

**UNIVERSITY OF ECONOMICS - VARNA  
FACULTY OF MANAGEMENT  
MARKETING DEPARTMENT**

---

**Ivelina Slavova Ivanova-Kadiri**

**CUSTOMER RELATIONSHIPS MANAGEMENT THROUGH  
GENETIC DATA**

**A U T H O R ' S   A B S T R A C T**

**of the dissertation for the award of the educational and scientific  
degree Doctor (PhD) in the professional field 3.8. Economics, Doctoral  
Programme Marketing**

**Scientific Supervisor:  
Prof. Evgeni Petrov Stanimirov, PhD**

**Varna**

**2025**

The dissertation has a total volume of 276 pages, including 169 pages of main text (title page and table of contents – 3 pages, introduction – 12 pages, three chapters – 113 pages, conclusion – 4 pages), a list of references – 29 pages, and six appendices – 106 pages. The main text includes 17 tables and 22 figures. The list of references contains 296 sources in Bulgarian and English, including 12 internet publications.

The public defense of the dissertation will take place on **DD.MM.YYYY** at HH:00 in Hall 1 of the University of Economics – Varna, during a meeting of the Scientific Jury appointed by Rector's Order No. **XXXX** of **DD.MM.YYYY**. The materials related to the defense are available on the website of the University of Economics – Varna: <https://ue-varna.bg/>

**UNIVERSITY OF ECONOMICS - VARNA**  
**FACULTY OF MANAGEMENT**  
**MARKETING DEPARTMENT**

---

**Ivelina Slavova Ivanova-Kadiri**

**CUSTOMER RELATIONSHIPS MANAGEMENT THROUGH  
GENETIC DATA**

**A U T H O R ' S   A B S T R A C T**

of the dissertation for the award of the educational and scientific degree Doctor (PhD)  
in the professional field 3.8. Economics, Doctoral Programme Marketing

**Scientific Supervisor:**

Prof. Evgeni Petrov Stanimirov, PhD

**Scientific Jury:**

1. XXXX
2. XXXX
3. XXXx

**Reviewers:**

1. XXX
2. XXX

**Varna**  
**2025**

The dissertation has been reviewed and approved for defense by the Department of Marketing at the University of Economics – Varna. The author is a full-time doctoral student at the department.

Author: Ivelina Slavova Ivanova-Kadiri

Title: Customer Relationship Management through Genetic Data

Print run: 30 copies

Printed at the Printing Center of the University of Economics – Varna

# **I. GENERAL CHARACTERISTICS OF THE DISSERTATION**

## **1. Relevance and significance of the research**

In the context of growing digitalization and personalization of consumer behavior, genetic data are emerging as a strategic resource with high potential to transform customer relationships. The dissertation focuses on a timely and challenging topic: the integration of genetic data into customer relationship management (CRM) systems for the creation of hyper-personalized marketing strategies. The study examines both the technological and market potential of genetic data, as well as the main legal, regulatory, and ethical challenges associated with their use.

The relevance of the topic is determined by several factors: the exponential development of genetics, and more specifically, personalized medicine; the decreasing cost of genome sequencing; the growing demand for personalized products and services in sectors such as healthcare, nutrigenomics, and cosmetics; and the need for new models to build consumer trust in the digital-genomic environment. Organizations have begun to apply approaches of genetic marketing as a strategy for hyper-personalized value creation based on biological markers.

The significance of this work lies in the proposal of a conceptual and applied model for integrating genetic data into CRM systems. The research identifies not only the potential but also the boundaries of applicability of such data in marketing, taking into account individual, social, and regulatory aspects involved in the sharing of highly sensitive personal information. Through the conducted empirical analysis of consumer attitudes in Bulgaria toward sharing genetic data for business purposes, and the expert interviews with representatives of business and academia, the dissertation deepens the understanding of the conditions under which genetic data can become a sustainable marketing resource.

The study contributes to the development of a new niche in marketing theory and practice — the management of customer relationships through genetic profiling. It introduces a new perspective to the static CRM Diamond model (Mack, Mayo & Khare, 2005) and offers an expanded interpretation that incorporates indicators for regulatory and ethical monitoring as well as consumer digital awareness.

## **2. Object and subject of the research**

The **object** of the research in this dissertation is the contemporary models of customer relationship management in the context of the increasing use of personalized data, and more specifically, genetic information.

The **subject** of the research is the strategic and analytical application of genetic data within CRM systems, aimed at enhancing customer value, building trust, and developing transformed business models that take into account the ethical, regulatory, and communicational dimensions of hyper-personalization.

## **3. Aims and objectives of the research**

The research aim of the dissertation is to explore the possibilities for transforming customer relationship management systems through the integration of genetic data, by analyzing consumer attitudes, marketing strategies for hyper-personalization, and the ethical, legal, and communicational challenges arising from the use of sensitive biological information.

In a broader sense, the dissertation seeks to raise public awareness regarding the practices of collecting, storing, and sharing personal genetic data with third parties for business purposes. It also aims to encourage consumers to take a proactive role in making informed decisions related to the purchase and use of genetics-based products and services. Increased awareness and critical consumer engagement can contribute to better market structure and regulation, improve the quality of offered solutions, and minimize ethical risks. In this way, the research establishes a foundation for innovation in the sector and creates opportunities for the sustainable development of personalized marketing practices.

The main objectives that specify and operationalize the research aim can be summarized as follows:

1. To trace the transformation of the concept of customer relationship management within the digital-genomic environment, by analyzing the phenomenon of genetic marketing and the mechanisms of market realization of genetics-based products.
2. To examine consumer attitudes toward sharing genetic data for the purposes of hyper-personalized products and services, and to identify key factors influencing trust and willingness to participate in such business practices.

3. To identify opportunities for integrating genetic data into customer relationship management systems and, on this basis, to propose a model for the transformation of CRM systems.

#### **4. Main research thesis**

The main thesis of the dissertation is that the integration of genetic data into customer relationship management has the potential to support the creation of hyper-personalized products, but at the same time poses serious risks to the protection of consumers' personal data, which may reduce their trust in goods and services based on customer genetic information. This risk can be significantly mitigated if companies apply the "market/product" criterion to identify suitable opportunities and integrate genetic data into CRM systems that have been specifically transformed for this purpose.

#### **5. Research methods**

To achieve the stated research objectives, the dissertation applies a combined methodological approach that integrates general research methods (description, analysis, synthesis, induction, and deduction) with specific qualitative and quantitative techniques.

The qualitative stage includes in-depth interviews with experts in the fields of marketing, genetics, and ethics. The results were processed through thematic coding and used to identify key indicators.

In the subsequent quantitative stage, a survey was conducted among Bulgarian citizens, using scales to measure trust, awareness, and ethical attitudes. The collected data were analyzed with IBM SPSS Statistics (version 28.0).

#### **6. Main limitations**

The study of the problem in its entirety and depth, in accordance with the stated research objective, was conducted while taking into account the following limitations:

**First limitation.** The sensitivity of the topic and the low levels of consumer trust restricted access to representative and complete information. The fear of misuse of genetic data led

some respondents to decline participation in the survey, which affected the scope and reliability of the empirical results.

**Second limitation.** The generalization of results is constrained by the specific geographical and cultural context of the research. The conclusions cannot be directly applied to other countries or market segments without further adaptation.

**Third limitation.** The institutional and technological environment is not commensurate with the complexity of genetic data management. There is a lack of unified regulations, a stable legal framework, and accessible technological infrastructure, particularly for small and medium-sized enterprises. This hinders the practical application of transformational CRM models.

**Fourth limitation.** The proposed interaction matrices and the dynamic model of the CRM Diamond have not yet been validated in a real business environment, which calls for future empirical studies to confirm their applicability. In this sense, the results should be interpreted as an analytical foundation for future modeling of CRM practices in the digital-genomic environment. Additional barriers include the high implementation costs of the required technologies, which are difficult for small and medium-sized enterprises to afford, as well as the general reluctance of organizations to share best practices and experience. The latter impedes the development of common standards and collective knowledge within the industry.

These limitations do not diminish the importance of the results; rather, they emphasize the need for the continuation of the scientific debate and for expanding the empirical base to validate and refine the proposed models.

## **6. Information sources**

The information necessary to achieve the goals and objectives set in the dissertation was obtained through:

- A review of publications by Bulgarian and international authors in the fields of customer relationship management, genetics, and genetic marketing;
- Secondary data from regulatory documents of the EU, Bulgaria, Canada, the United States, Australia, Japan, and China, as well as national legislation and international ethical policies on the protection of sensitive data;

- Secondary data from statistical and market reports, and publications by institutions and companies operating in the field of genetics-based products and services;
- A comparative review of models and theoretical concepts applicable to the construction of a transformational CRM model based on genetic data;
- Primary data collected by the author through empirical research, including in-depth interviews with experts in genetics and marketing, and a survey among Bulgarian citizens exploring attitudes toward sharing genetic data, perceived benefits for the development of hyper-personalized products and services, and perceived institutional protection.

## **7. Approbation**

The dissertation has been discussed at meetings of the Department of Marketing at the University of Economics – Varna. Parts of the research have been presented at international scientific conferences and published as papers and articles in specialized academic journals.

## **II. STRUCTURE AND CONTENT OF THE DISSERTATION**

The dissertation includes a title page, table of contents, introduction, three chapters, conclusion, references, and appendices, comprising a total of 276 pages. Of these, 1 page is the title page, 2 pages are the table of contents, 12 pages are the introduction, 113 pages constitute the main body, 4 pages are the conclusion, 29 pages contain the list of references, and 106 pages comprise the appendices.

In accordance with the stated aim and research objectives, the dissertation is structured as follows:

Introduction

Chapter One. Transformation of Customer Relationship Management in the Digital-Genomic Environment

1.1 Evolution of the Concept of Customer Relationship Management

1.1.1 A Brief History of the Understanding of the Customer

1.1.2 Strategic Framework of Customer Relationship Management in the Context of Digitalization

1.1.3 Specifics of the Diagnostic Process in Customer Relationship Management

1.2 Genetic Data as a Strategic Tool for Hyper-Personalization in Customer Relationship Management

1.2.1 Technological Dimensions of Consumer Profiling

1.2.2 Genetic Data as a Marketing Resource

1.2.3 Development of Genetic Marketing

1.3 Market Dimension of Genomic and Genetic Products and Services

1.3.1 Market Dynamics of Genomic Products and Services

1.3.2 Business Models of Genetic Products

1.3.3 Market Expansion of Direct-to-Consumer Genetic Tests

1.3.4 Ethical Challenges in the Application of Genetic Data for Business Purposes

Chapter Two. Study of Consumer Attitudes Toward Sharing Genetic Data for Business Purposes

2.1 Consumer Attitudes Toward Sharing Genetic Data: A Global Context

2.2 Expert Assessments of the Integration of Genetic Data into CRM: In-Depth Expert Interviews

2.2.1 Methodology of the Research

2.2.2 Synthesis of the Results from the Thematic Analysis

2.2.3 Verification of Research Hypotheses

2.3 Empirical Study of Consumer Attitudes Toward Providing Genetic Data for Business Purposes in Bulgaria

2.3.1 Descriptive Analysis

2.3.2 Correlation Analysis

2.3.3 Chi-Square Test for Independence

2.3.4 Cluster Analysis

2.3.5 Methodological Limitations and Validity of the Quantitative Study

2.4 Comparison of the Results from Expert Interviews and the Survey

Chapter Three. Integration of Genetic Data into Customer Relationship Management Systems

3.1 Discussion of the Results from the Empirical Research

3.1.2 Relation to Theoretical Models and Previous Studies

3.1.3 Vectors of Influence on Behavioral Attitudes

3.2 Models of Interaction Between Consumer Segments and Business Models in Genetic

## Marketing

3.2.1 Consumer Profiles in the Context of Sharing Genetic Data for Business Purposes

3.2.2 Compatibility Matrix Between Consumer Profiles and Business Models

3.3 Transformation of CRM Models Through the Integration of Genetic Data

3.3.1 Selection of a Conceptual CRM Model for the Integration of Genetic Data into Customer Relationship Management

3.3.2 Justification for Selecting the CRM Diamond as the Base Model

3.3.3 Dynamization of the CRM Diamond Model Through the Integration of Genetic Data

3.3.4 Adaptation of the Diagnostic Toolkit in the Dynamized CRM Diamond Model

## Conclusion

## References

## Appendices

### **III. SUMMARY OF THE DISSERTATION**

#### **Introduction**

The introduction substantiates the relevance and significance of the research topic addressed in the dissertation, which concerns the integration of genetic data into marketing approaches within the context of modern customer relationship management. The object and subject of the research are presented, followed by the formulation of the main research aim and objectives. The author's thesis is defined, and the methodological framework of the study is outlined. The limiting conditions under which the dissertation was developed are specified, along with the theoretical, methodological, and practical contributions of the research.

#### **Chapter One**

##### **Transformation of Customer Relationship Management in the Digital-Genomic Environment**

Chapter One presents a conceptual overview of the development of customer relationship management (CRM) from its origins to the present day. It clarifies the characteristics of human genetic data as a new type of information resource and a strategic asset. The chapter identifies the key features of genetic data, their marketing applications, and the challenges associated with their use. It also provides an analysis of market dynamics in the sector of genetic products and services, encompassing leading business models, technologies, and regional specificities.

##### **Section 1 – Evolution of the Concept of Customer Relationship Management**

This section traces the evolution of CRM as a managerial and marketing paradigm — from transactional approaches to models based on long-term value and digital ecosystems. Emphasis is placed on the changes resulting from technological progress. The conceptual transformations that CRM has undergone since its emergence are examined, and a developmental outlook is provided through 2040. A theoretical overview of established CRM definitions is presented, along with the role of diagnostic processes within CRM systems.

The diagnostic process includes the analysis of all customer touchpoints along the customer journey map, which serves as the starting point for applying a customer-oriented CRM

strategy. The integration of the customer interaction cycle, as proposed by Allam (2022), is shown to enable a clearer delineation of areas for strategic diagnosis. In the context of customer relationship management, **trust** is highlighted as a central strategic resource that extends beyond the functional role of CRM systems, linking them to the social and ethical legitimacy of business processes.

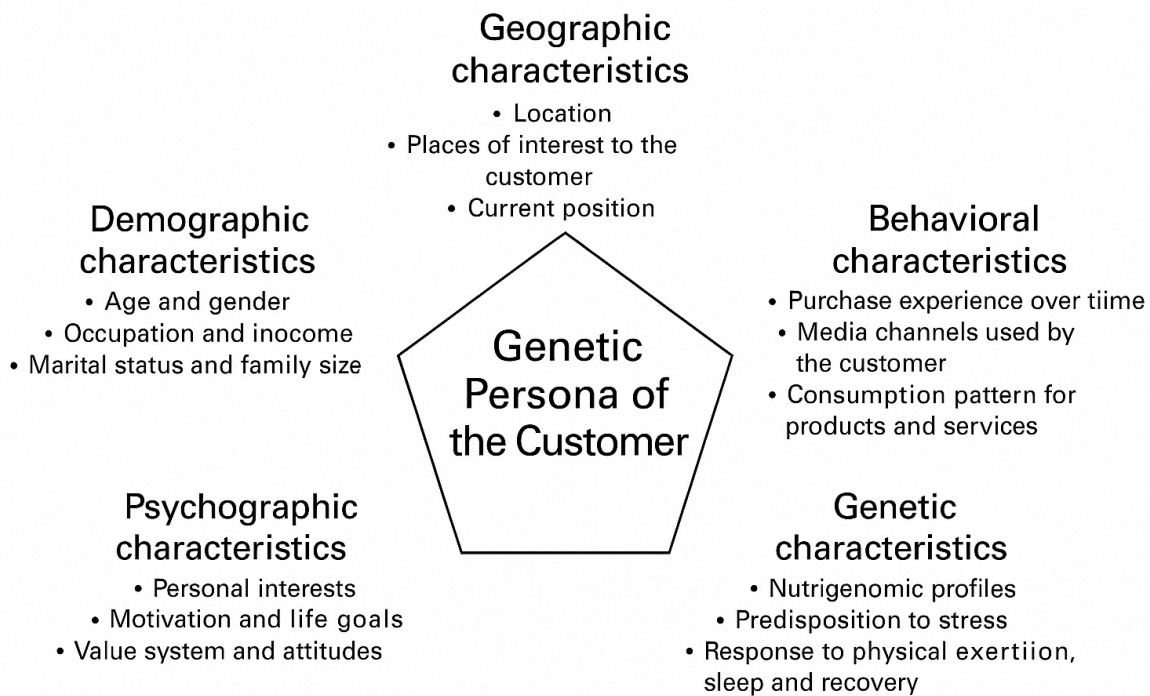
## **Section 2 – Genetic Data as a Strategic Tool for Hyper-Personalization in Customer Relationship Management**

This section explores the potential of genetic information to become a new resource for value creation within CRM systems. The focus is on the technological prerequisites that enable the transition from personalization to hyper-personalization — a process grounded in artificial intelligence, big data analytics, and bioinformatics. The biological characteristics of genetic data are analyzed as a unique source for predicting consumer preferences, behavioral tendencies, and health predispositions.

Genetic data are defined as a new paradigm and a starting point that determines all other consumer attributes. Following Daviet et al. (2020), four key characteristics of genetic data are outlined, which represent essential considerations for their use in marketing:

1. Ease of identification. Consumers can be identified with minimal amounts of genetic information.
2. Information about the entire family lineage. Genetic data provide information about an individual's relatives, including those who have not explicitly consented to share their own data.
3. Predictive capacity for consumer behavior. It is possible to infer a wide range of behavioral and psychological characteristics.
4. Immutability. The human genome remains stable throughout an individual's lifetime, changing only in cases of genetic mutation caused by extraordinary environmental factors.

The concept of the “**genetic persona**” is introduced as a new element of the customer profile that extends beyond classical demographic and psychographic dimensions, enabling the development of more precise and scientifically grounded marketing strategies (Figure 1).



*Source: Expanded from Kotler et al. (2020: 136)*

**Figure 1. Dimensions of the customer's genetic persona in the context of hyper-personalized marketing**

The adapted model enhances traditional frameworks by incorporating objective biomarkers, thereby enabling the transformation of CRM strategies into a predictive and adaptive model. It is concluded that genetic information should be regarded as a central element in the construction of the customer persona. Its implementation within CRM systems allows the development of more precise and scientifically grounded marketing approaches tailored to the unique biological context of each customer.

A definition of genetic marketing is proposed as a new strategic marketing approach to customer relationship management, based on voluntarily provided genetic data and oriented toward the hyper-personalization of products and services. The following opportunities for precise targeting and hyper-personalization are identified:

- Precise market segmentation;
- Strengthening customer loyalty;

- Creation of innovative business models;
- Anticipation of consumer needs.

Genetic data are conceptualized as a strategic asset, capable of advancing personalization by integrating biological and behavioral indicators into hyper-personalized offerings with potentially high consumer value.

### **Section 3 – Market Dimension of Genomic and Genetic Products and Services**

This section presents the market context of genomic and genetic products and services, focusing on the dynamics and scale of the direct-to-consumer genetic testing industry. The main market segments identified include:

- Diagnostic tests for hereditary diseases and oncological predispositions;
- Direct-to-consumer (DTC) genetic products;
- Access to genomic databases and profiling services, often offered through subscription models;
- Integrated platforms for predictive analytics and personalized medicine.

The market for genomic products and services demonstrates sustained and dynamic growth, reaching approximately USD 25.3 billion in 2023, with projections exceeding USD 60 billion by 2030, at an average annual growth rate of over 15%. Within this sector, the direct-to-consumer genetic testing market is expanding particularly rapidly, valued at USD 1.95 billion in 2024 and expected to grow to USD 9.57 billion by 2034, at a CAGR of 17.9%.

Regionally, North America holds a dominant share of around 62%, while Europe accounts for approximately 17.5% of the global market, limited by a stricter regulatory framework. In terms of product categories, predictive genetic tests represent about 19.5% of revenues (2024), and whole-genome sequencing exceeds 40% of the market.

A taxonomy of business models has been developed according to service type, distribution channel, data ownership, and usage patterns. The directions of market expansion are analyzed, and the “price–privacy” model, adapted from Thiebes et al. (2020), is presented to illustrate the strategic tension between affordability and the protection of sensitive data.

Particular emphasis is placed on the ethical challenges associated with the sharing of genetic data for business purposes. Specific aspects related to informed consent are examined,

including the right of withdrawal and the right to be forgotten, ownership and control over data, secondary use and resale, as well as risks of de-anonymization, profiling, and discrimination.

## **Chapter Two**

### **Study of Consumer Attitudes Toward Sharing Genetic Data for Business Purposes**

Chapter Two presents a two-stage empirical study examining consumer attitudes toward sharing genetic data for business purposes. The research integrates qualitative and quantitative methods in order to describe, explain, and predict consumer willingness to participate in the development of hyper-personalized products. The conceptual framework is built around three key axes — trust, awareness, and perceived benefits — exploring their role as predictors of behavioral intentions in the context of sharing sensitive data.

The dissertation tests the following hypotheses:

**H1.** Consumers are willing to provide their genetic data for personalized products and services, but only under strict rules for data protection and transparency in their use.

**H2.** Trust in companies that process genetic data depends on clear policies for protection, control, and consumer awareness.

**H3.** Financial incentives can influence consumers' willingness to share genetic data, but ethical considerations remain a key factor.

#### **Section 1 – Consumer Attitudes Toward Sharing Genetic Data: Global Context**

This section systematizes international findings regarding consumers' willingness to share genetic data beyond traditional health-related motives. Global trends reveal a persistent interest in personalized solutions, coupled with strong sensitivity to the risks of de-anonymization, secondary use, unauthorized third-party sharing, and discrimination. Distinct regional differences are observed: in North America, the higher market share of direct-to-consumer genetic testing correlates with greater consumer openness, while in Europe, stricter legal and ethical frameworks are associated with more conservative attitudes toward data sharing.

Across contexts, three constants are identified:

1. Informed consent must be transparent, specific, and revocable.

2. Control over the data life cycle (including the right of withdrawal and the “right to be forgotten”) is a necessary condition for trust.
3. Financial incentives have limited effect when ethical guarantees and corporate responsibility are poorly defined or inadequately communicated to consumers.

This synthesis provides a reference framework for the national-level research conducted in Bulgaria and for interpreting expert assessments.

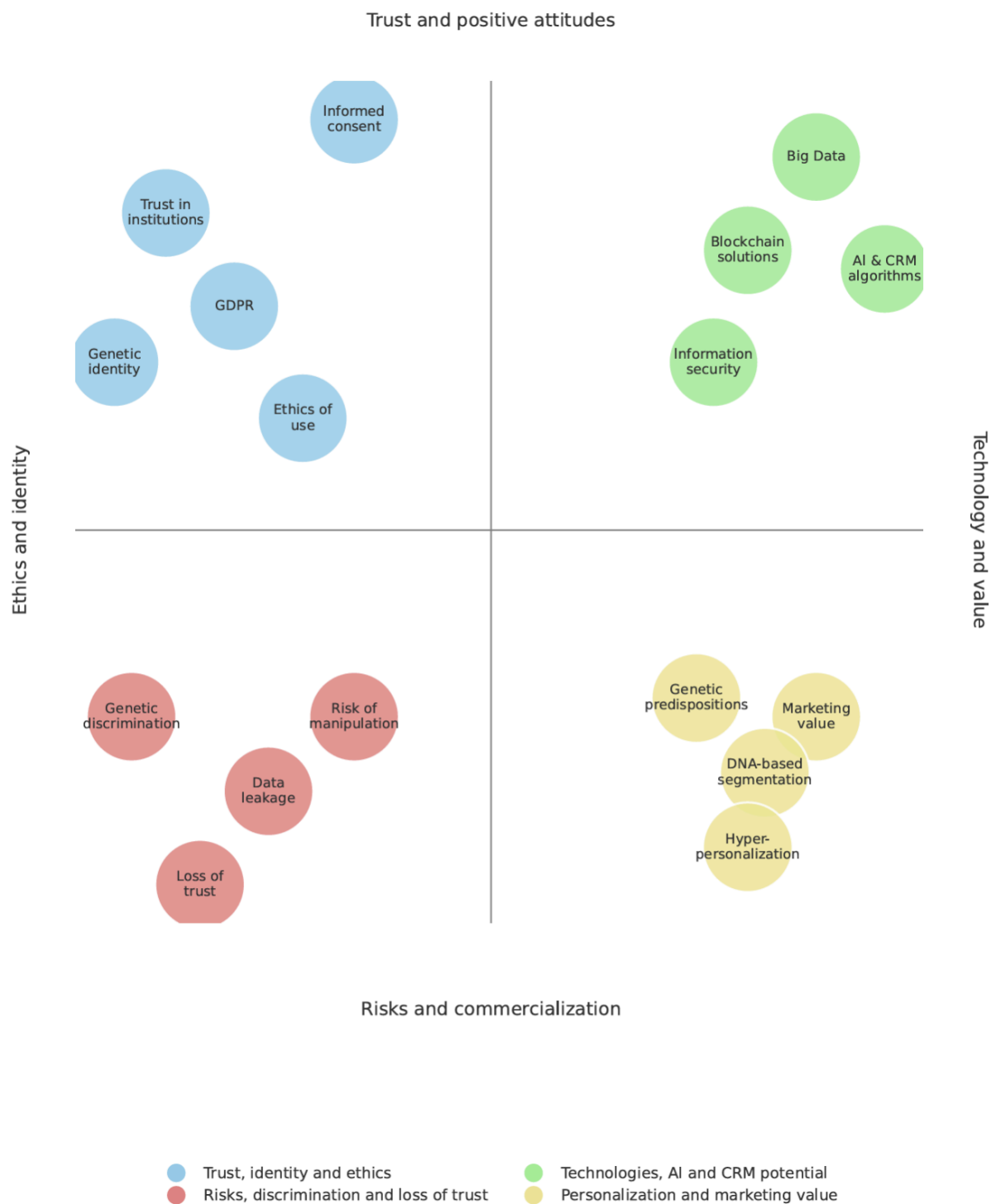
## **Section 2 – Expert Assessments of the Integration of Genetic Data into CRM: In-Depth Expert Interviews**

This section presents the results of a qualitative study based on semi-structured in-depth interviews with seven experts in the fields of genetics, personalized medicine, and marketing, conducted between April 2024 and July 2025 through online, email, and in-person formats. The interviews were analyzed using thematic coding and metric quantification, identifying five main thematic cores:

1. trust and transparency;
2. legal and ethical framework;
3. technological innovation and risk;
4. commercialization and hyper-personalization;
5. data misuse and discrimination.

The quantified analysis of the seven expert interviews demonstrates a high level of terminological and argumentative density. The average Terminological Depth Index (TDI) is 4.57, indicating a rich specialized vocabulary and conceptual maturity in the discussions. The coverage rate is also high — five out of seven experts addressed at least 80% of the thematic areas. The strongest consensus emerged regarding Hypothesis 2, related to the need for ethical mechanisms and informed consent, supported by high scores on both the Consensus Index (mean 4.49) and the Quality of Argumentation Index (mean 4.61). For Hypothesis 3, the agreement and argumentation values are slightly lower, particularly among experts with biomedical backgrounds, who tended to express skeptical or neutral positions.

The following conclusion is drawn: willingness to share genetic data depends on clear regulation, informed consent, and effective control mechanisms; trust in companies is a function of transparency and protection against discrimination; financial incentives have limited effect without ethical guarantees (Figure 2).



*Source: Author's analysis*

**Figure 2. Conceptual map of semantic cores extracted from the in-depth expert interviews**

Differences are observed regarding market applicability. Experts from the biomedical sciences are more optimistic about the potential of personalized solutions, while marketers are more cautious due to identified regulatory and reputational risks. The general conclusion is that the key barriers are not so much technological as they are ethical, legal, and communication-related. These results serve as an analytical framework for interpreting the subsequent quantitative study among Bulgarian consumers.

In paragraph 3—**Empirical study of consumer attitudes regarding the provision of genetic data for business purposes in Bulgaria**—the results of a survey are presented. A survey was conducted among 437 Bulgarian respondents (online questionnaire, 09.02–31.03.2025), focusing on attitudes towards providing genetic data for business purposes. The following methods were applied for data analysis and processing: descriptive analysis, correlation analysis, chi-square test for independence, and cluster analysis.

The results reveal a strong polarization among respondents: 41.9% would share their data voluntarily for scientific purposes, while 40.0% reject such sharing under any circumstances. 56.5% express willingness to purchase genetics-based products, yet 70% are highly concerned about the storage and protection of personal data. Expectations for strict regulation and transparent policies are high; however, the correlation analysis did not identify a statistically significant relationship between perceived institutional protection and actual willingness to share data. Financial incentives also showed no significant effect. Age was found to correlate with willingness to share ( $\chi^2$  significant), with the highest readiness observed among respondents aged 31–45, and the lowest among those 61 and older. The cluster analysis identified three distinct consumer profiles:

- “Pioneers” – individuals demonstrating high trust and strong interest in personalized solutions;
- “Cautious realists” – conditionally willing to share data only when clear guarantees are provided;
- “Conservatives” – those firmly opposed, representing a high-risk trust profile.

Despite methodological limitations, the study confirms several key insights: there is a pronounced interest in consuming hyper-personalized products, yet this is overshadowed by prevailing concerns over potential data misuse or unauthorized third-party sharing.

The analysis shows that the assumption of enhanced value through personalization holds true only when consumers have full awareness, control, and the right to refuse participation. This

finding necessitates a reformulation of the traditional concept of value in customer relationship management.

#### **Section 4 – Comparison of the Results from Expert Interviews and the Survey**

This section presents a comparative analysis between the two research methods. The potential of genetic data for creating personalized products is confirmed by the results of both studies. Survey data — with over 73% of respondents supporting the integration of a clear legal and regulatory framework — align with the opinions expressed by the interviewed experts.

Both approaches confirm the polarization of attitudes, ranging from willingness to participate to categorical refusal. The main barriers remain fear of misuse and the lack of institutional protection. Financial incentives are perceived as secondary, while ethical considerations are identified as the decisive factor.

The conclusion is that the integration of genetic data into customer relationship management is promising, yet it requires a robust ethical and legal framework to ensure protection and build lasting trust.

### **Chapter Three**

#### **Integration of Genetic Data into Customer Relationship Management Systems**

Chapter Three presents the author's adaptation of the CRM Diamond model developed by Mack, Mayo, and Khare (2005), achieved through the integration of genetic data. The empirical factors identified as influencing consumers' willingness to share genetic information are applied to the framework. The chapter introduces a matrix positioning of consumer segments in relation to different business models and proposes guidelines for adapting diagnostic tools within the context of genetic marketing.

#### **Section 1 – Discussion of the Results from the Empirical Research**

This section synthesizes the key findings from the survey and expert interviews. It traces the roles of trust, awareness, and perceived benefit as core determinants of consumers' readiness to share genetic data. The results are compared with established theoretical models, and

several vectors of influence and conflict zones are identified—particularly those related to ethics, risk, and the balance between individual rights and corporate interests.

The vectors of trust, motivation, and awareness are analyzed as interdependent regulators of consumer behavior. The absence of any one of these factors undermines the others, thereby limiting the potential for the sustainable use of genetic data in business contexts.

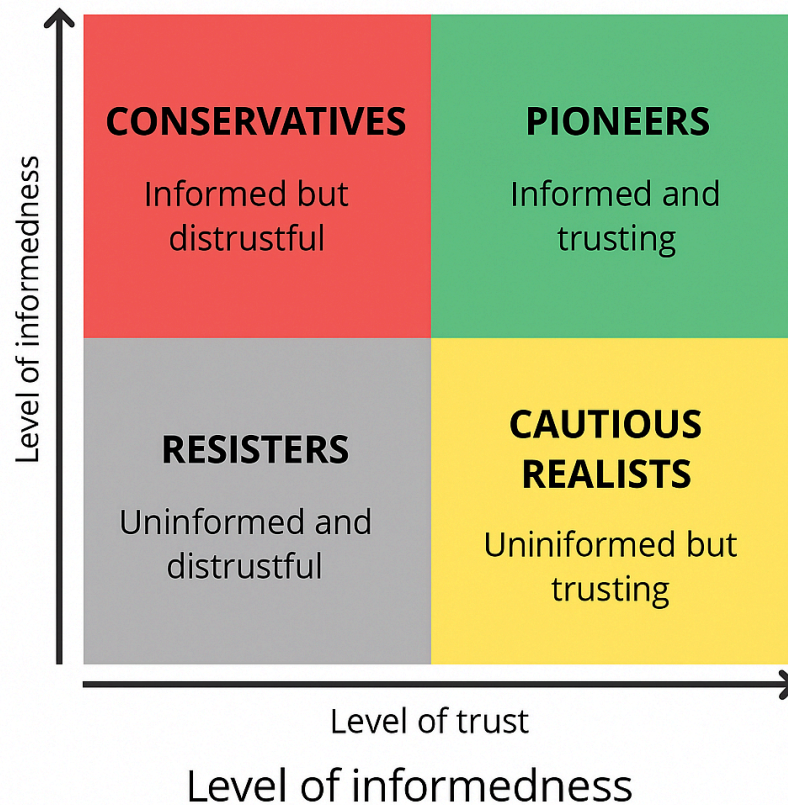
## **Section 2 – Models of Interaction Between Consumer Segments and Business Models in Genetic Marketing**

This section presents the compatibility matrices developed by the author, which enable the strategic positioning of organizations in relation to different types of customers. These matrices systematize the connection between consumer profiles and suitable business models, highlighting critical points for building trust and establishing long-term relationships.

The matrix of consumer profiles for sharing genetic data for business purposes (Figure 3) categorizes consumers into four main segments, each requiring a specific approach to communication, ethics, and CRM strategy:

- Informed and Trusting (*Cluster “Pioneers”*) – open to innovation and willing to share data when benefits and transparency are clear;
- Informed but Distrustful (*Cluster “Cautious Realists”*) – analytically minded, requiring strong guarantees and institutional oversight;
- Uninformed but Trusting – an intermediate group not represented in the results of the empirical study, theoretically significant for further research;
- Uninformed and Distrustful (*Cluster “Conservatives”*) – resistant to participation, motivated by privacy concerns and risk aversion.

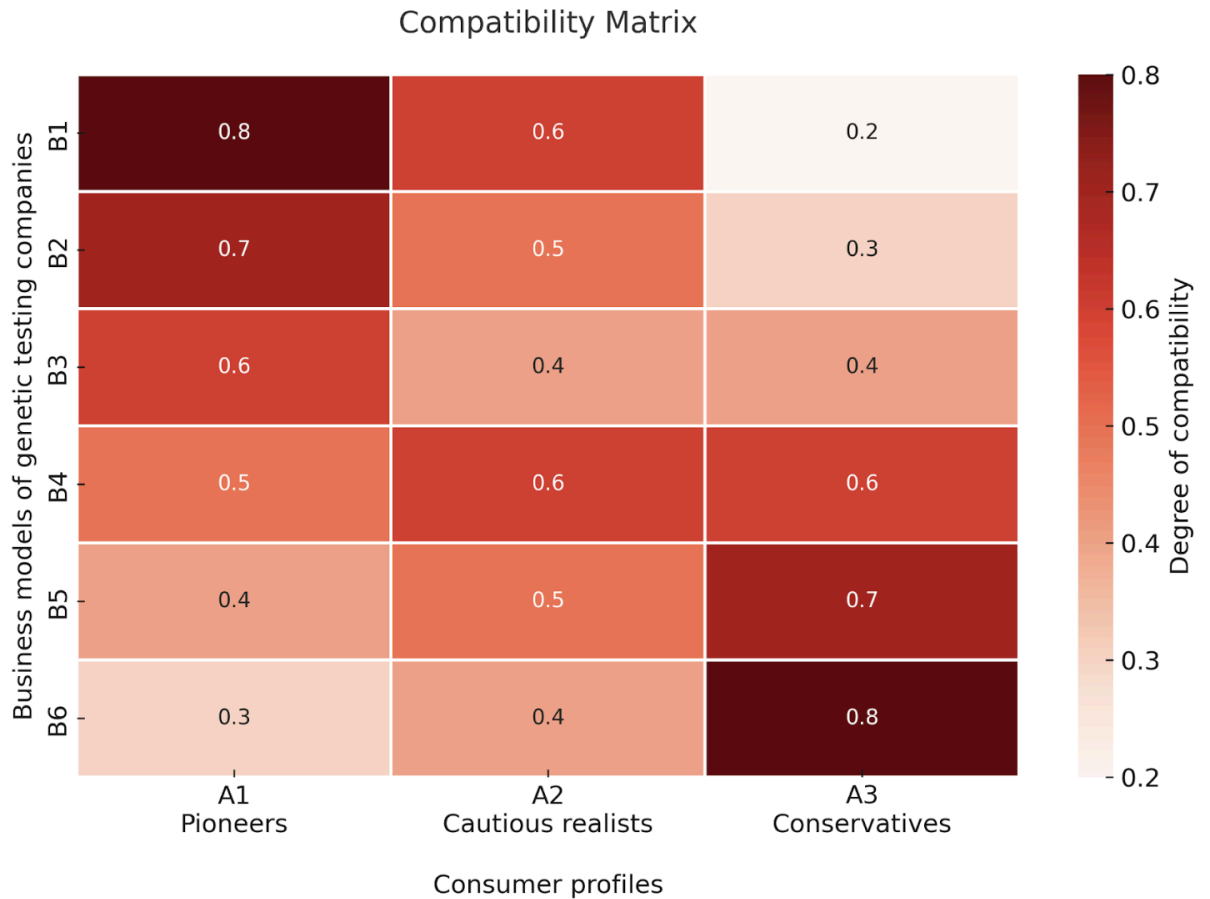
Each quadrant of the matrix defines a distinct behavioral archetype, illustrating how ethical awareness, information levels, and trust jointly determine the consumer’s openness to data sharing and the organization’s appropriate strategic response.



*Source: The Author, based on own data*

**Figure 3. Matrix of consumer profiles for sharing genetic data for business purposes**

The compatibility matrix between consumer profiles and business models visualizes the relationship between different types of consumers and the strategic approaches of companies offering genetic products (Figure 4). It enables the identification of zones of high, moderate, and low compatibility, thereby outlining the conditions under which trust and sustainable engagement can be established. The analysis shows that the pioneers align with innovation-driven and health-oriented business models; the cautious realists require clearly defined regulations and transparency; and the conservatives are compatible only with approaches that guarantee maximum protection and minimal risk. Thus, the matrix serves as a strategic tool for positioning organizations in relation to consumer attitudes and for formulating ethically and legally grounded CRM strategies.



- B1: Budget genetic tests for direct-to-consumer enthusiasts
- B2: Genetic tests with high privacy for enthusiasts
- B3: Genetic tests for extracting specific information
- B4: General health-related genetic tests
- B5: Basic low-cost genomics
- B6: Full genome sequencing with limited data processing

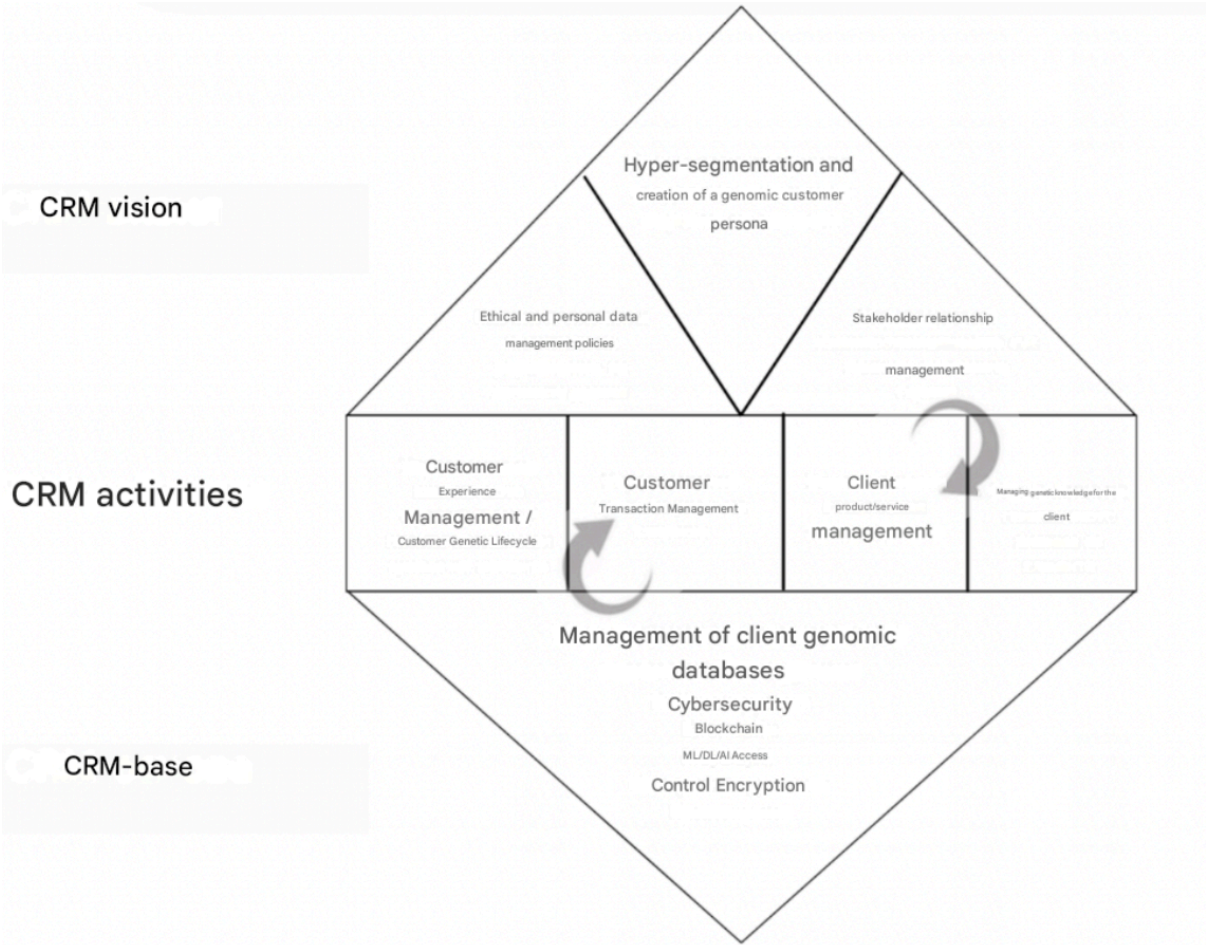
*Source: The Author; based on own data*

**Figure 4. Matrix visualization of the heatmap type showing the compatibility between consumer profiles and the business models of direct-to-consumer (DTC) genetic testing companies**

Different scenarios of match and tension between consumer expectations and the market strategies of companies have been identified, which underscores the necessity of adaptive marketing practices. In this way, the matrices fulfill the role of a strategic tool for positioning organizations relative to consumer attitudes and for the formulation of ethically and legally grounded CRM strategies.

In paragraph 3—**Transformation of CRM Models with the Integration of Genetic Data**—the choice of the CRM Diamond of Mack, Mayo & Khare (2005) is argued as the basic

model for the purposes of the scientific work. Based on the presented research results, the necessity to upgrade traditional CRM models was identified by including new functional elements that reflect the specificity of genetic information as a strategic resource. Based on a comparative analysis among established models, the choice of the CRM Diamond was justified as the most appropriate strategic framework, given its strategic depth, flexibility, and possibility for the integration of ethical and regulatory requirements. In the dynamized version of the model, new elements have been introduced—genetic profiles, hyper-segmentation, policies for transparency and control, as well as AI-based tools for predictive analysis (Figure 5).



Source: Ivanova-Kadiri (2024:136)

**Figure 5. Dynamization (or Dynamic Adaptation) of the CRM Diamond with Genetic Data**

The thus transformed CRM-Diamond creates conditions for the building of hyper-personalized strategies. Special attention is paid to the ethical framework and the necessity for data protection mechanisms, which turns the model into a conceptual and

applied tool for sustainable customer relationship management in the context of genetic marketing.

In addition, the necessity for a revision and expansion of the traditional diagnostic metrics used in CRM systems when genetic data is integrated into them is considered. It is emphasized that classical indicators for satisfaction, loyalty, and behavioral analysis are insufficient in the context of sensitive biogenetic information. Therefore, the introduction of new metrics is proposed to account for three key directions: the degree of correspondence between the genetic profile and the products, the level of ethical and regulatory compliance, as well as the effectiveness and return on innovation. This adaptation aims to ensure a more complete and balanced assessment of the interaction between clients and organizations, combining technological precision with ethical responsibility.

Based on the analyses and interpretations performed, it can be concluded that the thesis of the dissertation research is confirmed. The integration of genetic data into customer relationship management represents a promising approach for the creation of hyper-personalized products and services. At the same time, however, this process poses serious questions about ethics, security, and consumer rights. Fears of misuse of personal information and the lack of clearly regulated protection mechanisms emerge as the main barriers to consumer trust.

## **Conclusion**

In conclusion, it is summarized that consumers in Bulgaria demonstrate moderate to high interest in personalized products and services based on a genetic profile. At the same time, a low level of trust is observed towards companies that process sensitive biological data. The main factors influencing consumer attitudes are perceived institutional protection, the degree of informedness, the transparency of business practices, and expected individual benefits.

It is established that clearly distinguishable behavioral clusters exist among Bulgarian consumers, as well as polarized attitudes regarding the ethical use of genetic information. Based on the results obtained, a transformational model of customer relationship management was developed, which upgrades the classic CRM-Diamond of Mack, Mayo & Khare (2005). The new conceptual framework retains the basic structure of the original but includes additional functional elements: integration of genetic profiles into consumer segmentation, expanded parameters of the value proposition, and the use of predictive algorithms for personalized interactions. The model offers a new perspective for analysis, based on the compatibility between genetic characteristics and marketing approaches, which assists organizations in optimizing their product portfolio and assessing consumer openness to personalized solutions. The development is considered applicable within the strategic CRM policy of organizations, and not as a standalone marketing strategy, and aims to modernize and expand the toolkit of existing CRM systems through the integration of genetic data into the processes of segmentation and personalization.

Based on the conclusions drawn, recommendations were made for the development of ethical policies and traceable mechanisms for informed consent when working with genetic data, the introduction of supranational regulatory measures adapted to the digital environment, as well as the conducting of further research into the effectiveness of communication strategies tailored to consumers' genetic profiles.

A topic for future research was identified, namely—the potential of behavioral genetics as an analytical tool in marketing, with a focus on the effectiveness of communication strategies tailored to bio-behavioral profiles. According to the scientific literature, certain traits of consumer behavior, such as risk-taking propensity, innovativeness, trust, and entrepreneurial activity, may have a genetic conditioning. The implementation of principles from behavioral genetics could expand the understanding of consumer motivation during purchase decision-making and support the creation of personalized marketing messages with a higher degree of behavioral compatibility. This direction would open new horizons in strategic communication but also poses ethical and psychological challenges. It is necessary to further investigate the psychosocial effect of receiving marketing messages based on sensitive genetic information, especially in cases related to establishing identity, origin, or generating medical and health status. Such analyses presuppose a multidisciplinary approach, in which the biological, cultural, and emotional perspectives should take into account the good practices of responsible and sustainable organizations.

#### **IV. REFERENCE OF THE MAIN CONTRIBUTIONS IN THE DISSERTATION WORK**

The following scientific contributions have been identified:

In **theoretical terms**, the developed concept of the "genomic persona" enriches the framework of customer relationship management by offering a new understanding of the customer not only as a demographic or psychographic category, but also as a subject whose genetic markers can be used for hyper-personalization. It is proven that the assumption of increased value through personalization is valid only if the consumer has full informedness, control, and the right to refusal, which suggests a reformulation of the traditional concept of value in CRM.

In **methodological terms**, the author proposes and tests an expanded marketing toolkit (in-depth interviews, quantitative methods, and indicators for measuring trust). This approach expands the existing research arsenal and can be applied in future academic and applied studies in the field of genetic marketing.

In **practical-applied terms**, the created compatibility matrices between consumer profiles and business models, as well as the dynamized model of the CRM-Diamond adapted to the digital-genomic environment, allow for the precise positioning of segments, the identification of vectors of influence, and the building of sustainable CRM strategies.

## V. PUBLICATIONS RELATED TO THE DISSERTATION WORK

### Scientific Articles:

1. Ivanova-Kadiri, I. (2023). Decoding the DNA of customer relationships: The role of marketing diagnostics in the digital age. *Izvestiya: Journal of Economics, Management and Informatics*, 67(2), 101–109. Science and Economic Publishing House. <https://doi.org/10.56065/IJUEV2023.67.2.101>

2. Ivanova-Kadiri, I. (2024). Customer genetic data for sustainability and innovation management. In *ERAZ 2023: Knowledge based sustainable development: 9th International Scientific Conference* (pp. 169–176). Association of Economists and Managers of the Balkans – Udekom Balkans. <https://doi.org/10.31410/ERAZ.S.P.2023.169>

### Scientific Conference Papers:

1. Ivanova-Kadiri, I. Genetic Marketing: (R)evolution In Customer Segmentation. Ремаркетинг на реалността = Remarketing the Reality: Сборник с доклади: Международна научна конференция, посветена на 25 г. от създаването на кат. "Маркетинг" при ИУ - Варна, България, 17 юни 2022, Варна : Наука и икономика, 2023, 322-329., ISBN(печатно) 978-954-21-1134-4, ISBN(онлайн) 978-954-21-1134-4 <https://ue-varna.bg/uploads/filemanager/303/publishing-complex/2022/Reality-remarketing-2022.pdf>

2. Ivanova-Kadiri, I. Customer Genetic Data for Business: Empowering Your Genes for Sustainable Product Development. 7th FEB International Scientific Conference: Strengthening Resilience by Sustainable Economy and Business - Towards the SDGs, 16 May 2023, Maribor, Slovenia, Maribor, Slovenia : University of Maribor, 2023, 619-627., ISBN(онлайн) 978-961-286-736-2 / <https://doi.org/10.18690/um.epf.3.2023>

3. Ivanova-Kadiri, I. Innovative Models of Art Products through Genetic Marketing. *Management and Marketing Issues in Art: XI International Scientific and Practical Conference, 17-18.11.2023, Plovdiv*, Academy of Music, Dance and Fine Arts, 2024, 116-124.,

ISSN (Print) 2603-462X, ISSN (Online) 2815-519X / <https://doi.org/10.5281/zenodo.11472819>  
[https://www.artacademyplodiv.com/amtii/UMP-Art/MNK%20Upravlenski%20i%20marketin%20govi%20problemi%20v%20izkustvoto%20\(2023\).pdf](https://www.artacademyplodiv.com/amtii/UMP-Art/MNK%20Upravlenski%20i%20marketin%20govi%20problemi%20v%20izkustvoto%20(2023).pdf)

## **VI. DECLARATION OF ORIGINALITY**

I declare that the present dissertation work is entirely an author's product and that in its development, no external publications or works were used in violation of their copyrights.