

Comparative Analysis between Intel Corporation and AMD in the Context of the IT Industry in Romania

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Abstract

This scientific work delves into the remarkable surge of international trade in high-tech products observed globally over the past decade. Emphasizing their pivotal role in European Commission policies, particularly in environmental and climate-related discussions concerning our digital future and economic stability, the study provides key insights from Eurostat's analysis of extra-EU high-tech product trade. Noteworthy points include a steady 4.9% average annual increase in total trade outside the EU from 2011 to 2021, with high-tech products' share in total trade growing from 14.7% to 18.1% over the same period. China emerges as the principal partner for imports into the EU, while the United States takes the lead in exports from the EU.

Eurostat's data further reveals a substantial rise in total extra-EU trade (imports + exports) in high-tech products, surging from €482 billion EUR to €777 billion EUR between 2011 and 2021, indicating an average annual growth rate of 4.9%. Imports escalated from €248 billion to €392 billion, experiencing an average annual growth rate of 4.7%, whereas exports showed slightly stronger growth, increasing from €234 billion to €385 billion, with an average annual growth rate of 5.1%. This led to a reduction in the European Union's trade deficit, plummeting from €14 billion EUR to €7 billion EUR.

Additionally, the study examines the IT industry in Romania, characterized by steady and sustainable growth according to the Employers' Association of the Software and Services Industry (ANIS). The industry's value soared from 4.6 billion euros in 2015 to over 9 billion euros in 2022, signifying a substantial impact on the country's gross domestic product (GDP), reaching 7%. Bucharest holds the largest market share at 60%, followed by Cluj at 18%.

To provide comprehensive insights into the Romanian microprocessor market, the study employed an online questionnaire from December 3, 2022, to January 3, 2023. Participants were invited to respond to 22 questions, 16 of which were closed-ended, while 6 were open-ended. The questionnaire primarily focuses on gathering objective data related to the microprocessor market in Romania, particularly from the perspectives of industry leaders INTEL and AMD.

Following the administration of the aforementioned questionnaire, a total of 485 responses were gathered from individuals aged between 18 and 70 years old. The aggregation of the received responses yielded valuable information on various aspects including gender distribution, age demographics, professional fields, budget allocation for processors, annual spending on IT components, and preferences for processor manufacturers, among others. These insights provide a comprehensive overview of the Romanian

microprocessor market, offering crucial data for companies operating in this industry to make informed decisions and develop effective strategies.

Keywords: Market Study, Microprocessors, Intel, Amd, Information Technology

1. Introduction

International trade in high-tech products has witnessed significant growth over the past decade worldwide. Additionally, high-tech products play a crucial role in the policy objectives of the European Commission, particularly concerning the environment and climate, as discussions revolve around "our digital future" and "jobs and the economy."

According to Eurostat, concerning extra-EU trade in high-tech products, the following points can be highlighted:

- Total trade outside the EU in high-tech products increased between 2011 and 2021 at an average annual rate of 4.9%.
- The share of high-tech products in total trade grew from 14.7% in 2011 to 18.1% in 2021.
- China was the primary partner for imports of high-tech products into the EU.
- The United States was the primary partner for exports of high-tech products from the EU.

Furthermore, according to Eurostat, between 2011 and 2021, the total trade outside the EU (imports + exports) in high-tech products rose from €482 billion EUR to €777 billion EUR, reflecting an average annual growth rate of 4.9%. During the same period, imports increased from €248 billion to €392 billion, with an average annual growth rate of 4.7%, while exports grew slightly more, from €234 billion to €385 billion, with an average annual growth rate of 5.1%. Consequently, the trade deficit of the European Union decreased from €14 billion EUR to €7 billion EUR.

2. Methods

According to the Employers' Association of the Software and Services Industry (ANIS), the IT industry in Romania is experiencing steady and sustainable growth. Thus, in the year 2015, the value of the IT market was 4.6 billion euros, and by the year 2022, it surpassed the value of 9 billion euros. This growth is also highlighted by the fact that the impact of the IT sector on the gross domestic product (GDP) has reached 7%. The regions with the largest shares in the IT market are: Bucharest, accounting for 60%, and Cluj, accounting for 18%.

In order to analyze the evolution of the IT market in Romania from the perspective of microprocessors from INTEL and AMD, an online questionnaire was conducted between December 3, 2022, and January 3, 2023.

As such, participants were invited to respond to 22 questions, out of which 16 questions were closed-ended, and 6 questions were open-ended. The proposed questionnaire primarily contains

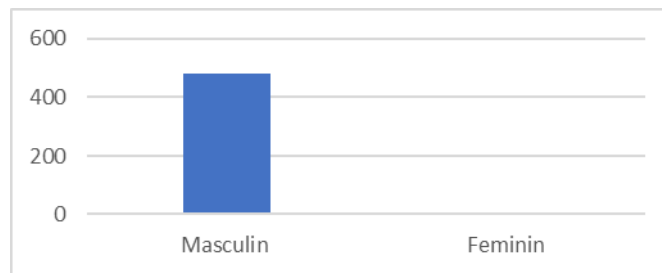
questions aimed at collecting data related to objective information about the microprocessor market in Romania.

3. Results

After conducting the aforementioned questionnaire, 485 responses were collected from individuals aged between 18 and 70 years old. The centralization of the received responses provided the following information:

At the first question, 485 responses were obtained, revealing that males predominate with a percentage of 98.8%.

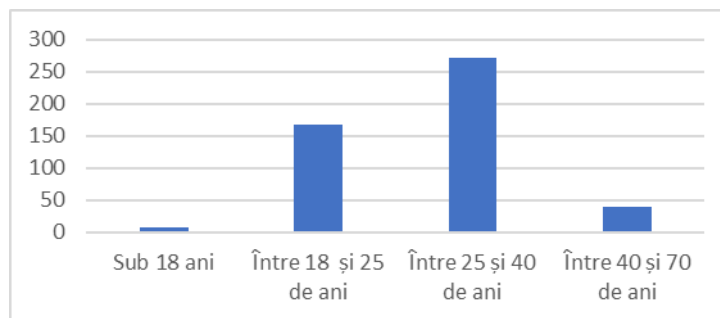
Figure no. 5: Gender of Microprocessor Buyers



Source: Own contribution

For question number 2, 485 responses were obtained. It can be observed that 7 participants are under 18 years old, 1.4% are between 18 - 25 years old, 34.4% are between 25 - 40 years old, and 55.9% are between 40 - 70 years old, with an 8.2% proportion.

Figure no. 6: Age Distribution

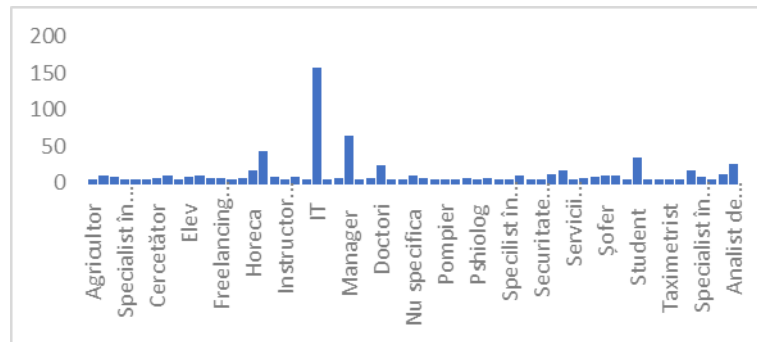


Source: Own contribution

Question number 3 refers to the respondents' professional field of activity. 485 responses were obtained for this question. It was observed that the IT sector predominates with a percentage of

29%, as microprocessors offer an efficient and powerful way to control and manage electronic functions, as well as the ability to develop systems and devices.

Figure no. 7: Professional Field of Respondents



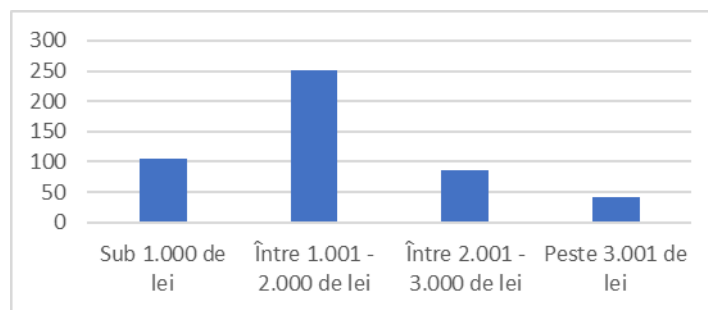
Source: Own contribution

Question number 4 addressed the price paid for a high-performance processor. 485 responses were obtained for this question:

- 8.5% of respondents allocate a budget of over 3,001 lei.
- 17.7% of respondents allocate a budget of 2,001 - 3,000 lei.
- 52% of respondents allocate a budget of 1,001 - 2,000 lei.
- 21.9% of respondents allocate a budget of less than 1,000 lei.

The allocated amount for processors varies, as each person has a different usage scenario. For instance, a programmer may not be able to perform their tasks as effectively with a processor costing less than 1,000 lei. The obtained responses can also be visualized in the following figure:

Figure no. 8: Amounts Paid for High-Performance Processors

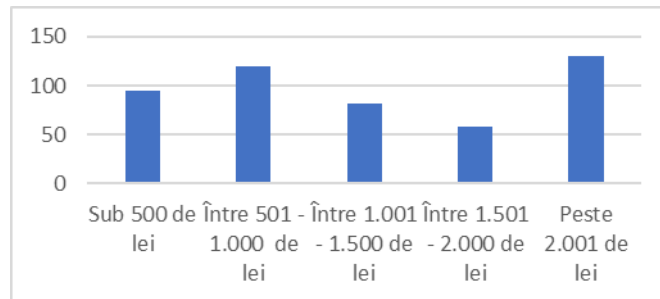


Source: Own contribution

Question number 5 refers to the annual spending on IT components. 485 responses were obtained for this question. Thus, 26.8% of respondents allocate over 2,001 lei annually on IT components,

while 12% of respondents allocate 1,501 - 2,000 lei annually, and 16.9% of respondents allocate 1,001 - 1,500 lei annually on IT components.

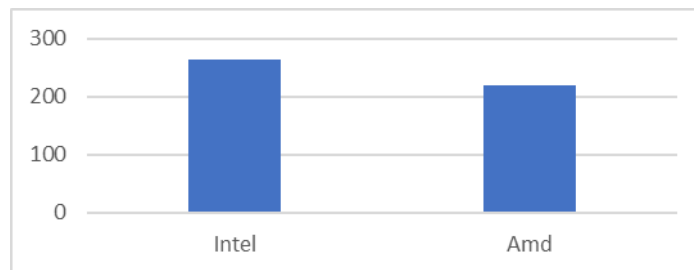
Figure no. 9: Annual Spending on IT Components



Source: Own contribution

By applying question number 6, the aim was to identify the company from which respondents purchase processors. 485 responses were obtained for this question. As a result, 54.6% of them prefer the Intel brand due to its successes, while 45.4% prefer the AMD brand due to the innovations brought by their microprocessors from 2017 to the present. The obtained responses can also be visualized in the following figure:

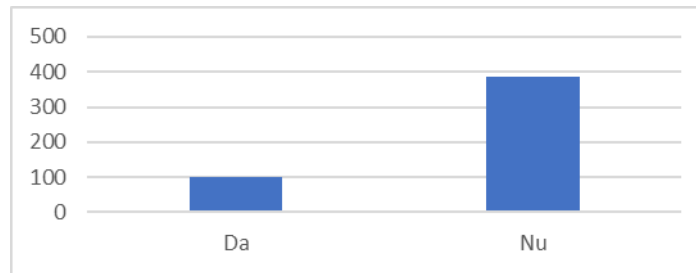
Figure no. 10: Preferred Processor Manufacturer



Source: Own contribution

For question number 7, 485 responses were obtained. Analyzing the received responses, it was observed that 79.4% of respondents seek help from others when purchasing a microprocessor, while 20.6% of respondents do not consider others' opinions when buying a microprocessor.

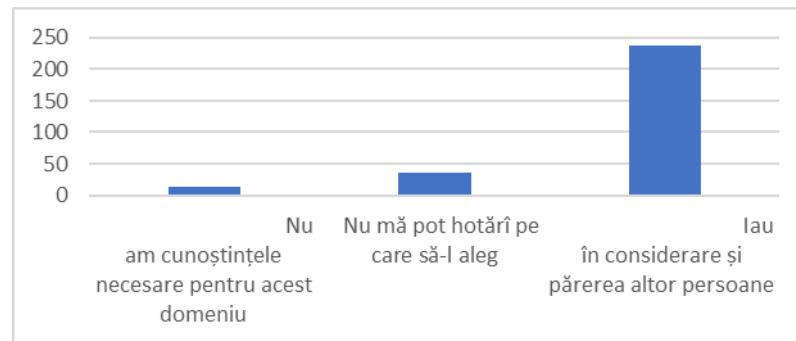
Figure no. 11: Assistance in Microprocessor Purchases



Source: Own contribution

Question number 8 addressed the reasons for seeking assistance when purchasing a processor. 286 responses were obtained for this question. Analyzing the question "What is the reason for seeking help when purchasing a processor?", it was noted that 83.2% of respondents consider others' opinions when buying a microprocessor, while 12.2% of respondents are undecided on which microprocessor to choose, and 4.5% of respondents lack the necessary knowledge to make a purchase decision.

Figure no. 12: Reasons for Seeking Assistance in Processor Purchases



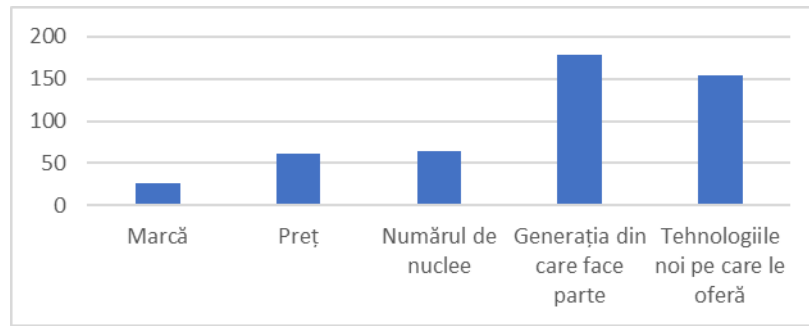
Source: Own contribution

By applying question number 9, the aim was to identify what respondents look at first when purchasing a processor. The results from the 485 responses were as follows:

- 31.8% of respondents consider new technologies brought by the microprocessor;
- 36.7% of respondents look at the generation to which the microprocessor belongs;
- 13.2% of respondents consider the number of cores the microprocessor has;
- 12.8% of respondents consider the price;
- 5.6% of respondents choose the microprocessor based on the brand;

Therefore, each respondent has a pattern for choosing the microprocessor they need to meet their requirements.

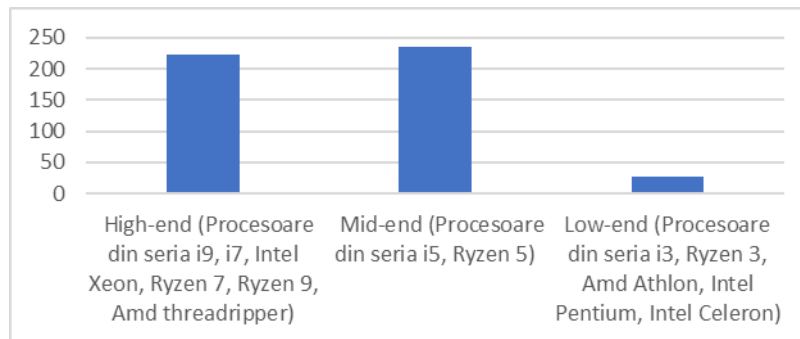
Figure no. 13: Criteria for Choosing a Microprocessor



Source: Own contribution

By applying question number 10, 485 responses were obtained. Analyzing the received responses, it was highlighted that 46% of respondents own a high-end processor, while 48.7% of respondents own a mid-end processor, and 5.4% of respondents own a low-end processor.

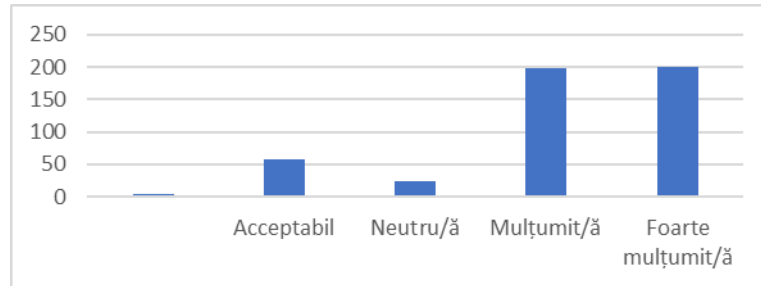
Figure no. 14: Categories of Microprocessors Owned



Source: Own contribution

Question number 11 aimed to assess the respondents' level of appreciation for microprocessors created by AMD. 485 responses were obtained for this question. As a result, 41.4% of respondents are very satisfied, while 41% of respondents are satisfied, 4.9% of respondents are neutral in terms of processor satisfaction, and 11.8% of respondents consider the performance of the processor acceptable. Additionally, 0.8% of respondents are dissatisfied with the owned processor.

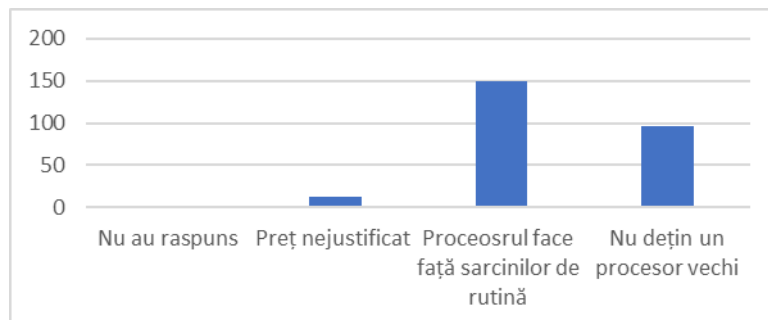
Figure no. 15: Level of Appreciation for AMD Microprocessors



Source: Own contribution

Question number 12 aimed to identify if respondents own an older microprocessor and the reason for not replacing it. 261 responses were obtained for this question. Thus, 57% of respondents specify that the processor handles routine tasks and therefore replacing it is not necessary, while 37% of respondents do not own an older processor, and 5% of respondents own an older processor due to the unjustifiably high price of current processor models compared to their performance. Furthermore, 1% of respondents did not provide a valid response.

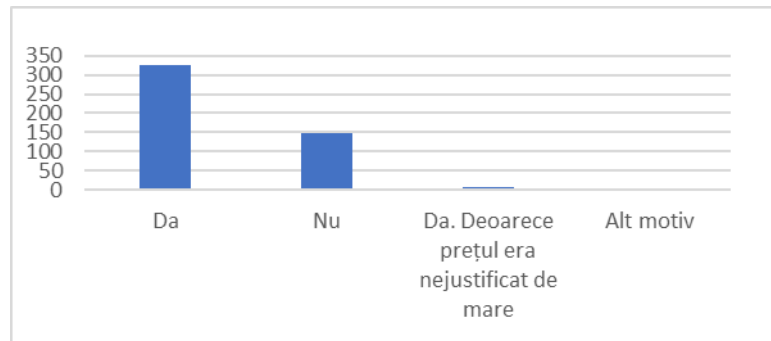
Figure no. 16: Ownership of an Older Generation Microprocessor and Reason



Source: Own contribution

By applying question number 13, the aim was to identify respondents who have switched between the two brands. 485 responses were obtained for this question. After analysis, it was shown that 66.8% of respondents have had a processor from both companies, 30.7% of respondents have not had a processor from both brands, while 1.9% of respondents have oscillated between the two brands based on price and 0.6% of respondents have oscillated between the two brands for other reasons.

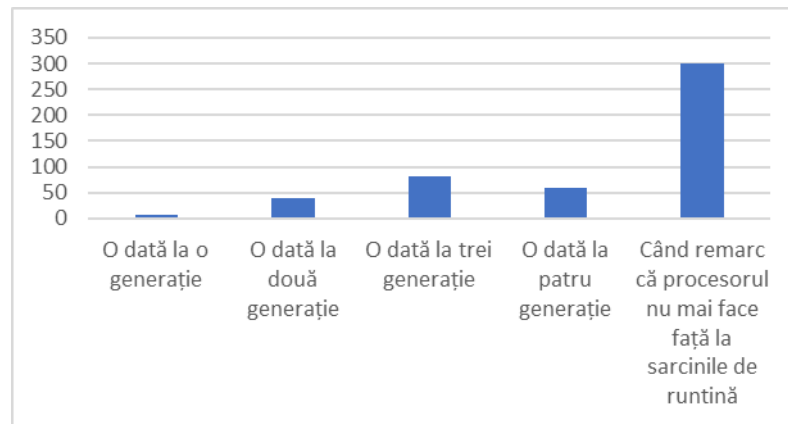
Figure no. 17: Oscillation Between Processor Brands



Source: Own contribution

Question number 14 aimed to determine how often respondents change their microprocessor. 485 responses were obtained for this question. Upon analysis, it was observed that 62% of respondents change the processor when it no longer meets routine tasks, while 8% of respondents change once every two generations, compared to 17% of respondents who change once every three generations. Additionally, 1% of respondents change the processor once per generation.

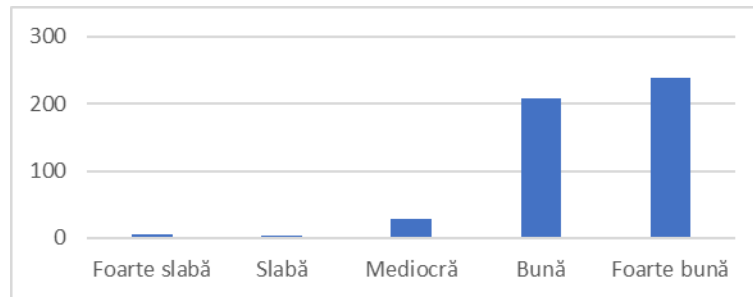
Figure No. 18: Frequency of Processor Changes Among Respondents



Source: Own Contribution

Question No. 15 refers to the level of appreciation that respondents have regarding the evolution of microprocessors created by AMD. For this question, 485 responses were obtained. After conducting the analysis, it was highlighted that 49.3% of respondents consider the evolution of AMD processors to be very good, while 43.1% of respondents consider the evolution to be good. Additionally, 5.8% of respondents consider it mediocre, 0.8% of respondents consider the evolution to be poor, and 1% of respondents consider the evolution to be very poor.

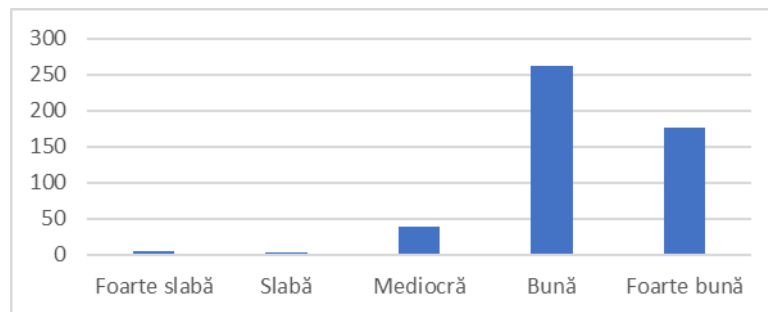
Figure No. 19: Level of Appreciation from Respondents Regarding Microprocessors Created by AMD



Source: Own Contribution

Question No. 16 refers to the choices made by the AMD manufacturer regarding architecture from 2017 to 2022 from the perspective of respondents. For this question, 485 responses were obtained. Thus, 36.3% of respondents consider the evolution of Zen architecture to be very good, 54.2% of respondents consider the evolution to be good, while 7.8% of respondents consider the evolution to be mediocre, and 0.6% of respondents consider the evolution to be poor. Additionally, 1% of respondents consider the evolution to be very poor. Despite the negative opinions representing 1% and 0.6% regarding the evolution of the Zen architecture, the majority of respondents consider the evolution of Zen architecture from 2017 to the Zen3+ series to be good to very good, represented by percentages of 54.2% and 36.3%.

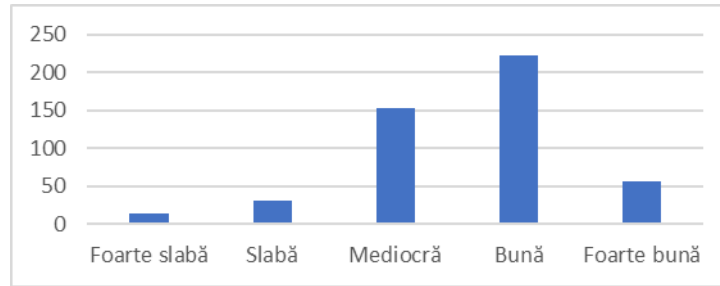
Figure No. 20: Respondents' Opinions on the Evolution of AMD's Architecture



Source: Own Contribution

Question No. 17 refers to the level of appreciation that respondents have regarding the evolution of microprocessors created by Intel. For this question, 478 responses were obtained. After conducting the analysis, it was highlighted that 11.9% of respondents consider the evolution of Intel processors to be very good, 46.4% of respondents consider the evolution to be good, while 32.2% of respondents consider the evolution to be mediocre. Additionally, 6.5% of respondents consider it poor, and 2.9% of respondents consider the evolution to be very poor.

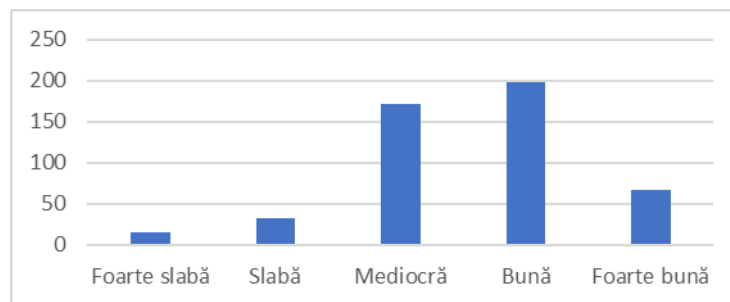
Figure No. 21: Level of Appreciation from Respondents Regarding Microprocessors Created by Intel



Source: Own Contribution

Question No. 18 refers to the choices made by the Intel manufacturer regarding architecture from 2017 to 2022 from the perspective/opinion of respondents. For this question, 485 responses were obtained. After conducting the analysis, it was highlighted that 13.8% of respondents consider the evolution of Intel processors from 2017 to 2022 to be very good, 41% of respondents consider the evolution to be good, while 35.3% of respondents consider the evolution to be mediocre. Additionally, 6.6% of respondents consider it poor, and 3.3% of respondents consider the evolution to be very poor.

Figure No. 22: Level of Appreciation from Respondents Regarding Microprocessors Created by Intel



Source: Own Contribution

4. Discussion

This paper presents an analysis of consumer needs in Romania regarding the IT industry. The analysis focuses on two major companies operating in the computer components market: Intel and AMD.

To analyze the requirements of the Romanian IT components market, we conducted an online evaluation questionnaire to determine the target audience for both companies and the extent of product usage. The results indicate the following:

The market research conducted revealed that out of the 485 respondents surveyed, 62% use products from Intel. This indicates that Intel holds a significant market share among IT component users in Romania. Analyzing the target audience, it was found that 43% of respondents fall within the age group of 18 to 25 years, representing the largest proportion within the Intel user group. On the other hand, 35% of respondents belong to the age group of 26-35 years, while 15% are in the 36-45 age group, and 7% are above 45 years old.

Regarding AMD, 38% of respondents use products from this company. Although AMD's market share is smaller than that of Intel, there is still a significant segment of users who prefer AMD products. As for the target audience of AMD, 27% of respondents are in the 18-25 age group, 40% in the 26-35 age group, 25% in the 36-45 age group, and 8% are above 45 years old.

Thus, it can be observed that Intel's target audience is more diverse in terms of age group distribution compared to AMD's target audience. This information about product usage and target audience characteristics can be extremely valuable for both companies in shaping their marketing strategies and product development. Companies can adapt their promotional and communication campaigns to effectively target their primary audience, namely individuals aged 18 to 35. Additionally, these data can provide insights into the specific preferences and needs of users in different age categories, enabling companies to develop products and services that better meet these requirements.

5. Conclusions

The market share of Intel is higher than that of AMD among the surveyed respondents. The target audience for both companies primarily consists of individuals aged 18 to 35, representing the majority of IT component users in Romania. The obtained information can serve as a guide for companies in developing and promoting products, thereby maximizing their market impact and meeting customer needs.

6. Bibliographic References

- [1] Badford Tim, Cooke Roger – Probabilistic risk analyses. Foundations and methods, Cambridge University Press, 2003
- [2] Craiu M. – Statistică Matematică. Teorie și probleme (Mathematical Statistics. Theory and problems) - Ed. MatrixRom, Bucharest1999
- [3] Craig Cochran – Using quality objectives to drive strategic performance improvement – Quality Digest Magazine (Nov. 2000)
- [4] Dinu, E. – ”Strategia firmei: teorie și practică” – Ed. Economică, 2000
- [5] Vasile A. Munteanu (Coordonator), Mariana Bucur-Sabo, Mihai Irimia, Anca Butnariu - Economie, Editura Sedcom Libris, Iași 2005
- [6] Monica Dudian (coordonator) – Economie, Ed. a II-a, Editura C.H. Beck, București, 2008

- [7] Monica Dudian (coordonator) – Economie, Editura All Beck, București, 2005
- [8] Feleaga, N. și Ionașcu, I. – “Contabilitate financiară” – Ed. Economică, 1993
- [9] Gherghina, R., Duca, I. (2012), Gestiunea financiară a întreprinderii, Editura Universitară, București
- [10] George T. Doran, There's a S.M.A.R.T. way to write management's goals and objectives, published in Management Review Magazine, November 1981
- [11] Gh. Crețoiu, Viorel Cornescu, Ion Bucur - Economie, Editura All Beck, București, 2003
- [12] Halpern, P., Weston, J.F. și Brigham E. – ”Finante manageriale” - Ed. Economica, 1998
- [13] Hardle W., Simar L., Applied Multivariate Statistical Analysis, Springer, 2007,
- [14] Ifrim, A. M., 2016, Mathematical tools in quality engineering – Application in project management, Lap Lambert Publishing, Saarbrücken, Germany
- [15] Ionica Oncioiu , Ioana Duca, Mirela Anca Postole și Marilena Ciobanasu - A Comparative Study of Financing Innovation Capacity for Romanian SMEs in a Global Economy- IGI Global, 2018
- [16] J. Rodney Turner, Stephen J. Simister, Manual Gower de Management de proiect, Publishing House Codecs, 2004
- [17] Luțac Gheorghe, Popescu Cristian și Brăilean Tiberiu - Economie. Teste, probleme, răspunsuri, Ed. Sedcom Libris Iași, 1999
- [18] Năstase Carmen – Microeconomie , Editura Universității Suceava, Suceava, 2006
- [19] Năstase Carmen, Boghean Carmen, Mihai Popescu, Adrian Liviu Scutariu - Microeconomie: Concepte Fundamentale, Editura Didactică și Pedagogică, București, 2009
- [20] Oprescu Gheorghe - Microeconomie, Macroeconomie, Editura Economică, București, 2000
- [21] Popescu C-tin, Gavrilă Ilie, Ciucur Dumitru – Teorie economică generală, - volumul I: Microeconomie, București, Editura ASE, 2005
- [22] Popescu M.O, Panait V. – Calitatea produselor și fiabilitatea (Product Quality and Reliability)– Ed. MatrixRom, Bucharest 2003
- [23] Elena Știrbu, Economie – Elemente de Teorie Fundamentală, Elemente de Microeconomie, Elemente de Macroeconomie, Editura Sedcom Libris, Iași, 2005
- [24] Vaduva Florin, Managementul strategic al firmei, București, Editura Universității "Titu Maiorescu" , 2005.
- [25] White, G., Sandhi A. și Fred, D. – “The Analysis and use of financial statements” – John Wiley and Sons, second edition, 1998

Resurse internet

- [26] <http://www.insse.ro> (accesat aprilie 2023)
- [27] www.ft.com, Financial Times
- [28] <https://www.amd.com/en/corporate-responsibility/environmental-sustainability> (accesat aprilie 2023)