



**THE ROLE OF ONLINE RETAILER
WEBSITE REVIEWS IN PRODUCT
DESIGN: A NETNOGRAPHIC STUDY FOR
CO-CREATION OF THE WHITE GOODS
MARKET IN TURKEY**

Master Thesis

Yaşar Semih TOLUKAN

Eskişehir 2025

**THE ROLE OF ONLINE RETAILER WEBSITE REVIEWS IN PRODUCT
DESIGN: A NETNOGRAPHIC STUDY FOR CO-CREATION OF THE WHITE
GOODS MARKET IN TURKEY**

Yaşar Semih TOLUKAN

MASTER THESIS

Department of Business Administration

Business Administration

Advisor: Prof. Dr. Sevgi Ayşe ÖZTÜRK

Anadolu University

Graduate School Institute

October 2025

Eskişehir

**ÜRÜN TASARIMINDA ÇEVİRİMİÇİ PERAKENDE WEB SİTESİ
YORUMLARININ ROLÜ: TÜRKİYE'DE BEYAZ EŞYA PAZARININ EŞ-
TASARIMI İÇİN NETNOGRAFIK BİR ÇALIŞMA**

Yaşar Semih TOLUKAN

YÜKSEK LİSANS TEZİ

İşletme Anabilim Dalı

İşletme Yönetimi Programı

Danışman: Prof. Dr. Sevgi Ayşe ÖZTÜRK

Anadolu Üniversitesi

Lisansüstü Eğitim Enstitüsü

Ekim 2025

Eskişehir

ABSTRACT

THE ROLE OF ONLINE RETAILER WEBSITE REVIEWS IN PRODUCT DESIGN: A NETNOGRAPHIC STUDY FOR CO-CREATION OF THE WHITE GOODS MARKET IN TURKEY

Yaşar Semih TOLUKAN

Department of Business Administration

Programme in Business Administration

Anadolu University, Graduate School Institute, October 2025

Advisor: Prof. Dr. Sevgi Ayşe ÖZTÜRK

In the highly competitive Turkish white goods market, companies must continuously refine and redesign their products to meet consumer demands. Online retailer reviews from actual consumers represent a vast and valuable source of consumer insights; however, effectively integrating this feedback into product design remains a challenge for companies. This research seeks to address how online reviews can be systematically utilized to drive product improvements in white goods design, focusing on customer preferences and expectations in Turkey. By using netnographic methods to analyze consumer feedback on online platforms, this research identified which product features consumers value most, common pain points, and opportunities for design enhancement. The research uses a netnographic approach to collect and analyze online reviews from major retailer platforms in Turkey. Text mining techniques are applied to extract themes. Through these methods, the study distils actionable insights into white goods product design enhancements.

Keywords: Netnography, Online Retailer Reviews, Product Design, Co-creation, White Goods, Turkey, Consumer Feedback Analysis

ÖZET

ÜRÜN TASARIMINDA ÇEVİRİMİÇİ PERAKENDE WEB SİTESİ YORUMLARININ ROLÜ: TÜRKİYE'DE BEYAZ EŞYA PAZARININ EŞ-TASARIMI İÇİN NETNOGRAFIK BİR ÇALIŞMA

Yaşar Semih TOLUKAN

İşletme Anabilim Dalı

İşletme Yönetimi Programı

Anadolu Üniversitesi, Lisansütü Eğitim Enstitüsü, Ekim 2025

Danışman: Prof. Dr. Sevgi Ayşe ÖZTÜRK

Türkiye beyaz eşya pazarındaki yoğun rekabet ortamı, şirketlerin tüketici taleplerini karşılayabilmek için ürünlerini sürekli olarak iyileştirmelerini ve yeniden tasarlamalarını gerektirmektedir. Gerçek tüketiciler tarafından çevrimiçi perakende platformlarında paylaşılan yorumlar, oldukça geniş ve değerli bir tüketici içgörüsü kaynağı sunmaktadır; ancak bu geri bildirimlerin ürün tasarım süreçlerine etkin biçimde entegre edilmesi firmalar açısından hâlâ önemli bir zorluk teşkil etmektedir. Bu araştırma, çevrimiçi kullanıcı yorumlarının beyaz eşya tasarımında nasıl sistematik biçimde kullanılabilirliğini ve Türkiye'deki müşteri tercihleri ile beklentilerine odaklanarak ürün iyileştirmelerine nasıl katkı sağlayabileceğini ortaya koymayı amaçlamaktadır. Netnografik yöntemler kullanılarak çevrimiçi platformlardaki tüketici geri bildirimleri analiz edilmiş, tüketicilerin en çok değer verdiği ürün özellikleri, yaygın sorun alanları ve tasarım geliştirme fırsatları belirlenmiştir. Araştırma, Türkiye'deki önde gelen perakende platformlarından çevrimiçi yorumları toplayıp analiz etmek için netnografik bir yaklaşım benimsemiştir. Temaları ortaya çıkarmak amacıyla metin madenciliği teknikleri uygulanmıştır. Bu yöntemler aracılığıyla, beyaz eşya ürün tasarımı için uygulanabilir içgörüler elde edilmiştir.

Anahtar Sözcükler: Netnografi, Çevrimiçi Perakende Yorumları, Ürün Tasarımı, Eş-tasarım, Beyaz Eşya, Türkiye, Tüketici Geri Bildirimi Analizi

ACKNOWLEDGEMENT

I would like to sincerely thank my esteemed advisor, Prof. Dr. Sevgi Ayşe Öztürk, for her unwavering support, academic insight, and thoughtful guidance throughout the course of this thesis. Her expertise and clear direction greatly enriched both the process and the outcome of my research. I am especially grateful for her patience, timely feedback, and the genuine care she showed at every stage of my work. It has been a privilege to be mentored by someone who is so dedicated and inspiring. I consider it an honor to have carried out this study under her supervision.

I owe a debt of appreciation to my family, particularly my wife, for giving me with the best possible support, love, and opportunities.



ETİK İLKE VE KURALLARA UYGUNLUK BEYANNAMESİ

Bu tezin bana ait, özgün bir çalışma olduğunu; çalışmamın hazırlık, veri toplama, analiz ve bilgilerin sunumu olmak üzere tüm aşamalarında bilimsel etik ilke ve kurallara uygun davrandığımı; bu çalışma kapsamında elde edilen tüm veri ve bilgiler için kaynak gösterdiğimi ve bu kaynaklara kaynakçada yer verdiğimi; bu çalışmamın Anadolu Üniversitesi tarafından kullanılan “Bilimsel İntihal Tespit Programı”yla tarandığını ve hiçbir şekilde “intihal içermediğini” beyan ederim. Herhangi bir zamanda, çalışmamla ilgili yaptığım bu beyana aykırı bir durumun saptanması durumunda, ortaya çıkacak tüm ahlaki ve hukuki sonuçları kabul ettiğimi bildiririm.

.....

Yaşar Semih Tolukan

STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis/dissertation is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with “Scientific Plagiarism Detection Program” used by Anadolu University, and that “it does not have any plagiarism” whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

.....
Yaşar Semih TOLUKAN

ÜRETKEN YAPAY ZEKÂ KULLANIM BEYANI

Bu tez çalışmasının hazırlanması, yürütülmesi, verilerin analizi vb. aşamalarının herhangi birinde üretken yapay zekâ programlarından yararlanmadığımı beyan ederim.

.....
Yaşar Semih TOLUKAN



DECLARATION OF GENERATIVE ARTIFICIAL INTELLIGENCE USAGE

I declare that I have not used generative artificial intelligence programs at any stage of the preparation, execution, data analysis, etc. of this study.

.....

Yaşar Semih TOLUKAN



TABLE OF CONTENTS

THE ROLE OF ONLINE RETAILER WEBSITE REVIEWS IN PRODUCT DESIGN: A NETNOGRAPHIC STUDY FOR CO-CREATION OF THE WHITE GOODS MARKET IN TURKEY	i
ABSTRACT.....	iii
ÖZET	iv
ACKNOWLEDGEMENT	v
ETİK İLKE VE KURALLARA UYGUNLUK BEYANNAMESİ	vi
STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES	vii
ÜRETKEN YAPAY ZEKÂ KULLANIM BEYANI.....	viii
DECLARATION OF GENERATIVE ARTIFICIAL INTELLIGENCE USAGE.....	ix
TABLE OF CONTENTS	x
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS	xiv
1 INTRODUCTION	1
1.1 Problem Statement.....	1
1.2 Purpose of the Study	2
1.3 Importance of the Study.....	2
1.4 Assumptions.....	3
1.5 Limitations	3
1.6 Structure of the Thesis	4
2 LITERATURE REVIEW	4
2.1 The Importance of Developing New Products in White Goods Industry	4
2.1.1 White goods industry	4
2.1.2 Importance of new product development	5
2.2 Customer-Centered Product Development	6
2.3 Digital Consumer Behavior	8
2.4 Co-Creation in Product Development.....	10
2.5 The Role of Digital and Social Media Platforms in Customer Co-Creation	12

2.6	Summary of Key Themes and Research Gap	14
3	METHODOLOGY	16
3.1	Research Design	16
3.2	Research Approach	17
3.3	Netnography and Text Mining	18
3.4	Complementary Analytical Lens: Deductive Content Analysis	19
3.5	Data Collection	19
3.5.1	Description of review platforms	21
3.5.2	Sample selection of consumer reviews	21
3.5.3	Subtracting the raw data	22
3.5.4	Data preparation and processing	24
3.5.5	Import and initial structure	24
3.5.6	Text preprocessing workflow in KNIME	24
3.5.7	Thematic Dictionary Development	25
3.5.8	Output	26
4	FINDINGS	28
4.1	Overview of the Analytical Process	28
4.2	Overview of Extracted Consumer Insights	28
4.3	Theme Frequency Analysis	28
4.4	Sentiment Polarity by Theme	29
4.5	Relational Patterns and Co-occurrence	31
4.6	Implications for Co-Creation	33
5	CONCLUSIONS, DISCUSSIONS, AND RECOMMENDATIONS	34
5.1	Conclusions	34
5.2	Discussions	34
5.3	Recommendations	35
	REFERENCES	37
	CURRICULUM VITAE	1

LIST OF TABLES

Table 2.1 Turkish Consumers' Device Usage During Shopping Journey	9
Table 2.2 Emotional vs. Rational Drivers in Online Product Evaluation (Turkey, 2023)	10
Table 3.1 Marketplaces in Turkey (Electrical Appliances, 2024)	21
Table 3.2 Finalized thematic coding dictionary	26



LIST OF FIGURES

Figure 3.2 Selenium-based script used for scraping consumer reviews from Trendyol.	23
Figure 3.3 KNIME preprocessing workflow for Turkish consumer review data.	25
Figure 4.1 Theme distribution within the product groups	29
Figure 4.2 Sentiment distribution across reviews	30
Figure 4.3 Heatmap of themes vs sentiment	31
Figure 4.4 Co-Occurrence patterns between themes	32



LIST OF ABBREVIATIONS

CCPD	: Customer-Centric Product Development
CSV	: Comma-Separated Values
eWOM	: Electronic Word of Mouth
HTML	: HyperText Markup Language
KNIME	: Konstanz Information Miner
NPD	: New Product Development
R&D	: Research and Development
UGC	: User-Generated Content
UX	: User Experience

1 INTRODUCTION

1.1 Problem Statement

The white goods refer to large household appliances or electrical goods used for domestic purposes. Although traditionally manufactured with white enamel-coated finishes—hence the name—modern white goods are available in a range of colors and designs that suit contemporary household aesthetics. The category primarily includes equipment for cleaning (e.g., washing machines, dishwashers), preservation and cooking (e.g., refrigerators, ovens), and heating or cooling (e.g., air conditioners, heaters), among others (The Business Research Company, 2023).

The inevitable increase of digitalization in the marketing landscape has led to the vanishing of the traditional boundaries between producers and consumers. Especially in the white goods market which involves high consumer engagement, consumers are no longer passive recipients of innovation, but active participants in shaping new product development or altering an existing product. The rise of online review platforms in Turkey, such as Hepsiburada and Trendyol, has created an environment where the end customer who purchases and experiences the product has the opportunity to regularly provide product-related feedback. The consumers also have a chance to share their dissatisfaction and most importantly, their suggestions on the product design. However, despite this rich and continuous data, companies may struggle to systematically utilize these insights into their design and innovation processes.

Due to the high level of competitiveness of the white goods market, new product development has become both a strategic advantage and necessity for maintaining market relevance. Functional differentiation is often limited in this market and long-term brand positioning can be determined by the ability to innovate based on nuanced consumer expectations. As product life cycles shorten day by day and user demands diversify, companies face increasing pressure to integrate real-time consumer insights into every phase of the new product development. In this context, innovation must be constructed not only by the internal R&D but also by the voices of actual consumers who interact with products under specific, real-time world conditions.

Opinions, complaints, suggestions and even informal design ideas are shared by consumers spontaneously across digital platforms. This insight coming from consumer generated contents is among the most valuable and authentic sources of information. Digital platforms such as e-commerce review sections, consumer forums, product comparison sites serve as open-access archives of user experiences. e-commerce review sections, consumer forums, product comparison sites. The unique anonymous and unfiltered nature of those platforms makes them particularly useful for usability issues, creative solutions or latent needs that might not emerge through traditional market research. Hence, systematically analyzing this stream of unsolicited feedback becomes essential for companies aiming to practice consumer-centered product development. By

doing so, companies may harness a rich informational resource and move closer to genuine creation applications with their consumer.

1.2 Purpose of the Study

This study aims to understand how consumer-generated feedback in digital environments can be gathered, analyzed and translated into actionable insights for customer-centered product development. To achieve meaningful answers and concepts, the netnography method is used. Netnography provides a qualitative analysis on the subject and is specifically tailored for studying online communities. This research will extract and analyze consumer stories related to white goods products in Turkey. The ultimate goal is to identify how these stories reflect the principles of co-creation in which consumers have the opportunity to create value in product innovation without being formally included in R&D processes.

Focusing on spontaneous consumer expressions like online reviews, narrative evaluations and complaints this study embraces a bottom-up perspective. In this perspective consumers are positioned as evaluators and also informal collaborators in the product development ecosystem. In doing so, the study works toward uncovering latent expectations, user adaptation and design suggestions that often failed to notice in traditional design research. Through the integration of netnographic inquiry and text mining techniques this study also aims to show how unstructured data coming from digital feedback can be analyzed into meaningful inputs. These inputs can be used as a supportive material for the innovation practices within the white goods market. The finding may offer both academic and managerial contributions by demonstrating a repeatable method for interpreting co-creative behavior in a digitally mediated consumer landscape.

1.3 Importance of the Study

The research contributes to both academic literature and managerial marketing practices by addressing the gap between passive data collection and active innovation based on digital consumer feedback mechanisms. While earlier studies have acknowledged the impact of electronic word of mouth (eWOM) and online feedback (e.g., Cheung & Thadani, 2012; Kozinets, 2010), at least to the knowledge of the researcher relatively very few have applied systematic netnographic methods has not been applied to the Turkish white goods market. In addition, cultural context is one of the most crucial aspects of consumer behavior, in which collective judgment and emotional expression play a strong role. The study aims to incorporate this concept and offers valuable insights for global brands operating in Turkey as well as domestic companies seeking deeper engagement with their user base.

This research contributes to the evolving discussion on consumer authorization and co-creation in product development. By positioning consumers as both sources of feedback and informal collaborators in design, the study offers a framework for interpreting real-time digital feedback as inputs for innovation. This perspective may help companies build

more culturally embedded and user informed product plans of action. Also, the proper application of netnography in a localized, high involvement product category may open windows for future research that blend qualitative insight with scalable data analysis tools.

1.4 Assumptions

It is assumed that the online reviews posted on public platforms reflect genuine user experiences and perceptions. Furthermore, the study assumes that these consumers act independently and are not influenced by marketing or brand incentives at the time of posting.

In addition to the authenticity of user-generated content, it is also assumed that the semantic used in these reviews coming from platforms enables a meaningful representation of user expectations, unmet needs and experiences. The study presumes that consumers are capable of speaking about product-related ideas, suggestions, and dissatisfactions in specific conditions. These conditions should be adequate so that reviews can be analyzed through qualitative methods such as netnography and supported by text mining tools.

Another crucial assumption is that the role of digital platforms selected for data collection such as Hepsiburada and Trendyol. These platforms serve as valid and relevant digital communities for observing consumer behavior in the white goods sector. It is believed that the anonymity and accessibility of these platforms encourage honest and spontaneous opinions. These properties increase the credibility of the data source. Also, the data pool is completely selected in a random manner which creates an unrestricted sample diversion unlike traditional methods such as questionnaires from selected users. Additionally, the study assumes cultural nuances inherent in Turkish consumer behavior such as emotional tone or collective sentiment can be interpreted meaningfully via qualitative analysis. It also contributes to the depth of insight generated by the research.

1.5 Limitations

This research is limited to publicly available consumer feedback from selected Turkish platforms within a specific time frame. It does not include private feedback, direct interviews, or controlled user studies. Additionally, while netnography captures deep qualitative insights, it cannot offer statistically generalizable findings.

The findings of this study are thus contextual, shaped by the cultural, temporal and technological characteristics of the platforms examined. The selected digital platforms are popular and content-rich but may not fully represent all consumer demographics or experiences across all Turkish white goods market. Certain user groups such as older consumers or limited access to the internet or consumers who prefer face to face purchasing rather than online may be underrepresented in the dataset.

Moreover, the qualitative nature of netnographic analysis relies on interpretation. Even if it is systematically conducted, it may inherently carry out the risk of subjective bias. The

lack of quantitative validation techniques means that the insights produced should be viewed as exploratory rather than predictive even though analytical accuracy and thematic coding frameworks are used to increase credibility. Finally, different language uses such as sarcasm, local idioms or non-standard spelling can lead to complexities in the analysis process. This may limit the clarity or consistency of interpretation in the text mining stages.

1.6 Structure of the Thesis

The thesis is organized into five main chapters. Chapter 2 provides a comprehensive literature review covering digital consumer behavior, co-creation theory, online feedback mechanisms, customer –centered product development and the Turkish digital ecosystem. Chapter 3 details the research methodology, including data sources, coding approach, and ethical considerations. Chapter 4 presents the findings of the netnographic analysis, highlighting key themes derived from consumer discourse. Chapter 5 discusses the implications of these findings in both academic and practical terms, and Chapter 6 concludes the thesis with key takeaways, limitations, and suggestions for future research.

2 LITERATURE REVIEW

2.1 The Importance of Developing New Products in White Goods Industry

2.1.1 White goods industry

Even though new product development is crucial for the whole market, because of the focus of the study, a general overview of the white goods market will be explained first. The white goods market broadly refers to large household appliances used for housework purposes such as refrigerators, dishwashers, ovens, televisions and air conditioning units. Also, their freestanding nature separates them from small kitchens or other appliances. The term “white goods” comes from the traditional white enamel coating that characterized early models of these electronic devices. On the other hand, nowadays, products in this category come in a wide range of color options and finish meeting evolving consumer expectations (The Business Research Company, 2023).

The white goods industry corresponds to a considerable segment of the consumer's durable market globally. According to recent estimates, the global white goods market was valued at \$610.7 billion in 2022 and is expected to reach \$834.6 billion by 2027, growing at a compound annual growth rate (CAGR) of 6.5% (The Business Research Company, 2023). The rising urbanization in both developed and emerging countries, increasing disposable incomes, energy efficiency regulations and the integration of smart technologies into household appliances may be the reason for the growth on the market. In many countries around the world, white goods are considered indispensable household items while contributing to stable predictable demand.

The Turkish white goods sector plays a vital role in the national economy. With a production capacity exceeding 30 million units annually, Turkey is recognized as the largest white goods manufacturer in Europe (TÜRKBESD, 2023). The industry supports

over 60,000 direct jobs around the country and serves as a major export source, with approximately 75% of its production exported to international markets (TÜRKBESD, 2023). Skilled labor force, geographic location and well-developed supply chain enable Turkey becoming a strategic manufacturing hub.

There are many global and domestic players play an active role in the Turkish white goods market. In addition to global brands such as Bosch, Siemens, Samsung, LG, Electrolux and Haier, domestic brands like Arçelik, Beko, Vestel held a dominant position in the market. These brands operate in a highly competitive market in the manner of local preferences in energy usage, product aesthetics and functionality. Therefore, brands create a broad portfolio of appliances tailored to diverse consumer needs. Additionally, the presence of rich and diverse e-commerce platforms and rising influence of digital consumer behavior have begun to reshape the way white goods are marketed, reviewed and purchased in Turkey.

In summary, the white goods market is improving globally and locally. In Turkey, white goods market has critical economic and social importance due to its industrial market hasty, export performance and consumer engagement.

2.1.2 Importance of new product development

In today's highly saturated and competitive markets, new product development (NPD) has become a complete necessity. In addition, it has become a strategic imperative for companies looking for long-term sustainability. A new product can be defined as any offering that is new to the company, the market or the customer that ranges from radical innovations to incremental improvement and modifications of existing product of the company (Kotler & Keller, 2016). The combination of a new product can consist of different layers. It could be radically a new product which involves breakthrough technologies or it could be improved products that redesign the existing functions or usability. And finally, it could be assessed as a modified product which introduces minor changes in design, packaging, or performance (Cooper, 2019).

The new products that are radically designed often come from troublesome technologies and they are associated with high award and high risk. These new products tend to create entirely new markets or consumer requirements and can reshape the industry and its standards. (Füller, 2010). The LED lamps can be an example of this type of new product. It came with great technological advancement and science alteration and provided a more efficient and more effective way of lighting. While this product has been a business achievement for the producers it has had positive environmental effects. On the other hand, improved products from existing designs involve a more iterative approach to innovation, focusing on improving the functionality, quality or user experience without fundamentally changing the product category. As an example, changing the color of a household item such as refrigerator does not make a big change in the product category however, aesthetically it can be a more appealing to a consumer who tries to create a color scheme for his or her kitchen. Modified products represent the most traditional way of

innovation, however, it is still valuable for maintaining the market interest and focusing on minor consumer feedback (Ulwick, 2002).

In the white goods industry new products play a vital role in conserving brand relevance and stimulating demand since in the white goods market products differentiation is mostly marginal and purchasing frequency is relatively low.. Consumers generally expect functional reliability, innovation and breakthroughs in energy efficiency, smart and connected features and of course design aesthetics. There is also competition between both strong global and local brands in the market such as Arçelik, Vestel and BSH in Turkey has made continuous innovation essential. As Kiron et al. (2013) note, companies in such mature markets must align their product portfolio with shifting consumer needs specifically in the context of environmental sustainability and digital transformation. Especially, sustainability has become an important issue for consumers and a necessity because of the regulations.

In the white goods market, sustainability has become an important driver of new product development with customers increasingly demanding energy efficient products. Durability, product differentiations and ethical considerations Are also important for the consumers. Customer-centric innovation has become much more important than the product centric innovation over the years and these drivers have led to this kind of broader shift. The main influence on design decisions is affected by these values and lifestyle expectations. (Prahalad & Ramaswamy, 2004). market White goods sector offers a great field of study due to its integral product complexity and strong connection between technical features and consumer satisfaction.

Furthermore, the inclination on the usage of digital platforms has enabled producers to gather feedback from consumers, test ideas for innovation and monitor and analyze consumer feelings in real time. These mechanisms can open a wide communication channel for the NPD teams about changing and evolving needs of customers and also help to reduce the risks that are linked with innovation. Although all these opportunities and new ways of understanding consumer insights, many companies still experience a lack of system and its methodologies to effectively convert customer insight and feedback into actionable new product strategies.

In conclusion, developing a new product is no longer a matter of strategic choice, it is a necessity for the companies. For the companies in the white goods industry, successful product designs do not come with only technological excellence. It also requires a deep understanding of consumer behavior, and feedback mechanism from consumers. The following sections will explore how these dynamics are being involved in customer-centered product development and co-creation models.

2.2 Customer-Centered Product Development

Customer-centered product development (CCPD) defines an innovation or new product design approach in which the needs, preferences and expectations of customers are prioritized throughout the entire product development lifecycle which includes idea

generation, testing, marketing and launching a product. Unlike traditional product-centric models that put the main focus on the internal capabilities of product itself and available technology push, CCPD highlights the “voice of customer (VOC)” as the most important driver of design, development and launch decisions (Griffin & Hauser, 1993). In industries such as white goods product failures can significantly affect brand loyalty and market shares. For example, a building fire happened in the UK in 2017 due to an electrical fault in a refrigerator. This kind of failure caused more than 70 deaths in that building and the manufacturer –Whirlpool- lost all market activity shortly after the catastrophic accident.

The core meaning of CCPD lies in understanding not only the customers’ voice on what they want but also what they count as value. This value often includes hidden needs that are not directly expressed. Ulwick (2002) argues that feedback coming from customers should not be viewed as requirements; it should be counted as clues that reveal desired outcomes. Firms can interpret this feedback coming from customers through structured methods such as Quality Function Deployment (QDF) or Jobs-to-be-Done (JTBD) analysis. These analyses can give a chance to create solutions that deliver ultimate customer value to the firms. In the white goods industry this can be translated to design decisions like reduced energy consumption, optimization of user interface simplicity and compatibility of the product with very diverse home environments.

Customer- centered product development has also been connected to increased success rates. Former research has shown that integrating customer feedback early and iteratively into the new product processes has a significant effect on product success. It also reduces the risk of market rejection and supports better market-product fit (Cooper & Kleinschmidt, 1995; Grégoire et al., 2015). In most of the countries such as Turkey, consumer expectations are shaped by both practical considerations and emotional attachment to brands. In this scenario, CCPD requires particular sensitivity to cultural cues. Domestic companies like Beko have successfully leveraged consumer insight to keep the level of brand trust at the top levels while introducing advanced features aligned with local consumer needs.

Another concept that is closely related to CCPD is value co-creation where consumers play a slightly different role as not merely informants but active collaborators in the new product design process. Prahalad and Ramaswamy (2004) define co-creation as a process created by both consumer and producer together through the 3 main topics as honest dialogue, transparency and shared problem solving. While the digital market environment where consumer feedback loops is continuous, this thesis focuses mainly on customer-centered development as a strategic lens but the boundaries between CCPD and co-creation often overlap. Therefore, co-creation will be the other focus on this thesis.

The times before the digital transformation and active use of the internet by the consumers integrating CCPD was not easy. Thanks to the digital transformation, the application of CCPD has skyrocketed and nowadays companies can use it for collecting, analyzing and responding the customer feedback in real time. In Turkey, online platforms such as

Hepsiburada and Trendyol function as informal product testing grounds. Customers share detailed feedback on performance, usability, design points and post sales service. If these data are analyzed systematically and scientifically, these insights from feedback become major inputs into product life cycle, especially when aligned with predictive analytics and user persona modelling (Grégoire et al., 2015).

CCPD implementation cannot be thought of as a single operation from a single department. To implement CCPD, absolute collaboration between R&D, marketing, and customer service departments is needed. In addition, these departments and the company as a whole must embed an organizational culture that views customers not as outsiders or external connections, but as innovation partners (Griffin & Hauser, 1996; Alam, 2002). This methodological shift on company culture requires strategic investment in data systems, training employees, and agile development practices which can accommodate and adapt to real-time customer feedback.

To sum up, customer centered product development cannot be considered just as a design philosophy to create a new product. It has layers of considerations and strategic capabilities that enable companies to stay updated and relevant in competitive and fast evolving markets. By integrating the customer's voice not only at the beginning but every stage, companies can reach higher levels of customer satisfaction, brand equity and sustainable growth.

2.3 Digital Consumer Behavior

The evolution of digital technologies and their usage have drastically changed how consumers engage with brands and producers, evaluating products and sharing experiences. After the expansion in the smartphone and social media platform usage, consumer journeys are no longer linear but dynamic and multi-platform in nature. According to We Are Social (2023), Turkish digital users spend an average of over 7 hours online daily with a significant portion of that time interacting with consumer-related content. These activities include reading product reviews, social dialogues on products or services and using online shopping platforms for both buying and browsing. In developing market like Turkey, digital behavior is affected by several socio-cultural factors such as collectivism, emotional expression and strong peer reliance (Hofstede Insights, 2022).

In the previous years, consumers have shifted from using digital platforms for ordinary product searches to full purchasing journeys across multiple devices. This transformation points out the complexity of today's consumer journey and the growing role of digital food print at every stage of purchasing decision.

Turkish customers have gained a multi device usage habit which makes the digital purchasing experience fragmented but integrated. The table below shows the average use of devices in purchase:

Table 2.1*Turkish Consumers' Device Usage During Shopping Journey*

Device Type	% Used in Purchase Process	Most Common Use Case
Smartphone	89%	Initial research, social sharing
Laptop/Desktop	68%	Detailed product comparison
Tablet	41%	Browsing during leisure
Smart TV	15%	Viewing product-related content

Source: Deloitte Digital Consumer Trends Turkey, 2023

This table shows that the purchasing process starts on one platform and finishes on another. For example, a customer can discover a product on a social media platform, read the online reviews on laptop and finally complete the transaction through a mobile app. This omnichannel behavior makes it crucial for producers to create a consistent consumer experience across all platforms.

High level of peer influence and social validation shape the Turkish digital consumer behavior. Due to community understanding and cultural emphasis on shared decision making, digital consumers in Turkey often rely on ideas and experiences of other consumers. eWOM has become more effective than traditional marketing tools such as advertising especially among young and middle-aged consumers. According to Erkan & Evans (2021), online platforms Hepsiburada and Trendyol comments are seen as credible sources of truth and solid feedback channels since they represent the existing experiences of “people like me”.

In addition, consumers nowadays may expect personalized relevance in their digital consumption. Recommended products based on their past behavior or algorithmically organized content prepared by brands are more likely to retain attention. On the other hand, these applications are accompanied by rising concerns about data privacy. For example, Salesforce (2022) states that while 73% of customers expect companies to understand their needs, only about half trust brands to use their data responsibly. Similarly, Cisco (2022) reported that 76% of customers wouldn't purchase from organizations they do not trust with their data. This situation highlights a new form of consumer perception in which value and control must coexist.

On the emotional side, there are several drivers that play a strong role in purchase decisions, design appeal, emotional brand bonding and aesthetic experience. This aligns with the theory of consumption values, which suggests that consumer choice is a function of multiple value dimensions such as functional, economic, emotional, and symbolic value (Sheth et al., 1991). In the Turkish market context, this suggests consumers evaluate

products through a combination of these rational and emotional perspectives. The table below illustrates how emotional and rational factors weigh in consumer decisions:

Table 2.2

Emotional vs. Rational Drivers in Online Product Evaluation (Turkey, 2023)

Factor	Score
Peer Opinion Trust	85
Aesthetic Preference	82
Emotional Brand Connection	78
Price Sensitivity	68
Feature Comparison	64

Note. (Composite index based on 1,000 digital consumers – scale 0 to 100)

In the above table, some deductions can be taken. Emotions dimensions may weigh more than technical or price-oriented comparisons especially in durable product categories like white goods.

With the advance in digital technologies, producers have started using real-time feedback analytics to predict consumer intention and adapt marketing strategies accordingly. In Turkey, companies adding the clickstream data and sentiment analysis into their product have seen significant improvements in customer satisfaction and loyalty.

In conclusion, it may be stated that digital consumer behavior in Turkey is shaped by technological engagement, emotional-cultural influence and collective decision making. While the consumers gain more control over how and when they interact with brands, companies should get over the traditional segmentation and adopt new strategies to stay relevant and competitive such as, culturally sensitive, adaptive and platform integrated.

2.4 Co-Creation in Product Development

The other focus on new product development is co-creation. It represents a paradigm shift in innovation thinking. Earlier, it was common to think that designing should be done for the customer but with the co-creation concept it is accepted that designing should be done with the customer. As clarified by Prahalad and Ramaswamy (2004), co-creation is a collaborative design process where value for a product is cooperatively generated by companies and consumers through interaction, negotiation and resource integration. The

traditional innovation models like stage-gate¹ or waterfall² models mostly position the end customer as passive end users and try to guess the customer expectations. On the other hand, a co-creation approach defines the customer as an active stakeholder that can contribute to the process with ideas, suggestions, preferences and solutions. In the context of new product developing, these attributes improve the quality of innovation, enhance innovation relevance, speed up market response and increase the strength of the bond between customer and companies.

The co-creation process can take different forms, first one is structured initiatives such as online ideation platforms (e.g., Dell IdeaStorm, LEGO Ideas) to make brainstorming with customers. The second one is getting informal (unstructured) consumer feedback through product reviews, forums and social media platforms. Füller (2010) distinguishes between virtual co-creation and traditional customer research. Companies can create deeper consumer engagement and find a hidden unmet or emerging need using the co-creation. The important part here is the power of revealing unseen requirements. Wittke and Hanekop (2011) further argue that innovation costs and time-to-market by leveraging scattered consumer knowledge by digital co-creation.

In the white goods market, product design includes both engineering of functionality and consumer's lifestyle considerations. In that manner, co-creation provides a platform between producers and consumers that creates a unique opportunity to align product design specifications with actual user environments. For example, consumers may complain about the noise level of the home appliances. Also, they may give feedback about appliance's outer or inner dimensions to better suit to small urban apartments. Consequently, producers can take advantage of dimension patterns for specific market or overall product layout simplification for specific consumers. Other than the traditional feedback or review mechanisms, this kind of context-specific insight that is usually shared through online platforms provides invaluable information for achieving perfect design-market alignment..

The Turkish market may offer a rich ground for digital co-creation practices. Turkish consumers on almost every age have high internet penetration and there is widespread use of review platforms like Hepsiburada and Trendyol. Also, consumers frequently engage in voluntary co-creation like suggesting product upgrades, reporting overlooked issues and even suggesting alternative design ideas. Despite not being formally included

¹ *The Stage-Gate model*, developed by Robert G. Cooper, is a project management and product development framework that divides the innovation process into a series of sequential stages separated by decision-making gates. Each gate evaluates whether the project should continue based on criteria like market potential, technical feasibility and resource availability (Cooper, 1995).

² *The Waterfall model* is a linear and sequential product development approach commonly used in engineering and software development. It emphasizes a step-by-step process such as requirements, design, implementation, verification, and maintenance with minimal iteration or user involvement after early stages (Royce, 1970).

in R&D processes, many consumers can integrate into the shaping of the product attributes and expectations using online platforms. Comments on e-commerce platforms of product or complaints on other forums can be written by actual consumers.

The importance of the platform design concept comes from the fact that platform design is the one of the critical enablers of successful co-creation. Platform design involves many characteristic design choices at the platform level. It includes infrastructural capabilities and governance mechanisms. According to Piller et al. (2012), the ultimate customer input platform must consist of clear incentives, easy to use participation mechanisms, and most importantly transparent feedback loops. The idea behind it is when customers see their feedback being acknowledged or implemented, they are more likely to keep giving feedback and supporting the brand. This give and take dynamic creates a familiar environment and increases the sense of ownership and brand loyalty. In the home appliances product category, this is particularly important due to the high involvement. The customers purchasing one of the home appliances like a refrigerator from a specific brand may purchase another product category like a washing machine at the same brand if the ownership sense between brand and consumer are constructed well.

From a strategic perspective, producers must go further on co-creation instead of viewing it as a marketing gimmick. They have to integrate the concept into their core product innovation systems. Even the conceptual design phase consumer's voice can be considered. To embed co-creation and extract actionable insights from it, several tools can be used. Data analytics, sentiment analysis, and user-experience mining are among the most common techniques employed to interpret user-generated content and transform it into innovation-relevant input (Gunarathne et al., 2020). But most importantly, organizations of the firm must embrace a cultural shift that knowing the significance of external knowledge and decentralizes innovation authority.

In conclusion, co-creation in early product development is a powerful concept for building customer-oriented offerings that are compatible with customer needs. It alters consumers from being product evaluators into innovation collaborators. It enables superior product design made with customer, deeper brand-customer relationship and competitive advantage.

2.5 The Role of Digital and Social Media Platforms in Customer Co-Creation

Digital and social media platforms may act as important sources of new product ideas today. The expansion of these platforms significantly reshaped how companies engage with consumers in the new product development. Previously all R&D functions were performed inside the companies. These functions now have evolved into permeable, interactive systems that leverage consumer contributions at different stages of new product development like an internal member of R&D teams. Online forums, social media, review websites and collaborative innovation hubs now make it possible to share information between sides. In these platforms, consumers not only react to products but

also affect and shape them via feedback, ideation and evaluation (Wittke & Hanekop, 2011).

Electronic word-of-mouth (eWOM) can also be considered a remarkable mechanism in this digital shift. E-WOM is generated by the consumers, mostly sourced from personal experiences of consumers and it includes communication shared via digital channels. eWOM has a high degree of credibility, especially when it comes from perceived fellow users. When it comes to customer attitudes and purchase decisions, eWOM has shown critical impact on these concepts (Cheung & Thadani, 2012). The relationship between eWOM and co-creation has become clearer with the new digital age. In co-creation context, eWOM acts as a postman between producers and consumer which carry information about innovation between sides. Due to this postman's existence, consumers not only evaluate but often reimagine products based on their personnel use case.

Similarly, online consumer feedback serves as both an evaluative tool and a creating environment for customers. Consumers often move beyond evaluating and rating the performance of the products. They can offer a new design suggestion, reporting unforeseen and emerging problems or comparing the functionality of products with the competitor brands. The last one especially creates a limitless benchmarking option for the producer. If these insights are systematically analyzed they can be used for detecting early indicators of design mismatches, unsatisfied needs or even unexplored market trends (Füller, 2010). For example, a pattern of reviews requesting wider and bigger refrigerator or quieter washing machines can affect both short-term design fixes and long-term R&D priorities and may serve as a roadmap.

In the Turkish market context, post purchase experience and digital product discourse can be gathered on online platforms such as Hepsiburada and Trendyol. These platforms have become central for consumers' voice. Turkish consumers tend to use these platforms in detailed storytelling. The concept of this storytelling includes personal experiences and technical evaluations. With the culture of Turkish people these two aspects most of the time blend together and emerge as critics of product with personal touch. Of course, this form of "narrative feedback" provides richer context rather than simple star or point based rating systems. This kind of feedback offers clues about emotional, cultural and functional expectations. Moreover, Ekşi Sözlük and other forums serve as a unique platform where users talk about sentiments for brand in more opinionated and socially contextualized practices. These platforms function as an informal co-creation system if the information from them can be actively monitored and respond the customer feedback.

From a marketing standpoint, social media and other review platforms enable firms to decrease time and cost of market research by leveraging real-time consumer insights rather than traditional market research that can be only done before or after product design. Piller & West (2014) emphasize that identifying latent innovation opportunities, responding to crises quickly and engaging consumers in continuous product improvement is only possible with the effective use of social media and other review platforms. However, the real challenge starts with filtering the data from consumers, identifying

signals and noise. Converting the unstructured data into actionable intelligence that aligns with product development and company goals is a big part of this process.

In summary, digital review and social media platforms play a role as both mirrors and enabling motors of co-creation. They reflect real-time consumer experiences while shaping the long-term innovative decisions. Investing in monitoring technologies, data analytics and social media engagement platforms are several options for better understanding the concept. After these investments the earned digital spaces become invaluable resources for customer-centered and co-created new product development.

2.6 Summary of Key Themes and Research Gap

The literature reviewed in this chapter points out the multi-dimensional transformation in how new products are developed in response to altering consumer behavior, technological progress and market dynamics. In academic environment, growing strategic importance of new product development (NPD) in saturated and competitive markets such as white goods industry is emphasized in fields of marketing, consumer behavior and innovation.

Customer-centered product development (CCPD) concept prioritizes the customer's voice in all stages of product development, from conceptual design phase to post-launch evaluation. Studies reveal that firms employing CCPD achieve higher rates on several performance indicators such as product-market fit, higher innovation success rates, higher market penetration and greater brand loyalty (Griffin & Hauser, 1993; Ulwick, 2002). In addition, the idea of value co-creation extends the CCPD logic by counting the consumers as active contributors to new product design rather than passive information sources (Prahalad & Ramaswamy, 2004).

The role of digital and social media platforms becomes enablers of consumer involvement in the new product design processes. These platforms can enable every consumer to speak fairly and clearly and provide real-time access to insights generated by consumers to the producers. eWOM and online reviews are now accepted as trust-based communication tools and sources of co-creative input (Cheung & Thadani, 2012; Füller, 2010). Specifically, in Turkey where culturally expressive and high engagement market environments these platform function as informal innovation spaces in two crucial ways. Firstly, consumers may criticize the product and secondly, co-develop brand narratives and product directions.

While there is extensive theoretical discussion on co-creation and consumer engagement in digital environments (Prahalad & Ramaswamy, 2004; Payne et al., 2008), relatively few studies have investigated how unsolicited digital feedback can be systematically analyzed and integrated into traditional NPD processes (Hou et al., 2019). Much of the existing research has focused on Western markets and structured collaboration models, often overlooking organic, culturally situated expressions of consumer feedback (Ind & Coates, 2013). By contrast, the understanding of Turkish consumers, their behaviors, and market habits remains limited (Dirsehan, 2020). Research in the Turkish context shows that consumers often form emotional and collective bonds with brands they consume,

with social media platforms serving as a key channel for this connection and engagement (Özkan et al., 2020). The Turkish white goods sector, characterized by high consumer involvement, therefore represents a valuable context for this type of research (Euromonitor International, 2022).

This thesis points out these gaps by applying netnography to understand and analyze the consumer feedback on new product design. Netnography is a qualitative method designed to analyze online community behavior and gathering consumer feedback collected from Turkish digital and social media platforms. It contributes to the literature by offering an interpretive, culture-sensitive view of how consumers prompt requirements, propose new ideas about design and engage in value creation without formally being part of the R&D processes. The findings aim to bridge between unstructured digital data coming from consumer reviews and structured new product development in the design phase. Also, they offer a framework for integrating consumer's voice into actionable innovation strategies.

Beyond netnographic approaches, deductive content analysis has also become a well-known method when it comes to examining consumer-generated content. Deductive content analysis starts from theoretical categories or predefined coding frames and systematically applies them to textual data (Elo & Kyngäs, 2008; Schreier, 2012). This approach makes the method particularly preferable when the research's goal is to test or validate existing conceptual frameworks, not just uncovering emergent themes. In consumer research and marketing, scholars have used deductive content analysis to conduct customer surveys or analyze online reviews into dimensions such as perceived quality, usability, aesthetics or innovation potential (Schuckert et al., 2015). Such studies show that consumer narratives can be meaningfully mapped onto established constructs, thus facilitating comparability across contexts and studies (Mayring, 2014).

When applied to online customer reviews, deductive content analysis may create an efficient way to connect spontaneous consumer expressions with strategic themes such as co-creation. This approach enables user-generated content not treated as anecdotal but is instead connected to broader theoretical debates. In the context of the white goods industry the feedback concerning energy efficiency, functionality, or design can be systematically aligned with customer-centered design frameworks. While this study primarily relies on netnography for capturing contextual nuance of consumer communities, insight from deductive content analysis serves as a complementary anchor.

The main aim of this research is intersecting the concepts of new product development (NPD), customer centered product development (CCPD), co-creation and digital platform analysis. To gathering these concepts in emerging market contexts in Turkish white goods market, the study offers a novel contribution to both academic knowledge and practical innovation management for firms that positioned themselves in this market.

3 METHODOLOGY

3.1 Research Design

In modern-day marketing research, the understanding of consumer behavior has shifted drastically. In this study, the primary objective is to investigate how digital consumer feedback in Turkish online platforms contributes to new product development (NPD) in the white goods market. A qualitative research method is highly suitable for this study due to the highly interpretive and naturally occurring data collection environment of digital review platforms. This method enables a deeper understanding of socio-cultural, emotional and contextual layers embedded in consumer emotions across the digital environment.

Consumer experiences and expectations are complex, subjective and socially constructed phenomenon. Therefore, exploring this kind of topic requires a qualitative paradigm (Denzin & Lincoln, 2018). On the other hand, quantitative designs often seek generalizability. While aiming the generating rich, detailed insights by examining how consumers articulate their needs, frustrations and product ideas within the informal spaces of e-commerce and review platforms, this study should be conducted with qualitative methods. In this regard, qualitative research provides the necessary flexibility to gather consumer's decision-making processes in their natural settings.

The chosen qualitative methodology for this study is netnography, a specialized form of ethnography adapted to digital contexts. Created by Kozinets (2002), netnography allows researchers to analyze naturally and spontaneously occurring online interactions to understand patterns of meaning, behavior and sentiment. While understanding digital co-creation and customer centered product development practices this method is particularly effective due to capturing real time, spontaneous and culturally situated consumer insights (Bartl, Kannan, & Stockinger, 2016). In addition, particularly in Turkish e-commerce market where highly expressive and socially engaged customers tend to discuss their experiences in detail, netnography enables to translating of consumer expectations. This translation process can use rich narrative data found in user reviews, complaint forums and social media platforms.

The main point of this research is observing consumer behavior in the situation without any intervention. Therefore, it relies on publicly available digital content from platforms such as Hepsiburada and Trendyol. These platforms provide evaluative data, also user-generated design suggestions, post-purchase feedback and cultural meanings associated with product use. The non-intrusive nature of netnography ensures that the authenticity of consumer's voice is protected, and this is essential for achieving interpretive validity (Kozinets, 2020).

Additionally, this design is exploratory in nature and aimed at theory building rather than theory testing. The objective is to develop themes and frameworks that can explain how consumer input in digital platforms functions as a strategic resource for NPD. This is in line with the inductive logic of qualitative inquiry, where patterns emerge through

systematic engagement with data rather than predefined hypotheses (Creswell & Poth, 2018).

In summary, the research design is rooted in the interpretivist paradigm and follows a qualitative, netnographic approach. It allows the researchers to engage with consumer generated content in its natural, cultural and technological context. In this manner, uncovering meanings that would be more difficult to access through conventional survey or interview methods will be possible. This approach is particularly suitable for addressing the identified research gaps around unsolicited digital feedback, consumer co-creation, and localized behavioral patterns in emerging markets such as Turkey.

3.2 Research Approach

The philosophical orientation of this study is conducted in the interpretivist paradigm. Therefore, it suggests socially constructed, subjective and context dependent reality. Unlike positivist paradigms that view reality as singular and measurable, interpretivism states that individuals compose their own understanding of the world across lived experiences and cultural correlations (Schwandt, 2014). While the study's objective is uncovering the how consumers make sense of products, services and brands in digital platforms, this paradigm is commonly appropriate. Due to these consumer expectations are highly contextual and influenced by socio-cultural parameters, interpretivist approach is perfect match for this kind of study.

Interpretivism aligns with the core objective of this study which is explore how Turkish consumers communicate product related experiences, expectations and suggestions on digital platforms and how these expressions can be integrated new product development (NPD). To understand the true nature of interpretivist stance, researchers approach consumer reviews, complaints and feedback not just as isolated data but meaningful narratives. They need to see these as reflections of deeper social and emotional realities (Lincoln, Lynham, & Guba, 2018). This is especially relevant in Turkey e-commerce market where the relationship between consumer and producer are often shaped by emotional proximity, collective sentiment and high value interactions.

After this philosophical positioning, the research engages an inductive reasoning approach. This approach is crucial for qualitative analysis. The study is looking to generate insights and develop themes that are organically from the data because testing the predefined hypothesis is not suitable (Thomas, 2006). In this sense, knowledge is jointly constructed through the interaction between the researcher and the analyzed digital texts. The objective is rather than generalizing finding to all consumers, but to develop theoretical propositions that explain how specific behaviors and patterns emerge in specific cultural and digital contexts.

The process of choosing netnography method also depends on the inductive logic. Netnography method as an approach that giving the opportunity for higher communication with online communities of consumer and broad spaces, it is characteristically interpretive and combined with naturalistic observation. It offers great

flexibility to adapt to data which contains emerging patterns to explore. It also remains sensitive to the social, emotional and symbolic nuances implanted in user generated content (Kozinets, 2020).

In practical terms, the analysis process is iterative and reflexive. As the researcher starts to interact with digital reviews, complaints, ideas and discussion themes begin to appear. This appearing leads to progressive focusing of the investigation. After that point, the use of KNIME analytics in this context doesn't mean replacing the power of the interpretation abilities of humans with automation. On the other hand, it enhances pattern recognition and assist interpretive depth through text mining and visualization tools. This kind of hybrid handling with data enables a more nuanced and comprehensive analysis since machine assisted coding infrastructure meets human sense making.

Additionally, this approach encircled methodological diversity within a qualitative framework. While the core method is netnography, the study uses many other techniques from other methods such as digital discourse analysis, sentiment mapping and thematic analysis. Therefore, it makes the study both epistemologically clear and methodologically flexible.

In conclusion, the research method of this study contains two main courses, interpretive philosophy and inductive approach. These two courses create a conceptual backbone for this study. They enable for deep and context sensitive understanding of how Turkish white goods market consumers use digital review platforms to express requirements, values that they give higher priority, suggestions on product and real expectations on them. The philosophical attitude not only validates the methodological choices made but also reinforces the validity of the insights derived from culturally embedded and emotionally rich consumer data.

3.3 Netnography and Text Mining

Netnographic methodology and text mining techniques are used in this study to investigate how consumers in the Turkish white goods market contribute product-related discussions on digital platforms. Netnography is defined as a qualitative research approach pioneered by Kozinets (2010), which is an adaptation of ethnographic methods to online environments. It is particularly suited for studying naturally occurring consumer discourse from virtual communities, forums, user-generated content coming from e-commerce platforms. It can be used for analyzing meaning, context and pattern.

Netnography observes how users express themselves voluntarily in public forums. It allows the researchers to study consumer behavior in a non-intrusive and culturally embedded manner. When consumers suggest product improvements, share detailed user experiences or express expectations related to design and functionality on online platforms, netnography plays an effective role for understanding co-creative behaviors. This method may often provide more authentic and emotionally charged insight than structured interviews or surveys because of the spontaneous nature of these expressions.

In this study netnographic interpretation is complemented with text mining for supporting scalability and consistency of data processing. To gather these data the open-source software “KNIME Analytics Platform³” is used. To identify recurring patterns, terms and themes within the text based on big data, text mining techniques assist the researcher in organizing and simplifying large volume of textual data. This hybrid approach of using text mining and netnography maintains the interpretive depth of qualitative analysis while benefiting from the efficiency and structure of computational methods.

With these two concepts together provide a sturdy framework for analyzing how consumers interact in informal innovation processes with their voluntary feedback through digital platforms. The method is well aligned with the study’s objective: understanding the consumer’s indirect role in product value creation. Finding out the actionable insight for the white goods sector from online reviews is key to this understanding.

3.4 Complementary Analytical Lens: Deductive Content Analysis

Netnography forms the backbone of this study by creating an in-depth immersion into customer voices across digital platforms. The analysis also integrates components of deductive content analysis which is particularly suitable when the target is to apply pre-existing theoretical constructs to textual material (Elo & Kyngäs, 2008). In this study, coding process was not entirely open-ended however, categories were informed by the literature on co-creation and product design. These categories includes functional product attributes, aesthetic design elements, usability and innovation suggestions.

During the text mining phase in KNIME, reviews from e-commerce sites were first preprocessed through tokenization and stop-word filtering. After that, terms were organized into coding frames reflecting the above categories. Therefore, the netnographic interpretation allowed contextual and cultural complexity to stay central while the deductive framework guided the grouping of customer response. This dual approach increases both the reliability and validity of the findings. Predefined categories offer a systematic look for classification and reliability. In addition, immersion into the reviews prevents the reduction of consumer voices into mere statistics and validity. Rather than viewing netnography and content analysis as contradictory paradigms, this study tries to position them as mutually reinforcing. Netnography may capture the richness of consumer storytelling, while deductive content analysis tries to anchor these reviews to the theoretical constructs.

3.5 Data Collection

In this study, user-generated content was collected from the review sections of 2 leading Turkish e-commerce platforms; Hepsiburada and Trendyol to capture rich, spontaneous

³ KNIME (Konstanz Information Miner) is an open-source data analytics platform widely used for data preprocessing, machine learning and text mining through a modular, node-based interface. It enables users to build workflows without coding and is suitable for both qualitative and quantitative data analysis.

consumer feedback. These platforms were selected based on their relevance to the white goods market in Turkey, the volume of the product reviews and popularity among the e-commerce consumers.

In fact, the white goods and small household appliances category generated the highest e-commerce volume in Turkey in 2023, reaching approximately ₺233 billion (Ecommerce News Europe, 2023). Within this category, Trendyol led the market in 2024 with an estimated US \$754.8 million in appliance sales, followed by Hepsiburada with US \$402.4 million and Amazon Turkey with US \$137.9 million (EcommerceDB, 2024). These figures highlight the central role of Trendyol and Hepsiburada in shaping consumer interaction with white goods online, justifying their selection as the primary data sources for this research.



Table 3.1

Marketplaces in Turkey (Electrical Appliances, 2024)

Platform	Gmv (Usd Millions)	Estimated Share
Trendyol	754.8	~54%
Hepsiburada	402.4	~29%
Amazon Turkey	137.9	~10%
Total	1,395.1	100%

3.5.1 Description of review platforms

Hepsiburada is one of the Turkey's largest e-commerce marketplaces. It offers a broad range of product categories including white goods. Each product webpage includes a review section where only the customer who has already purchased the product can leave feedback. In addition to the text-based feedback consumers also use a star rating system for that product. While some reviews are brief, many contain detailed reflections on product design, usability, and logistics issues.

Trendyol is also one of the dominant marketplaces in Türkiye. The platforms initially started with fashion products but after a short time they widened their range to technology and home appliances. Like Hepsiburada, Trendyol creates a space for consumers to post reviews after purchasing a product. Addition to text-based reviews, the platform also enables star rating system and let to upload photos. Due to its strategies for encouraging the consumer to post reviews and mobile-friendly interface and widespread use, the company's review system yields a large volume of short and medium length user feedback. Thus, Trendyol and Hepsiburada are highly suitable platforms for text mining and thematic exploration

3.5.2 Sample selection of consumer reviews

Selection of raw, unprocessed reviews excerpts is presented below to better illustrate the nature and tone of the digital consumer feedback used in this study. A typical user-generated review on Turkish white goods market has characteristic emotional tone and authenticity. These examples are chosen due to clearly demonstrate the attributes of these reviews. User identifying details such as name and supplier have been removed for privacy and reviews have been quoted as originally written, including spelling or grammatical variations.

Example 1 – Trendyol (Washing Machine): “Ürünü yaklaşık 2 haftadır kullanıyoruz. Sessiz çalışıyor. çamaşırları güzel yıkıyor ama kapağı çok zor kapanıyor. Keşke tasarımı biraz daha pratik olsaydı.”(We've been using the product for about 2 weeks. It runs

quietly. It washes well, but the door is very hard to close. I wish the design was a bit more practical.)

Example 2 – Hepsiburada (Refrigerator): “Yeni aldığım buzdolabı motor sesi çok yüksek. Ayrıca iç raflar çok dayanıksız. Daha kullanıcı dostu bir tasarım beklerdim açıkçası bu fiyata.” (The motor noise of the new refrigerator is very loud. Also, the interior shelves are quite flimsy. I expected a more user-friendly design at this price point.)

These two samples are shown for the creating reflection of design-centered, unsolicited consumer insights that were thematically coded and analyzed in the study. To extract meaningful signals from large volumes of such text using text mining and netnography, natural and experience-based language were used.

3.5.3 Subtracting the raw data

For subtracting the reviews from online platforms, a custom Python scrip using Selenium⁴ was developed instead of using manual scrapping or third-party visual tools. This approach enabled automated and flexible exploration of product review pages while ensuring the gathering of text data from real-world customer feedback. Selenium was chosen because of the ability to interact with dynamically loaded elements such as text parts of the reviews. This attribute is essential for platforms like Trendyol where user reviews are progressively loaded during screen scrolling.

The script workflow included the following steps:

- Reading a list of product URLs selected by the researcher and specific category names from an input CSV file (input_urls.csv),
- Opening each product page in an internet browser,
- Automatically scrolling down to load more comments,
- Extracting text from all visible review containers,
- Saving all valid reviews into a structured list with associated product names.

Each entry collected contained:

- Product Name
- Raw Review Text

The code used in the web scrapping is shown below.

⁴ Python is a high-level, general-purpose programming language widely used for data science and automation tasks (Van Rossum & Drake, 2009). Selenium is an open-source tool for browser automation, enabling interaction with dynamically loaded content on web pages, which makes it particularly suitable for scraping user-generated data from modern e-commerce platforms (SeleniumHQ, 2023).

Figure 3.1

Selenium-based script used for scraping consumer reviews from Trendyol.

```
[1]: from selenium import webdriver
from selenium.webdriver.chrome.service import Service
from selenium.webdriver.chrome.options import Options
from selenium.webdriver.common.by import By
import time
import pandas as pd

# Load URLs and product names (semicolon-separated CSV)
input_df = pd.read_csv("input_urls.csv", delimiter=";")
if "URL" not in input_df.columns or "Name" not in input_df.columns:
    raise ValueError("CSV must contain 'URL' and 'Name' columns")

# Setup headless browser
options = Options()
options.add_argument("--headless")
options.add_argument("--no-sandbox")
options.add_argument("--disable-dev-shm-usage")
driver = webdriver.Chrome(service=Service(), options=options)

# List to collect all data
all_reviews = []

for idx, row in input_df.iterrows():
    url = row["URL"]
    name = row["Name"].strip()

    print(f"🔍 Scraping: {name}")
    driver.get(url)
    time.sleep(3)

    # Scroll loop
    same_count = 0
    last_count = 0
    max_repeat = 5

    while True:
        review_elements = driver.find_elements(By.CLASS_NAME, "comment-text")
        current_count = len(review_elements)

        if current_count == last_count:
            same_count += 1
        else:
            same_count = 0
            last_count = current_count

        if same_count >= max_repeat:
            break

        if review_elements:
            driver.execute_script("arguments[0].scrollIntoView({block: 'end'});", review_elements[-1])
        else:
            driver.execute_script("window.scrollTo(0, document.body.scrollHeight);")

        time.sleep(2.5)

    print(f"📄 Loaded {len(review_elements)} reviews for {name}")
    for r in review_elements:
        text = r.text.strip()
        if text:
            all_reviews.append({"Name": name, "Review": text})

driver.quit()
```

The reviews were then exported to a CSV file using UTF-8 encoding to preserve Turkish characters. This file served as the input for following text processing and analysis in the KNIME environment.

During the web scrapping phase ethical considerations were considered. All data were extracted from webpages where all of them were publicly available. No usernames or any personal information that identify the person who wrote the review were collected or

stored. The content was used exclusively for academic research purposes, following established netnographic research guidelines (Kozinets, 2015).

3.5.4 Data preparation and processing

After scraping raw reviews with the custom Selenium-based Python script, the dataset was exported into CSV format and imported into the KNIME Analytics Platform. Preparation was made not merely to clean noise, but also to structure reviews for multi-layered analysis. This included tokenization, normalization (lowercasing, punctuation erasure) and removal of Turkish stop words using a curated list. Unlike the standard workflow that stopped at simple term frequencies, additional structuring was performed to enable advanced clustering and relational analysis. Each review was preserved with product metadata (e.g., product type, platform source) to maintain contextual richness in later interpretation if necessary.

3.5.5 Import and initial structure

The CSV dataset containing two core fields—product name and review text—was submitted into KNIME platform using the File Reader node with UTF-8 encoding to preserve Turkish-specific characters. Initial structuring involved:

- Removing empty or malformed rows,
- Verifying reliability of review texts,
- Creating categorical variables for source platform (Trendyol and Hepsiburada) and product type (refrigerator, washing machine, dishwasher).

This approach enabled both a comprehensive analysis of all reviews and a comparative analysis across different platforms and product types. This initial structuring was essential, as it allowed the later frequency, sentiment and relational analyses to be meaningfully applied to distinct consumer groups.

3.5.6 Text preprocessing workflow in KNIME

The preprocessing workflow was designed to feed into multiple analytical studies on KNIME. The following transformations were applied:

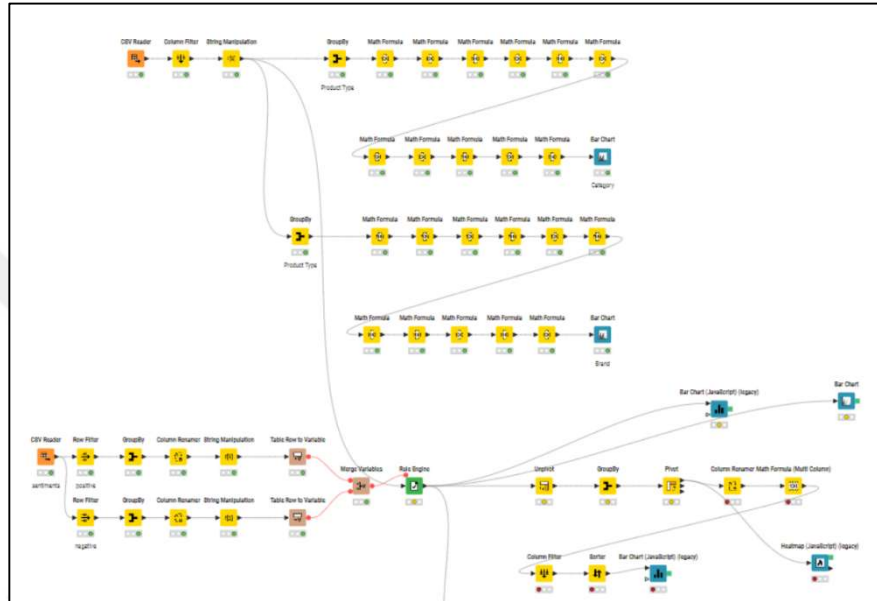
- Tokenization & Normalization – Translating of text into document format, lowercasing, and punctuation erasure according to Turkish language rules.
- Stop Word Filtering – Removal of generic Turkish stop words and platform-specific artifacts using embedded library of KNIME.
- Term Frequency Extraction – Creation of a term-document matrix and relative frequency distribution of key words.
- Sentiment Tagging – Application of sentiment dictionaries prepared for Turkish word structure, categorizing reviews as positive, negative, or neutral.
- Thematic Grouping – Mapping frequent words to predefined thematic categories such as durability, design appearance, energy efficiency, delivery/installation, etc.

- Co-occurrence Matrix Construction – Transformation of review data into co-occurrence matrices to capture relational patterns between themes.

This expanded process (Figure 3.2) was created through repeated refinement, balancing processing speed with insightful results. It was designed to ensure the analysis considered not just single words but also broader themes and grouped sentiments.

Figure 3.2

KNIME preprocessing workflow for Turkish consumer review data.



3.5.7 Thematic Dictionary Development

The creation of a strong and verified coding lexicon was necessary to make the shift from unstructured text data to organised and analysable topics. To make sure the thematic framework was both based on previously published work and representative of the unique subtleties found in the Turkish customer feedback, this study used a hybrid, iterative approach that included deductive and inductive methodologies.

An initial set of thematic categories—Performance, Durability, Design, Noise, Energy Efficiency, and Price/Value—was established deductively based on prior literature and market reports. McKinsey (2025) identifies durability, energy efficiency, and affordability as enduring consumer priorities in white goods. Pernice et al. (2023) show that consumers consider price, performance, design, and energy efficiency when evaluating appliances. Additionally, GfK’s (2024) outlook underscores performance, durability, innovative design, and value-oriented factors as central to purchase decisions in durable goods.

Through this process, new, focused topics evolved, including “Smell/Odor” (especially for dishwashers and washing machines), “Program Features” (the intricacy and utility of electronic programs), and “Delivery/Installation” (a major issue that emerged as separate from the device itself or depended on packaging). The original broad theme of

performance was successfully divided into two more specific categories: “washing performance” (for dishwashers and washing machines) and “cooling performance” (for refrigerators).

The final coding dictionary comprised 11 distinct themes (Table 3.2). For each theme, a comprehensive list of Turkish keywords, key phrases, and synonymous expressions was defined. This list included single words (e.g., for Noise/Vibration: "ses", "gürültü", "titreme", "titreşim"), common phrases (e.g., for Delivery/Installation: "teslimat süresi", "montaj yapılmadı", "kurye sorunu"), and common misspellings or slang terms found in the data.

This finalized dictionary was then operationalized within KNIME using a series of Rule-based String Matchers and Dictionary Taggers. Each review was processed through this node series, and tags for all present themes were appended to the data. A single review could be tagged with multiple themes, enabling the subsequent co-occurrence analysis.

Table 3.2
Finalized thematic coding dictionary

Theme	Description	Example Keywords (Turkish)
Noise/Vibration	Comments on operational sound or physical vibration	ses, gürültü, titreme, vızıltı, uğultu, sessiz
Capacity/Size Fit	Comments on interior space, external dimensions, suitability for home	kapasite, hacim, büyük, küçük, dar, geniş, sığmıyor
Energy Efficiency	Mentions of energy consumption, efficiency class, electricity bill	elektrik, enerji, verimlilik, tasarruf, fatura, A+
Washing Performance	Effectiveness of cleaning (for washers & dishwashers)	temizlemiyor, leke, kir, temiz, parlak, beyazlatma
Smell/Odor	Unwanted odors post-wash or from the appliance itself	koku, koku yapıyor, küf, ağır, havalandırma
Durability/Quality	Perceived build quality, material quality, longevity	kalite, dayanıklılık, plastik, çelik, kırılgan, bozuldu
Design/Appearance	Aesthetics, color, finish, visual appeal	tasarım, güzel, çirkin, renk, görünüş, modern, eski
Delivery/Installation	Experience with delivery time, service, setup	teslimat, kargo, montaj, kurulum, bekletme, hasarlı
Program Features	Functionality, number, and complexity of settings	program, ayar, karmaşık, basit, otomatik, akıllı
Price Value	Assessment of product worth relative to its cost	fiyat, pahalı, ucuz, değer, para, layık, almaya değer
Cooling Performance	Effectiveness and consistency of cooling (for refrigerators)	soğutma, soğutmuyor, buzlanma, ısınıyor, derece

3.5.8 Output

The outputs of preprocessing and analysis were structured into four corresponding products:

- Frequency Tables – Highlighting dominant themes and attributes most stated by consumers in the reviews.
- Sentiment Polarity Distributions – Showing the percentage of positive/negative feedback across themes. It enables differentiation between “high salience, high satisfaction” versus “high salience, low satisfaction” attributes.
- Heatmaps & Pivot Visualizations – Illustrating intersections between consumer intentions (e.g., feature requests, complaints) and thematic clusters, supporting systematic interpretation of consumer priorities.
- Co-occurrence Networks – Mapping how themes such as design and price or delivery and durability were discussed together, thus pointing to latent consumer logics and universal expectations.

These outputs served as the realistic backbone for the Findings chapter, allowing both quantitative visualization and qualitative netnographic interpretation to converge.



4 FINDINGS

4.1 Overview of the Analytical Process

The main objective of this chapter is to extract and interpret insights from online consumer-generated reviews to support the co-creation opportunities in the white goods design in the Turkish market. To achieve this, a mixed approach combining netnographic interpretation and computational text mining was employed. The data was gathered from online platforms including Trendyol and Hepsiburada, using a Python-based automated scraping script, then processed via the KNIME Analytics Platform.

The review pool consists of 10381 individual review entries across selected white goods products (refrigerator, washing machine and dishwasher), all of which were cleaned, break down, and pre-processed to enable structured mining. Steps included tokenization, lowercasing, stop-word filtering (with attention to Turkish linguistic context), term frequency extraction, and sentiment tagging.

4.2 Overview of Extracted Consumer Insights

This chapter analyzes consumer reviews using a structured approach to identify opportunities for co-creating product designs in the Turkish online appliance market. After collecting and preparing the large number of user reviews from Trendyol and Hepsiburada, the dataset was examined through both computational and netnographic methods. This combined approach ensures that the results are statistically reliable and contextually rich, basing design suggestions on actual consumer feedback.

The results are presented in three parts:

- A thematic frequency analysis which identifies the product attributes that receive the most consumer attention.
- A sentiment and polarity analysis which assesses consumer feelings toward those attributes.
- An analysis of relational patterns and co-occurrence that examines connections between themes to reveal broader consumer expectations.

4.3 Theme Frequency Analysis

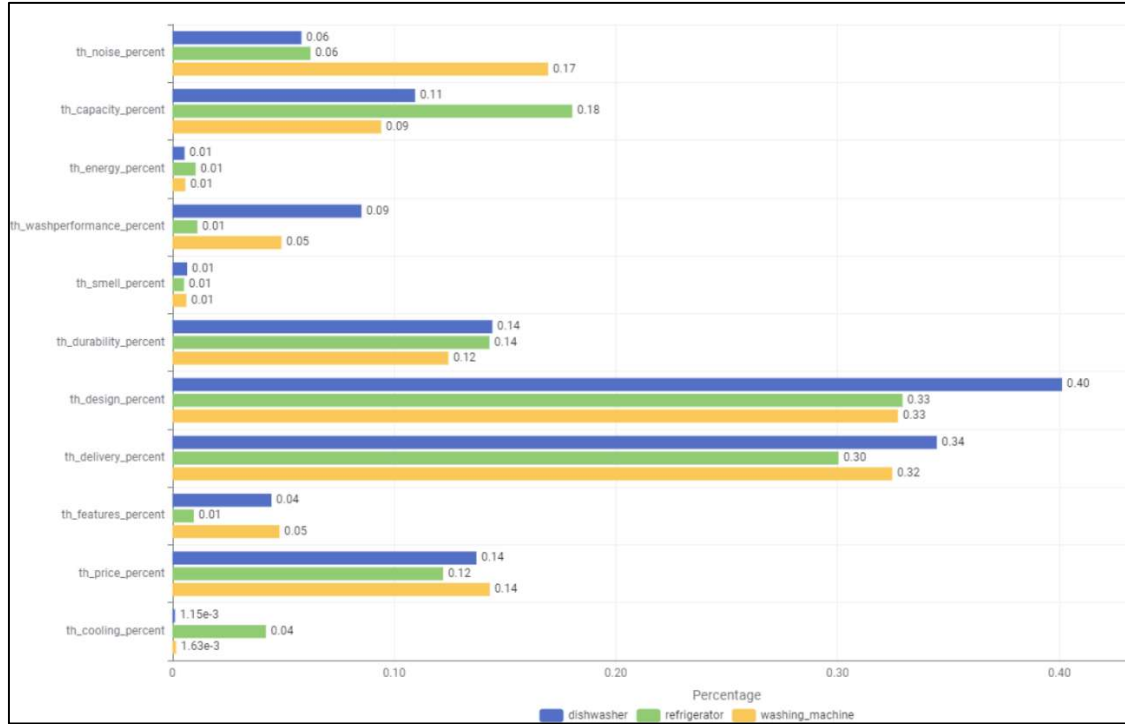
The first stage involved understanding the importance of key product attributes. The dictionary driven classification diagram grouped terms at 11 categories under predefined themes such as capacity/size fit, cooling performance, durability, delivery/installation, design appearance, noise and vibration, energy consumption, washing performance, smell and odor, features and price. The relative counts across these categories highlight which attributes consumers discuss most frequently and which areas they perceive as most critical in their purchase and after sales experience.

Overall, capacity/size fit and design characteristics emerged as dominant topics, reflecting the practical concerns of Turkish households where kitchen and utility spaces are often constrained and where the usability of product takes important place. On the

other hand, themes such as programs features and smell/odor were less frequently mentioned, suggesting that while important, they occupy a secondary role in consumers' minds.

Figure 4.1

Theme distribution within the product groups



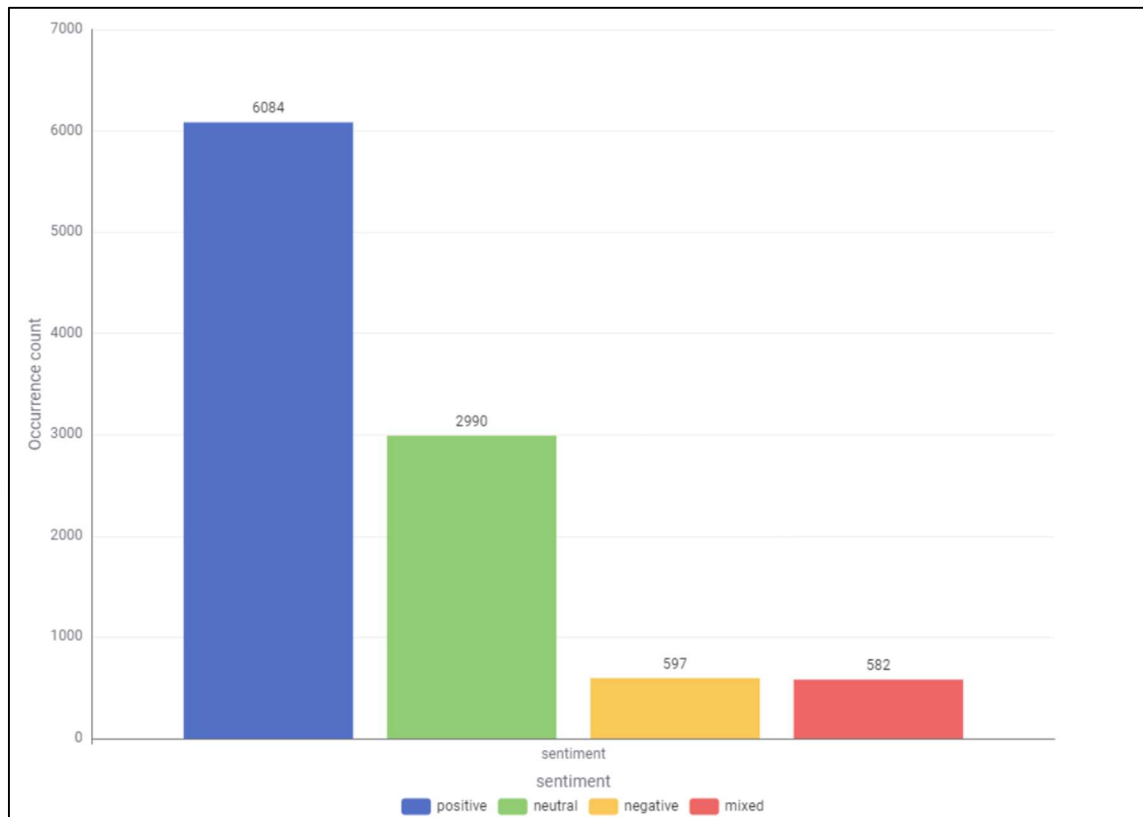
The relative distribution not only points out urgent design areas that needs attention but also provides early warning signals about potentially under-communicated features. For example, if noise/vibration is underrepresented, this may not necessarily indicate consumer satisfaction, it may signal that such attribute is insufficiently highlighted that consumers only report them when dissatisfied.

4.4 Sentiment Polarity by Theme

The next layer involved examining the sentiment distribution attached to each thematic group. Using a sentiment scoring model adapted to Turkish word structure, each review fragment was classified as positive, negative or neutral. When aggregated by theme, these scores allow for a more nuanced interpretation.

Figure 4.2

Sentiment distribution across reviews

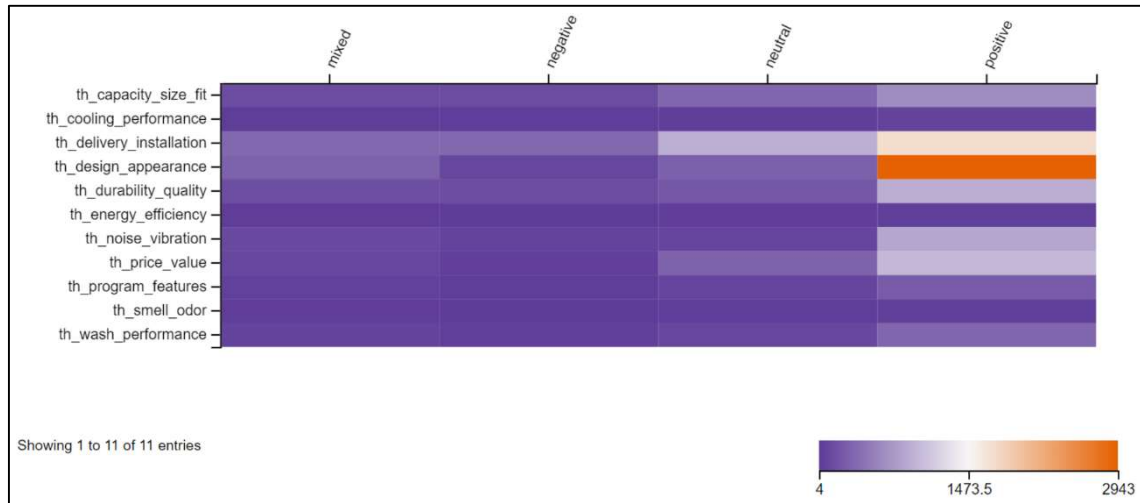


Results reveal a clear divergence between functional and experiential attributes (See Figure 4.3):

- Energy efficiency, durability, and cooling performance received a higher proportion of positive sentiment which shows consumer satisfaction in the technical reliability of products.
- Delivery and installation exhibited a strongly mixed profile, with substantial negative sentiment concentrated around delays, damaged items, or unsatisfactory service.
- Design appearance elicited highly polarized responses—positive in cases where aesthetics aligned with consumer expectations, negative when perceived as outdated or inconsistent with premium branding.

Figure 4.3

Heatmap of themes vs sentiment



This distinction points out that consumer satisfaction with white goods is not only about the product itself but also about the service ecosystem surrounding it. A technically flawless household item may still generate dissatisfaction if its delivery experience undermines overall trust in the brand.

4.5 Relational Patterns and Co-occurrence

The next step involved analyzing co-occurrence patterns between themes. Specifically mapping which attributes tend to be mentioned together within the same review. Such analysis helps enlighten latent consumer expectation groups, where satisfaction or dissatisfaction with one aspect influences perceptions of another.

The results indicate:

- Strong relationship between capacity/size fit and design appearance, suggesting that consumers perceive these as part of a broader “practical usability” dimension.
- Frequent pairing of delivery/installation with durability, indicating that poor service during delivery often raises doubts about long-term reliability.
- A cluster linking design appearance with price value, reflecting the fact that consumers deliberately evaluate whether aesthetics justify the financial costs.

Figure 4.4

Co-Occurrence patterns between themes

	noise_vibration	capacity_size_fit	energy_efficiency	wash_performance	smell_odor	durability_quality	design_appearance	delivery_installation	program_features	price_value	cooling_performance
noise_vibration	38	13	5	8	4	12	30	24	11	18	4
capacity_size_fit	13	142	7	11	5	27	92	58	15	26	13
energy_efficiency	5	7	18	6	1	9	29	23	11	7	1
wash_performance	8	11	6	33	9	16	37	28	9	10	3
smell_odor	4	5	1	9	21	14	33	32	6	9	3
durability_quality	12	27	9	16	14	87	75	60	19	26	10
design_appearance	30	92	29	37	33	75	324	129	34	45	31
delivery_installation	24	58	23	28	32	60	129	210	27	35	25
program_features	11	15	11	9	6	19	34	27	36	15	4
price_value	18	26	7	10	9	26	45	35	15	73	7
cooling_performance	4	13	1	3	3	10	31	25	4	7	26

Beyond these patterns, the heatmap above reveals a spectrum of strong and weak co-occurrences. The strongest clustering is observed between design appearance and delivery/installation (129 times), as well as design appearance and durability (75 times). This may indicate that consumers do not isolate aesthetic considerations from the practical realities of ownership. Rather, the attractiveness of a product appears closely tied to perceptions of robustness and to the reliability of the delivery process, suggesting a holistic judgment process where appearance and functionality intersect.

Similarly, price value is moderately connected to design (45 times) and durability (26 times), reinforcing that consumers balance financial considerations with both aesthetic appeal and long-term reliability. These relationships highlight that purchase decisions pass simple cost–benefit logics, combining experiential and symbolic aspects of product ownership.

On the weaker side, themes such as “smell/odor” show consistently low co-occurrence values across the matrix (mostly below 15 times). This suggests that although unpleasant odors are occasionally noted, they remain a minor issue compared to central drivers like efficiency, price, and durability. Likewise, cooling performance is relatively isolated, with only minor associations (scores ranging from 3 to 26 times), indicating that this theme may be considered important only in specific product categories such as refrigerators rather than across the white goods spectrum.

Taking together, the relational mapping highlights that consumer evaluations have multiple layers: strong linkages between design, durability, and service highlight the experiential aspects of product ownership, while weaker ties (e.g., odor, cooling performance) reflect more product-specific concerns. Such insights help frame consumer logics as systemic, where core drivers like price, aesthetics, and service reliability are

consistently weighed together, whereas secondary factors receive attention only when they strongly deviate from user expectations.

Such relational insights are invaluable for co-creation workshops. They reveal not just isolated product weaknesses but systemic consumer logics, where design, price, and service are judged holistically.

4.6 Implications for Co-Creation

This study is a netnographic analysis taken as a case study on 3 product groups of white goods (refrigerators, dishwashers and washing machines) purchased on 2 marketplaces (Hepsiburada, Trendyol). The findings of this study may provide implications for how white goods companies in Turkey should approach consumer co-creation. The analysis shows that consumer engagement extends beyond simply mentioning product features; it reflects underlying expectations about how durability, aesthetics, and long-term reliability contribute to overall value.

The analysis showed that capacity, design appearance and durability emerged as dominant topics across product categories. These aren't trivial requests for small improvements. They represent core functional expectations that consumers actively demand. In co-creation terms, this suggests that R&D teams must involve consumer insights earlier in the R&D process, particularly during conceptual design phase. For example, instead of defining capacity solely through technical benchmarks across different brands, consumer feedback highlights that the sufficiency and flexibility of space are equally important considerations.

Analysis showed that consumers view delivery and installation as core aspects of product design, not just backend logistics. Since installation feedback is directly connected to usability perceptions, companies must integrate service design into product development, making end-to-end experience a focus of co-creation.

5 CONCLUSIONS, DISCUSSIONS, AND RECOMMENDATIONS

5.1 Conclusions

The findings of this research confirm that online consumer-generated reviews represent a valuable resource for the co-creation of new products specifically white goods in the Turkish market. Through the integration of netnographic interpretation and computational text mining on large volumes of user-generated content, it has been demonstrated that online platforms such as Trendyol and Hepsiburada act as informal but highly active arenas where consumers articulate frustrations, highlight product deficiencies, and propose new features. These broad practices are not isolated expressions but collectively reveal patterns of consumer knowledge that directly map onto product design concerns.

According to the analysis, issues including capacity, appearance, and durability surfaced as common areas of dissatisfaction, further demonstrating how customers routinely prioritize aspects of operational dependability and long-term use in their assessments. Contrarily, although cost-related issues (i.e., price-value assessments) are still present, they were given far less weight, indicating that Turkish white goods buyers place a higher priority on long-term performance and flawless customer service than just the initial purchase price.

These trends were made clear by the study, which provided an organized illustration of how customer intentions, such as requests for attributes, usability improvements, and performance problems, intersect with theme concerns. These trends demonstrate that customers may be actively involved in the innovation process by providing ongoing inputs that can guide iterative product development. This makes consumers co-creators and active participants in the new product development rather than just being passive consumers of goods and services. This discovery supports the claim that, when methodically used, consumer input can enhance organizational innovation strategies since it is consistent with theoretical viewpoints on co-creation.

5.2 Discussions

The findings of this research have implications both for the practice and co-creation literature. By converting customer feedback into real product improvements, companies in the Turkish market may strengthen their competitive advantage. As often said, issues such as capacity, enhanced durability, and expedited installation procedures are key areas where innovation could result in quantifiable increases in customer satisfaction. These kinds of output may be helpful in new product design or improving existing products.

It is important to highlight that customer reviews may represent a valuable and underutilized source of data for understanding consumer needs and expectations. Beyond their descriptive content, reviews offer scalable insights that can be systematically analyzed to inform product development. The methodological approach applied in this study demonstrates that such analysis is not restricted to large corporations with advanced analytics capabilities or financial capacities but can equally be adopted by small- and

medium-sized enterprises across diverse sectors. As e-marketplaces continue to expand and become increasingly crowded, the ability to distill actionable knowledge from consumer-generated feedback will emerge as a critical competitive advantage, enabling firms to differentiate themselves through responsiveness and alignment with customer priorities.

From a theoretical standpoint, this study contributes to the co-creation conversation by providing actual evidence of how digital traces of consumer discourse might be converted into useful design knowledge. The results of this study demonstrate that consumers already engage in spontaneous co-creation in online settings, in contrast with traditional co-creation frameworks that depend on organized workshops, surveys, or participatory design laboratories. After being run through a text mining and sentiment analysis pipeline, their unsolicited reviews provide a reliable and scalable source of insights that are pertinent to design. By establishing computational social science approaches, such as KNIME-based workflows, as essential resources for further study, this advances the methodology of co-creation studies.

This study can also be regarded as an experimental application of text mining and netnography, illustrating how digital footprints of consumer interaction can be transformed into structured insights about co-creation. By combining computational analysis with interpretive exploration, the method demonstrates that meaningful patterns can be extracted from large volumes of spontaneous customer feedback. The findings suggest such an approach is capable of uncovering hidden expectations and relational logics that might remain hidden in traditional survey-based methods. More broadly, this highlights the potential of text mining and netnographic analysis as adaptable tools for systematically incorporating customer voices into decision-making across industries.

Additionally, significant complexity is provided by the distribution of thoughts among themes. Positive comments center on energy efficiency and design aesthetics, whereas unfavorable reviews predominate when it comes to performance and service concerns. This asymmetry implies that consumer co-creation includes both the reinforcing of desirable traits and problem identification. Companies can intentionally highlight their strengths in their branding and innovation narratives in addition to fixing their flaws by acknowledging this duality.

5.3 Recommendations

A number of strategic recommendations can be made for both academic researchers and industry players based on the findings produced by this study. Integrating consumer review mining into the formal design pipeline is the first thing that businesses should consider doing. The KNIME workflows used in this study offer a low-cost, reproducible method for continuously observing customer dialogue. Making this kind of monitoring a regular practice might guarantee that customer input is not limited to post-purchase assistance but rather is incorporated into design choices.

Additionally, as durability and capacity optimization technologies are persistent sources of customer annoyance, investments in these areas may be considered top priority at the product level. Consumer trust may be strengthened by increasing transparency in these areas and emphasizing advancements through marketing communications.

On a larger scale, firms may want to think about creating organized feedback routes in addition to the passive accumulation of reviews. Community-driven feature proposal forums, beta testing programs, or digital co-creation platforms would enable a more dialogical interaction with customers, transforming their unplanned contributions into concerted creative endeavors. In a highly competitive industry, emphasizing consumer contributions in marketing narratives could help brands stand out as companies that actively listen to and innovate alongside their consumers.

The study creates a number of research opportunities for the future. While longitudinal analyses would allow the discovery of time-based alterations in consumer priorities, comparative research across product categories might assess the methodological framework's transferability. Additionally, using deep learning-based sentiment detection could increase the analysis's granularity, especially when it comes to picking up on subtleties in Turkish language expressions. Lastly, the paradigm could be expanded in future studies to examine sustainability aspects, examining how consumer discourse is increasingly emphasizing ecological effect, energy efficiency, and circular economic factors.

REFERENCES

- Alam, I. (2002). An exploratory investigation of user involvement in new service development. *Journal of the Academy of Marketing Science*, 30(3), 250–261.
- Bartl, M., Kannan, V. J., & Stockinger, H. (2016). A review and analysis of literature on netnography research. *International Journal of Technology Marketing*, 11(2), 165–196.
- Cheung, C. M., & Thadani, D. R. (2012). The impact of electronic word-of-mouth communication: A literature analysis and integrative model. *Decision Support Systems*, 54(1), 461–470.
- Cisco. (2022). 2022 consumer privacy survey. Cisco Systems. Retrieved from <https://www.cisco.com/c/en/us/about/trust-center/cisco-consumer-privacy-survey.html>
- Cooper, R. G. (2019). The drivers of success in new-product development. *Industrial Marketing Management*, 76, 36–47.
- Cooper, R. G., & Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management*, 12(5), 374–391.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Deloitte. (2023). Digital Consumer Trends 2023: Turkey report. Deloitte Türkiye. Retrieved from <https://www2.deloitte.com/tr/en/pages/technology-media-and-telecommunications/articles/digital-consumer-trends.html>
- Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research*. Sage.
- Dirsehan, T. (Ed.). (2020). *Managing Customer Experiences in an Omnichannel World: Melody of Online and Offline Environments in the Customer Journey* (pp. 179–194). Springer International Publishing.
- Ecommerce News Europe. (2023, December 15). Ecommerce in Turkey. Ecommerce News. Retrieved September 6, 2025, from <https://ecommercenews.eu/ecommerce-in-europe/ecommerce-turkey/>
- EcommerceDB. (2024). Top marketplaces in Turkey – electrical appliances. Statista. Retrieved September 6, 2025, from <https://ecommercedb.com/ranking/marketplaces/tr/electrical-appliances>
- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107–115.
- Erkan, I., & Evans, C. (2021). The influence of eWOM in social media on consumers' purchase intentions: An extended approach to information adoption. *Computers in Human Behavior*, 111, 106424.
- Euromonitor International. (2022). Consumer Appliances in Turkey [Market report]. Euromonitor. Retrieved September 6, 2025, from <https://www.euromonitor.com/consumer-appliances-in-turkey/report>
- Füller, J. (2010). Refining virtual co-creation from a consumer perspective. *California Management Review*, 52(2), 98–122.
- GfK Market Intelligence. (2024). *Consumer Tech & Durables - Outlook 2024* (Publication No. GfK-2024-CTD). GfK.
- Griffin, A., & Hauser, J. R. (1993). The voice of the customer. *Marketing Science*, 12(1), 1–27.
- Griffin, A., & Hauser, J. R. (1996). Integrating R&D and marketing: A review and analysis of the literature. *Journal of Product Innovation Management*, 13(3), 191–215.

- Grégoire, Y., Salle, A., & Tripp, T. M. (2015). Managing social media crises with your customers: The good, the bad, and the ugly. *Business Horizons*, 58(2), 173–182.
- Gunarathne, P., Rui, H., & Seidmann, A. (2020). When social media delivers customer service: Differential customer engagement and firm performance. *MIS Quarterly*, 44(1), 239–263.
- Hofstede Insights. (2022). Country comparison: Turkey. Retrieved from <https://www.hofstede-insights.com/country-comparison/turkey/>
- Hou, T., Yannou, B., Leroy, Y., & Poirson, E. (2019). Mining customer product reviews for product development: A summarization process. *Expert Systems with Applications*, 132, 141–150.
- Ind, N., & Coates, N. (2013). The meanings of co-creation. *European Business Review*, 25(1), 86–95.
- Kiron, D., Kruschwitz, N., Haanaes, K., & Velken, I. V. (2013). The benefits of sustainability-driven innovation. *MIT Sloan Management Review*, 54(2), 69–73.
- Kotler, P., & Keller, K. L. (2016). *Marketing Management* (15th ed.). Pearson Education.
- Kozinets, R. V. (2002). The field behind the screen: Using netnography for marketing research in online communities. *Journal of Marketing Research*, 39(1), 61–72.
- Kozinets, R. V. (2010). *Netnography: Doing ethnographic research online*. Sage Publications.
- Kozinets, R. V. (2015). *Netnography: Redefined*. Sage Publications.
- Kozinets, R. V. (2020). *Netnography Unlimited: Understanding Technoculture using Qualitative Social Media Research*. Routledge.
- Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2018). Paradigmatic controversies, contradictions, and emerging confluences. In *The SAGE handbook of qualitative research* (pp. 108–150). Sage.
- Mayring, P. (2014). *Qualitative content analysis: Theoretical foundation, basic procedures and software solution*. Beltz. Retrieved from <https://nbn-resolving.org/urn:nbn:de:0168-ssolar-395173>
- McKinsey & Company. (2025, August 12). What's trending in white goods? Durable, efficient, and affordable. McKinsey & Company. Retrieved from <https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/whats-trending-in-white-goods-durable-efficient-and-affordable>.
- Özkan, P., Süer, S., Keser, İ. K., & Kocakoç, İ. D. (2020). The effect of service quality and customer satisfaction on customer loyalty: The mediation of perceived value of services, corporate image, and corporate reputation. *Journal of Internet Applications and Management*, 11(1), 5–24.
- Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the co-creation of value. *Journal of the Academy of Marketing Science*, 36(1), 83–96.
- Piller, F. T., Vossen, A., & Ihl, C. (2012). From social media to social product development: The impact of social media on co-creation of innovation. *Die Unternehmung*, 66(1), 7–27.
- Pernice, G., Orso, V., & Gamberini L. (2023). Consumer perspectives towards sustainability information: Factors including price, quality/performance, design, aesthetic appeal, and energy efficiency. *IADIS International Journal on Computer Science & Information Systems*, 18(1), 1–15.
- Piller, F. T., & West, J. (2014). Firms, users, and innovation: An interactive model of coupled open innovation. In *New Frontiers in Open Innovation* (pp. 29–49). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199682461.003.0002>
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5–14.

- Royce, W. W. (1970). Managing the development of large software systems. *Proceedings of IEEE WESCON*, 26(8), 1-9.
- Salesforce. (2022). State of the connected customer (5th ed.). Salesforce Research. Retrieved from <https://www.salesforce.com/resources/research-reports/state-of-the-connected-customer/>
- Schreier, M. (2012). *Qualitative content analysis in practice*. Sage Publications.
- Schuckert, M., Liu, X., & Law, R. (2015). A segmentation of online reviews by language groups: How English and non-English speakers rate hotels differently. *International Journal of Contemporary Hospitality Management*, 27(6), 1261-1283.
- Schwandt, T. A. (2014). *The Sage dictionary of qualitative inquiry*. Sage.
- Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, 22(2), 159–170. [https://doi.org/10.1016/0148-2963\(91\)90050-8](https://doi.org/10.1016/0148-2963(91)90050-8)
- The Business Research Company. (2023). White Goods Global Market Report. Retrieved from <https://www.thebusinessresearchcompany.com/report/white-goods-global-market-report>
- Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237–246.
- TÜRKBEŞD. (2023). 2022 Sector Report. Retrieved from <https://www.turkbesd.org/tr/raporlar>
- Ulwick, A. W. (2002). Turn customer input into innovation. *Harvard Business Review*, 80(1), 91–97.
- We Are Social. (2023). Digital 2023: Turkey. We Are Social. Retrieved September 6, 2025, from <https://wearesocial.com/us/blog/2023/01/digital-2023/>
- Wittke, V., & Hanekop, H. (2011). New forms of collaborative innovation and production on the internet. SOFI.

CURRICULUM VITAE

Name and Surname: Yaşar Semih TOLUKAN

Languages: Turkish, English

Education History:

- 2025, Anadolu University, Graduate Education School, Master of Business Administration.
- 2021, Middle East Technical University, Industrial Engineering

Work Experiences:

- 2025 – Still
TUSAŞ Engine Industries
Eskişehir, Turkey
- 2020 – 2025
Beko Global
Eskişehir, Turkey