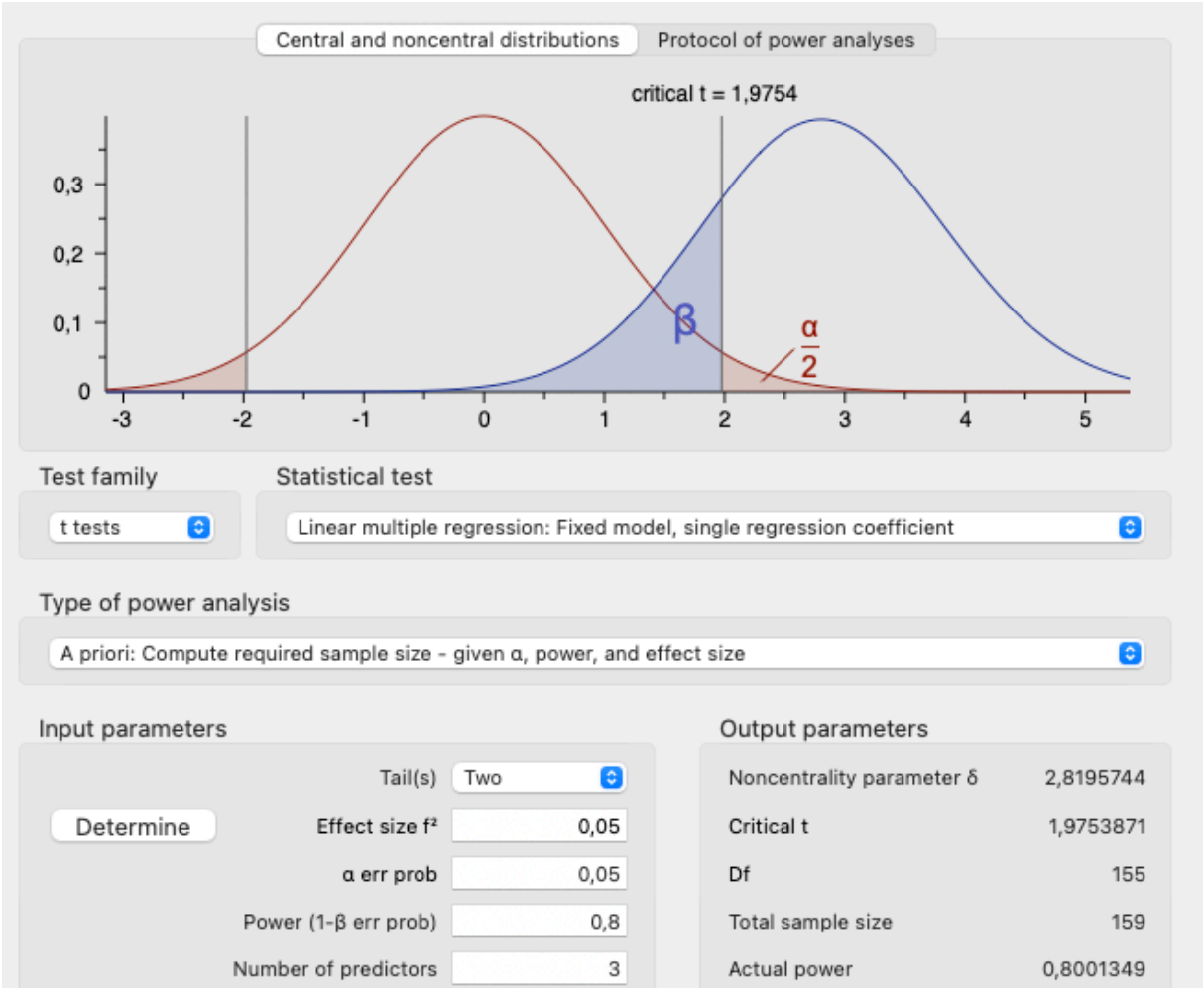
Appendix

Appendix A. Selected research overview

Reference	Relationship Quality /Dimension	Strategic Factor	Industry	Country	Relevant conclusion
(Hanaysha 2015)	Relationship Quality	Product Innovation	Automotive	Malaysia	Product innovation does not have an impact on relationship quality.
(Hanaysha and Hilman 2015b)	Relationship Quality	Product Innovation	Automotive	Malaysia	Product innovation does have a positive impact on relationship quality.
(Hanaysha and Hilman 2015a)	Relationship Quality	Product Innovation	Automotive	Malaysia	Product innovation does have a positive impact on relationship quality.
(Nemati, Khan, and Iftikhar 2010)	Brand Satisfaction	Product Innovation	Mobile Phone Industry	Pakistan	Innovation does have a positive impact on customer satisfaction.
(Hu and Huang 2011)	Brand Satisfaction	Product Innovation	Aviation	Taiwan	Innovation does have an positive influence on customer satisfaction.
(Ellitan, Sindarto, and Agung 2023)	Brand Satisfaction	Product Innovation	Food	Indonesia	Product innovation does have a positive impact on customer satisfaction.
(Hanaysha, Hilman, and Abdul-Ghani 2014)	Brand Trust	Product Innovation	Automotive	Malaysia	Product innovation does have a positive impact on brand trust.
(Simbolon and Sukresna 2021)	Brand trust	Product Innovation	Tabacco	Indonesia	Product innovation does have a positive impact on brand trust.
(Adiwijaya et al. 2021)	Brand Trust	Product Innovation	Fashion industry	Indonesia	Product innovation does have a positive impact on brand trust.
(Dimyati 2011)	Brand Trust	Product Innovation	Banking	Indonesia	Product innovation does have a positive impact on customer trust.
(Aljarah et al. 2020)	Relationship Quality	Environmental Responsibility	/	Global	CSR has a generally positive relationship with the dimensions of relationship quality: customer satisfaction, trust, and commitment. The strength of the impact of CSR on relationship quality dimensions varies, with the most significant impact observed on customer commitment, followed by trust and satisfaction.
(Shankar and Yadav 2020)	Relationship Quality	Environmental Responsibility	Banking	India	CSR practices that are group-oriented have a greater impact on brand relationship quality compared to individual-oriented CSR practices.
(S.-B. Kim and Kim 2016)	Relationship Quality	Environmental Responsibility	Hospitality	US	CSR positively influences consumer trust and consumer satisfaction.

(Mei 2019)	Relationship Quality	Environmental Responsibility	Banking	China	CSR significantly positively impacts brand relationship quality.
(Huo et al. 2022)	Brand Trust	Environmental Responsibility	Fashion	Pakistan	CSR does have positive impact on brand trust.
(Khan and Fatma 2023)	Brand Trust	Environmental Responsibility	Banking	India	CSR does have positive impact on brand trust.
(S.-O. Kim, Lee, and Lee 2021)	Brand Trust	Environmental Responsibility	Mobile Phone Industry	/	CSR positively and significantly affects brand trust.
(Dawood 2019)	Brand Trust Brand Satisfaction	Environmental Responsibility	Apparel	Pakistan	Perceived CSR does not have a direct significant impact on consumer satisfaction and trust.
(Pérez, del mar García de los Salmones, and Rodríguez del Bosque 2013)	Brand Satisfaction	Environmental Responsibility	Financial Services	Spain	CSR can enhance consumer identification with a company, which has been found to have a positive correlation with satisfaction.
(Coulter, Price, and Feick 2003)	Brand Commitment	Product Involvement	Cosmetics	Hungary and Romania	Product involvement has a positive impact on brand commitment.
(Warrington and Shim 2000)	Brand Commitment	Product Involvement	/	US	Product involvement and brand commitment are not related.
(C. J. Liang and Wang 2008)	Brand Commitment Brand Trust	Product Involvement	Information education services industry	Taiwan	Product involvement has a positive influence on trust and relationship commitment.
(Yang, Hlee, and Koo 2019)	Brand Satisfaction	Product Involvement	Tourism	Korea	Destination satisfaction is significantly impacted by involvement with tourism products.
(C. J. Liang and Wang 2007)	Brand Satisfaction	Product Involvement	Information education services industry	Taiwan	A greater degree of involvement with the product results in increased customer satisfaction.

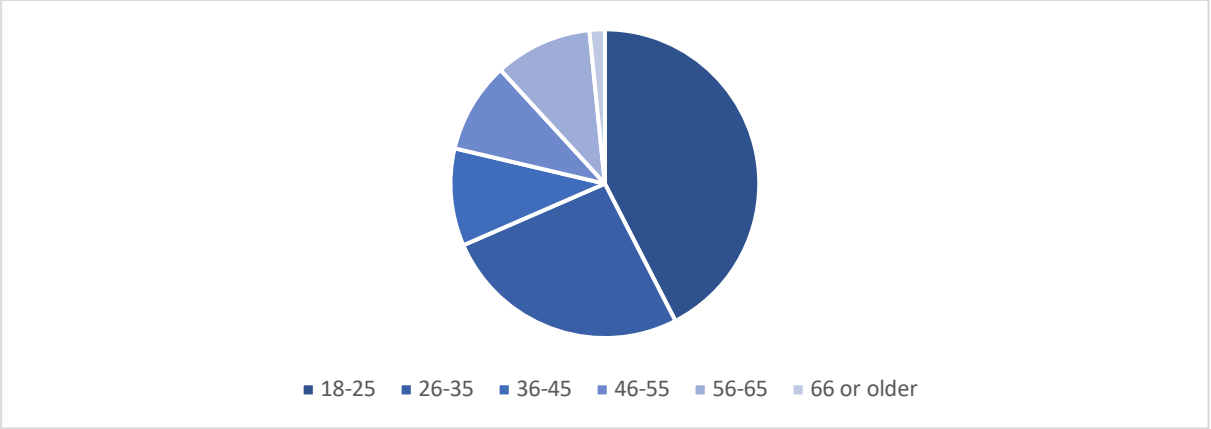
Appendix B. Power Analysis Sample Size Determination in Linear Multiple Regression



Appendix C. Overview of constructs and items

Constructs	Items	α	Reference
Relationship Quality	Brand Trust: - The car brand I am using is trustworthy. - The car I am using is reliable. - The car I am using is safe. Brand Commitment: - I am committed to this car brand. - I am willing to make small sacrifices in order to keep using this car brand. - I have made a pledge to stick with this car brand. Brand Satisfaction: - I am satisfied with the decision to purchase this car. - The choice to buy this car was a wise one. - I think buying this car was the right decision. - I am happy that this car was bought.	.965	(Hanaysha and Hilman 2015c)
Environmental Responsibility	This Company… - exploits renewable energy in a productive process compatible with the environment. - is concerned with respecting and protecting the natural environment. - has a positive predisposition to the use, purchase, or production of environmentally friendly goods. - Reduces its consumption of natural resources. - communicates to its customer about its environmental practices.	.881	(Fatma, Rahman, and Khan 2016)
Product Involvement	To me a car… - is important. - is boring. - is relevant. - is exciting. - means nothing. - is appealing. - is fascinating. - is worthless. - is involving. - is not needed.	.900	(Zaichkowsky 1994)
Product Innovation	- This car brand is highly innovative compared to other car brands in the market. - This car brand is frequently updated with new models. - This car brand is frequently supplemented with new features and specifications for the customers. - This car brand differs from competing models in the market. - This car brand frequently comprises new features which are meaningful to the customers. - This car is considered to be innovative in terms of product design.	.910	(Hanaysha and Hilman 2015b)

Appendix D. Pie Chart of Age Distribution among Survey Respondents

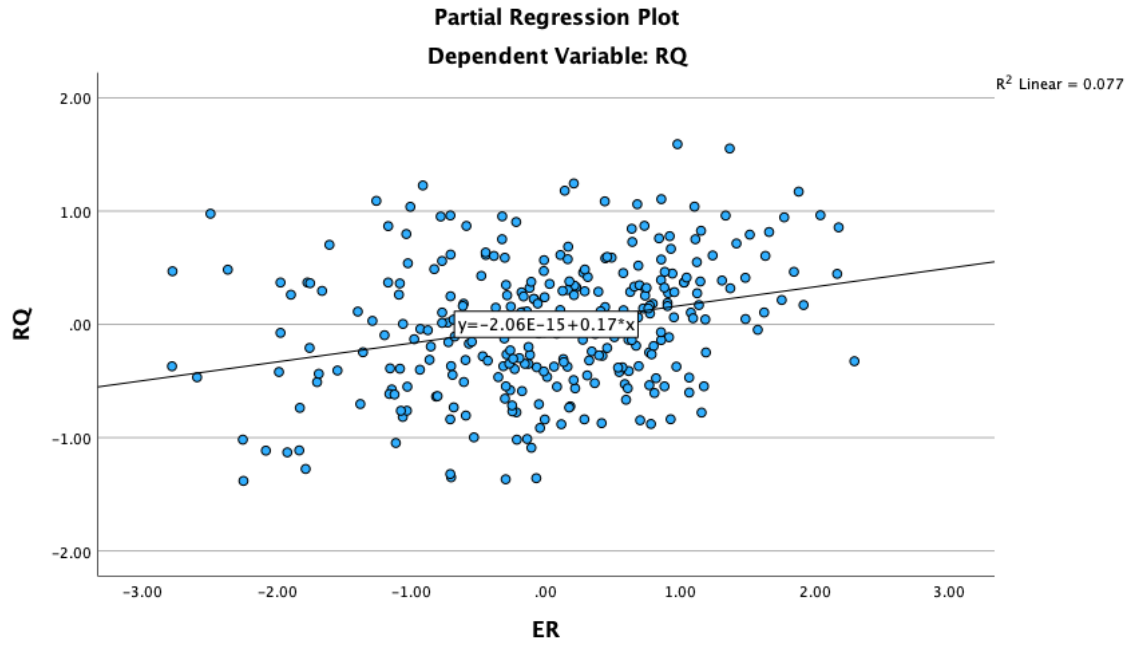


Appendix E. Demographic Characteristics of Respondents

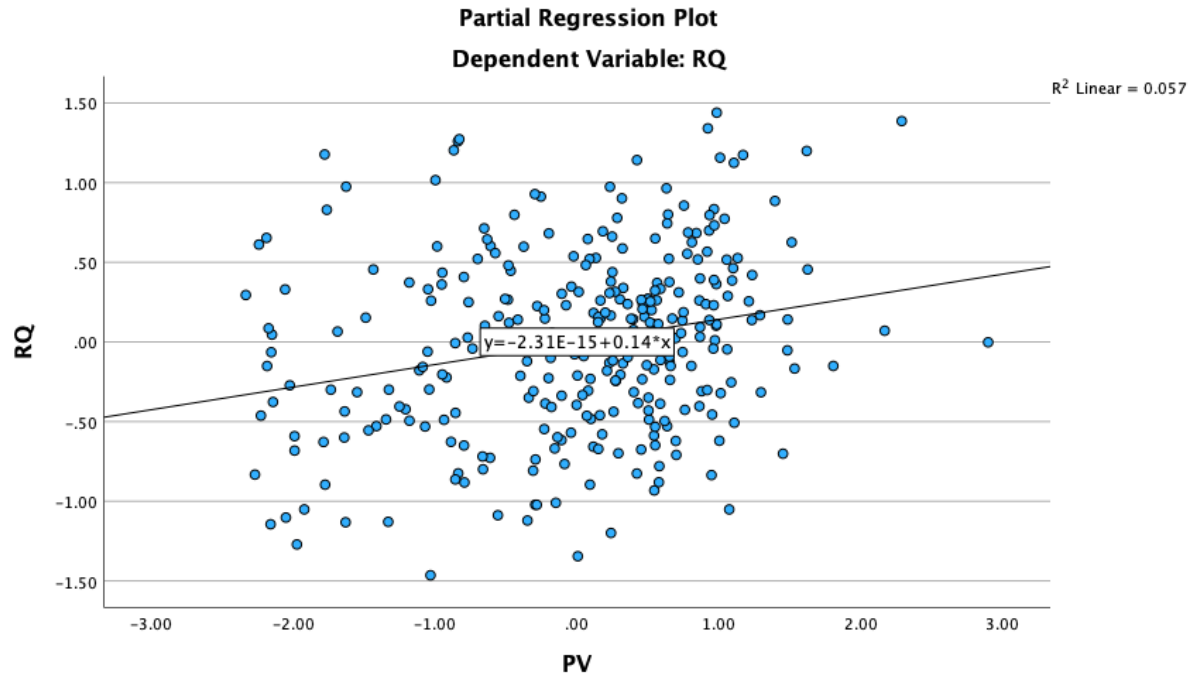
Items	Category	Frequency	%
Age	18-25	129	42.4
	26-35	79	26.0
	36-45	31	10.2
	46-55	29	9.5
	56-65	31	10.3
	66 or older	5	1.6
Gender	Female	136	44.7
	Male	168	55.3
	Diverse	0	0
	Not listed	0	0
Education Level	No diploma	6	2.0
	High School Diploma	38	12.5
	Apprenticeship	33	10.9
	Bachelor's Degree	124	40.8
	Master's Degree	55	18.1
	Diploma	23	7.6
	State Examination	16	5.3
	PhD	7	2.3
	Other	2	0.7
Employment Status	Employed	182	59.9
	Working Student	58	19.1
	Intern	8	2.6
	Student	43	19.1
	Unemployed	3	1.0
	Retired	4	1.3
	None of the above	6	2.0

Note. N=304

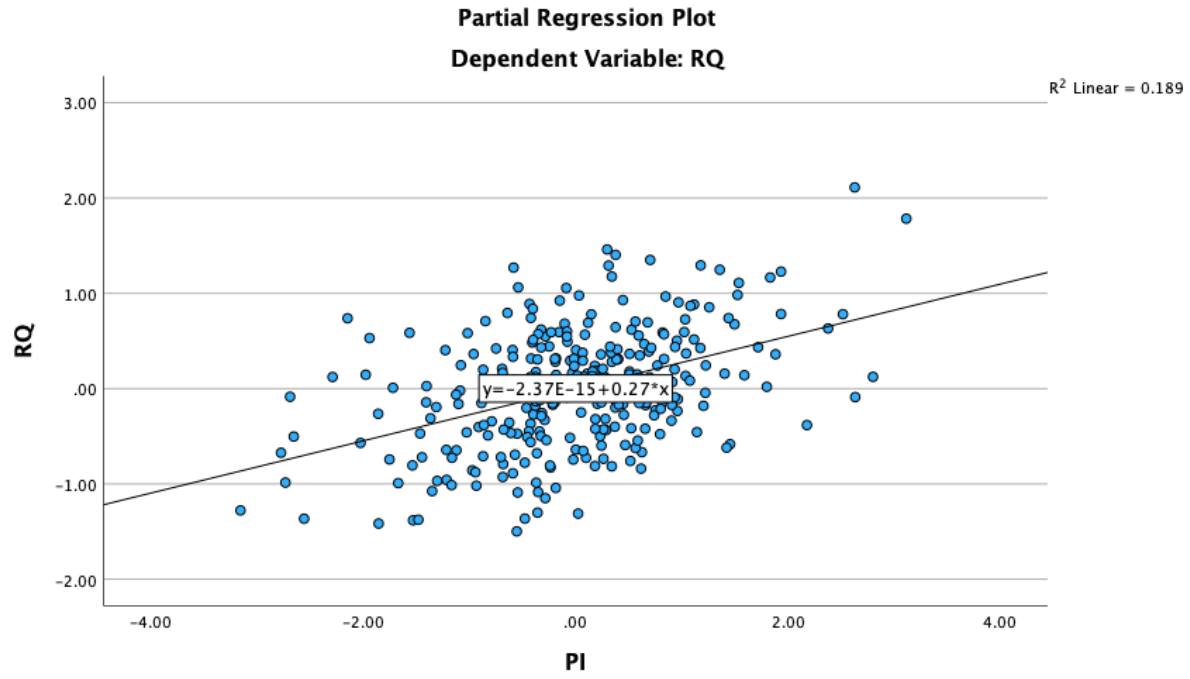
Appendix F. Partial regression plot examining the relationship between environmental responsibility and relationship quality



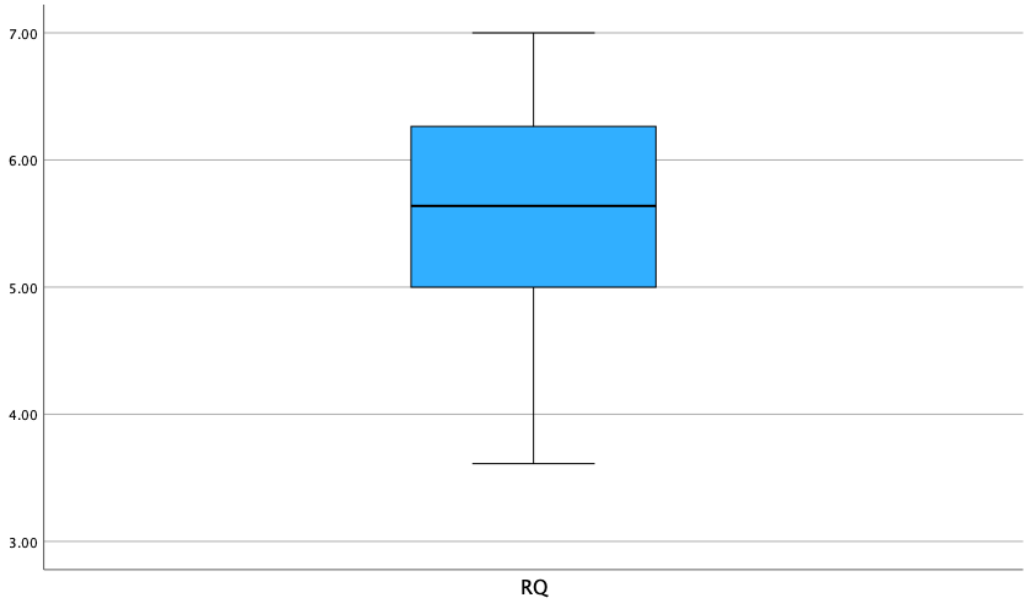
Appendix G. Partial regression plot examining the relationship between product involvement and relationship quality



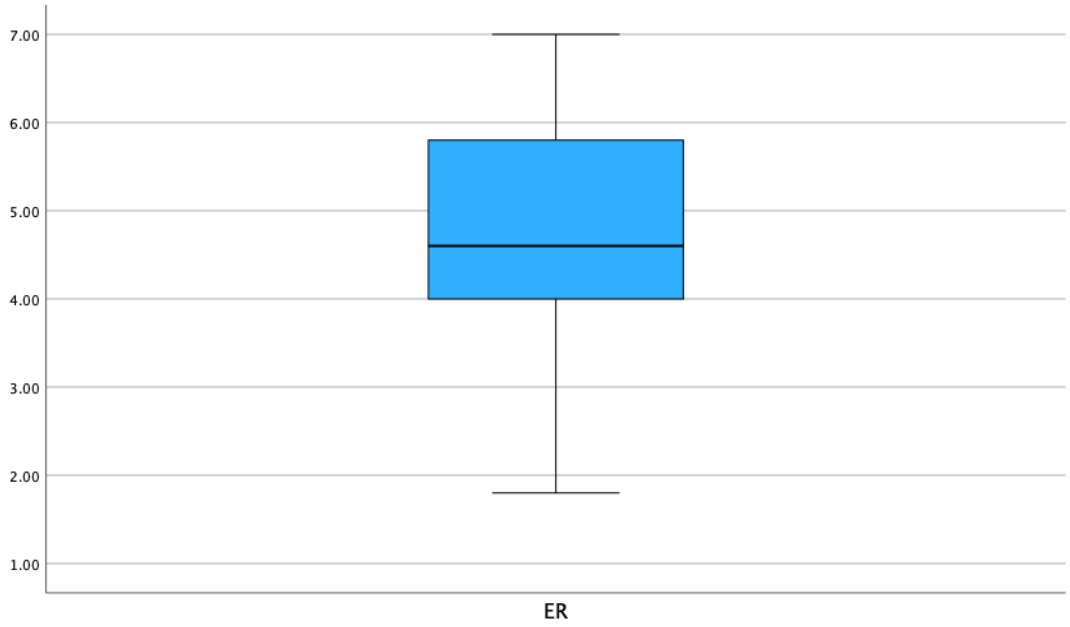
Appendix H. Partial regression plot examining the relationship between product innovation and relationship quality



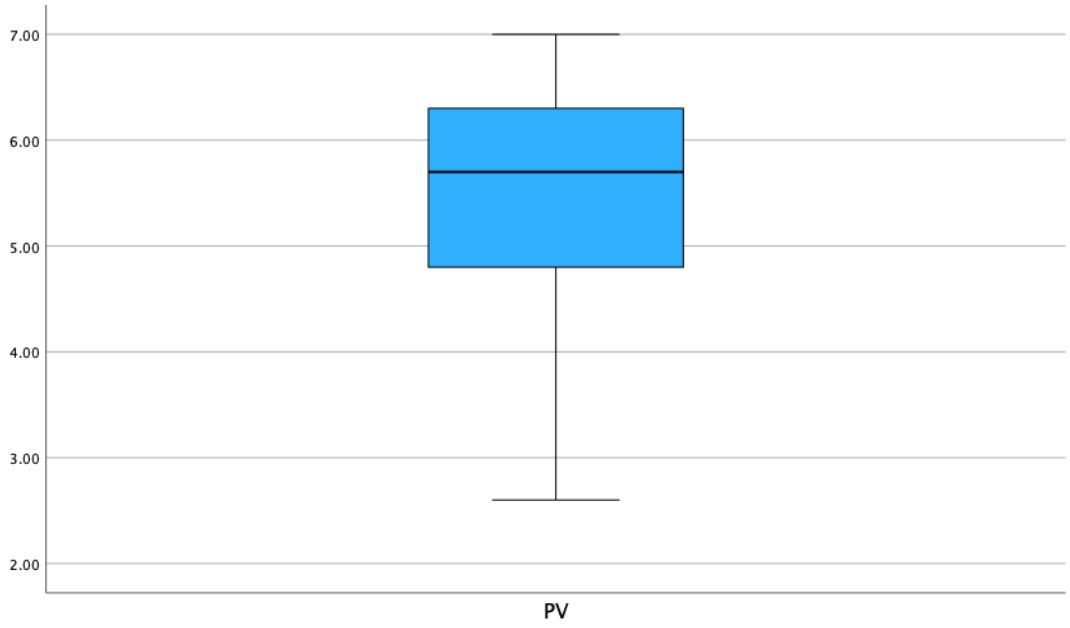
Appendix I. Boxplot of relationship quality



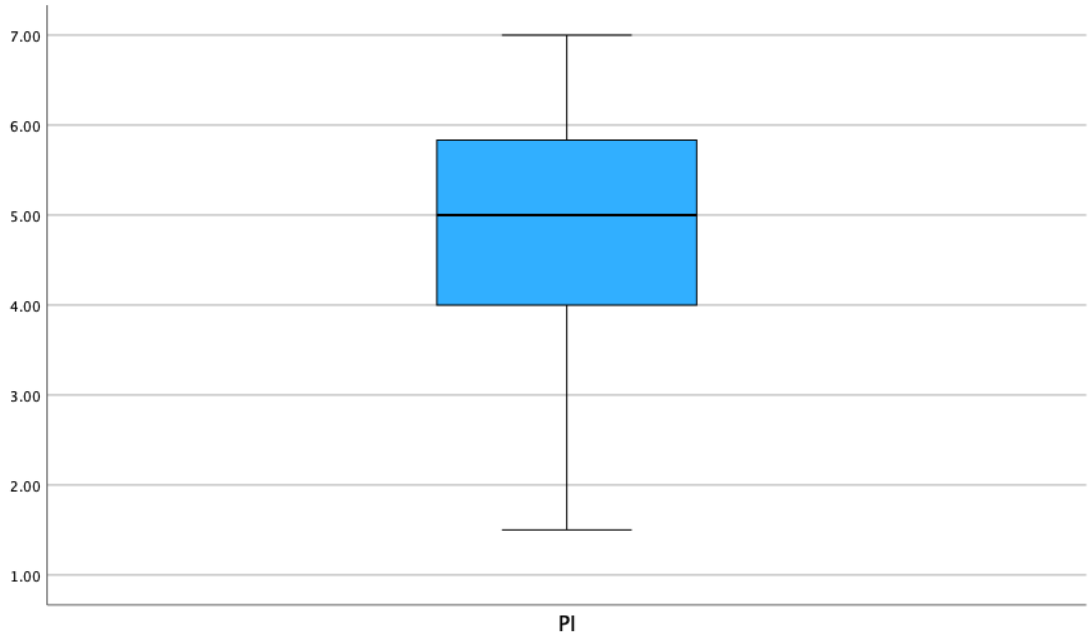
Appendix K. Boxplot of environmental responsibility



Appendix L. Boxplot of product involvement



Appendix M. Boxplot of product innovation

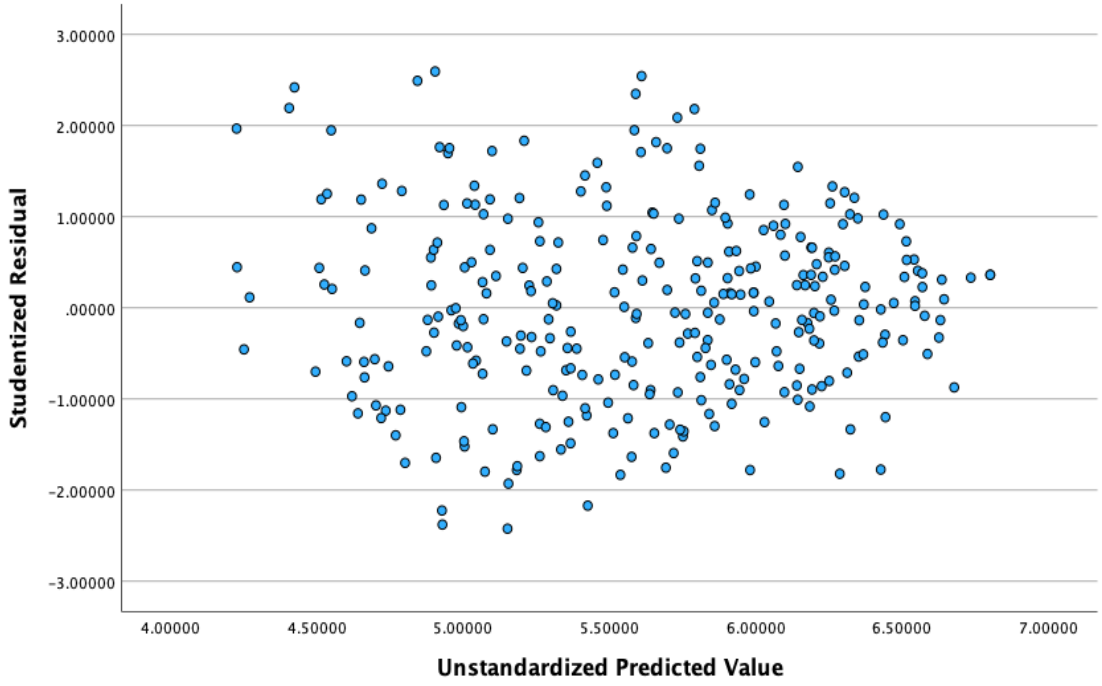


Appendix N. Coefficient Table

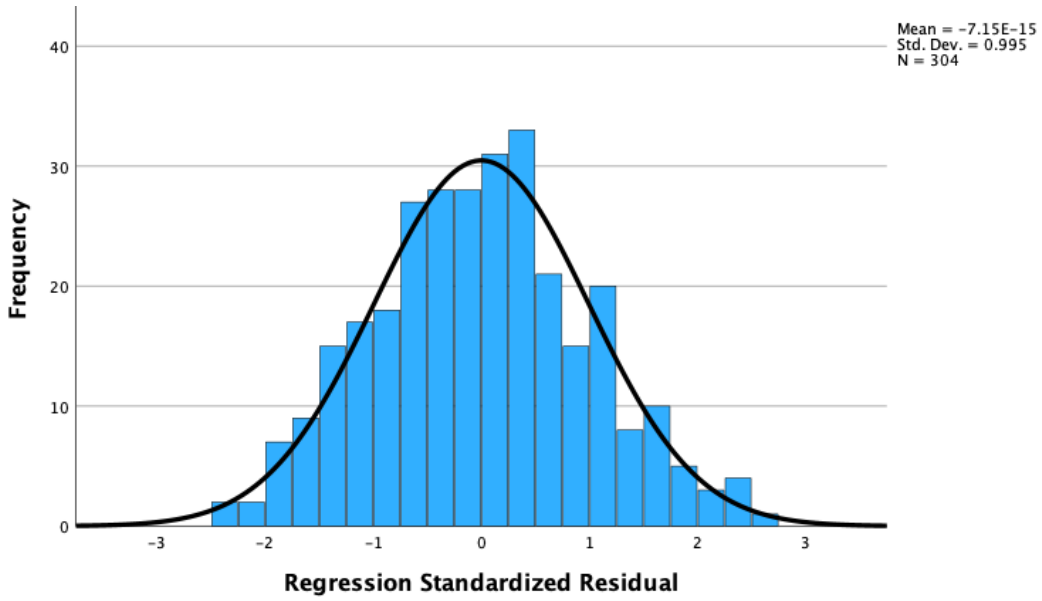
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	2.728	.174		15.691	<.001		
PI	.274	.033	.435	8.355	<.001	.569	1.759
ER	.166	.033	.248	5.000	<.001	.624	1.602
PV	.142	.033	.193	4.257	<.001	.746	1.340

Note. RQ = Relationship Quality, PI = Product Innovation, PV = Product Involvement, EV = Environmental Responsibility

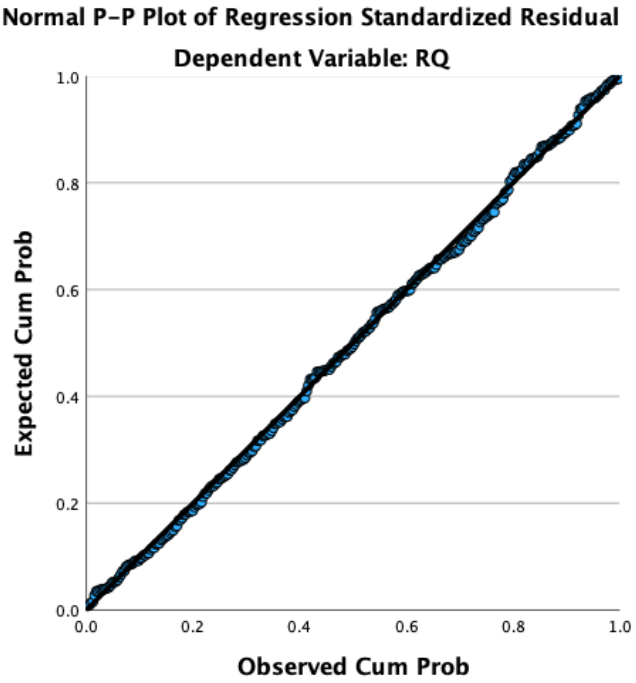
Appendix O. Scatterplot of Standardized Residuals vs. Unstandardized Predicted Values



Appendix P. Histogram of Regression Standardized Residuals for Relationship Quality with Normal Curve Overlay



Appendix Q. Histogram of Regression Standardized Residuals for Relationship Quality with Normal Curve Overlay



Appendix R. Regression Coefficients with Interaction Term Between Product Involvement and Environmental Responsibility

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.728	.174		15.691	<.001		
	PV	.142	.033	.193	4.257	<.001	.746	1.340
	ER	.166	.033	.248	5.000	<.001	.624	1.602
	PI	.274	.033	.435	8.355	<.001	.569	1.759
2	(Constant)	3.208	.628		5.109	<.001		
	PV	.055	.114	.076	.487	.627	.064	15.611
	ER	.057	.140	.086	.409	.683	.035	28.664
	PI	.270	.033	.429	8.142	<.001	.556	1.798
	Int_PV_ER	.020	.025	.242	.795	.428	.017	60.058

a. Dependent Variable: RQ

Appendix S. Regression Coefficients with Interaction Term Between Product Involvement and Product Innovation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.728	.174		15.691	<.001		
	PV	.142	.033	.193	4.257	<.001	.746	1.340
	ER	.166	.033	.248	5.000	<.001	.624	1.602
	PI	.274	.033	.435	8.355	<.001	.569	1.759
2	(Constant)	4.261	.604		7.053	<.001		
	PV	-.135	.110	-.184	-1.232	.219	.067	14.835
	ER	.155	.033	.233	4.701	<.001	.616	1.624
	PI	-.064	.132	-.102	-.486	.627	.035	28.978
	Int_PV_PI	.061	.023	.808	2.647	.009	.016	61.708

a. Dependent Variable: RQ

Appendix T. Regression Coefficients with Interaction Term Between Environmental Responsibility and Product Innovation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.728	.174		15.691	<.001		
	PV	.142	.033	.193	4.257	<.001	.746	1.340
	ER	.166	.033	.248	5.000	<.001	.624	1.602
	PI	.274	.033	.435	8.355	<.001	.569	1.759
2	(Constant)	2.968	.497		5.968	<.001		
	PV	.139	.034	.190	4.122	<.001	.729	1.372
	ER	.110	.114	.164	.964	.336	.053	18.871
	PI	.229	.094	.363	2.434	.016	.069	14.405
	Int_ER_PI	.011	.021	.143	.514	.608	.020	49.903

a. Dependent Variable: RQ