

## Article

# The Degree of Adoption of Business Intelligence in Romanian Companies—The Case of Sentiment Analysis as a Marketing Analytical Tool

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**Abstract:** The structural changes in the public communication space through the advent of the Internet and the further development of online commerce culminate today with the explosion of blockchain techniques and social networks. This communication space was quickly taken over by marketing tools, as demonstrated by the many marketing campaigns dedicated to these new communication channels. The development of online commerce and the emergence of social networks have allowed consumers to efficiently search for brands/products/services, compare them, express their point of view on them, and even give them grades. Due to the explosion of relevant data online, the changing business environment needs attention to interpret and extract relevant information. The application of sentiment analysis to public reaction in the online environment provides the researcher with how the authors of the analyzed texts (clients/beneficiaries) express themselves regarding the studied reference (product/service/organization/social theme and a feature of them). Along with the other metrics present in marketing, including digital marketing, the reports in the analysis panels of google analytics and social networks, sentiment analysis instantly provides the general and competitive context in which the product/service/theme evolves. In this article, two types of research have been conducted to highlight the benefits felt, but also the degree of knowledge, implementation, and use of sentiment analysis in online marketing analysis. One of the types of research was qualitative, carried out on 10 participants (specialists in the field of marketing), with the help of an interview guide. Qualitative research aims to find out the level of knowledge of sentiment analysis and the general degree of digitalization of Romanian companies, an indicator considered critical in the new post-pandemic business environment. The second research was quantitative and used to develop analysis by structural equations. For this, a questionnaire applied to a sample of 108 respondents was used. Through the analysis by structural equations, a conceptual model was developed that presents the main factors that are related to others and that contribute to the satisfaction of the users of the analysis of feelings for obtaining marketing data.

**Keywords:** digitalization; sentiment analysis; big data; marketing; digital marketing; E-WoM; CGC; internet; social networking; blockchain



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## 1. Introduction

### *Structural Changes in the Field of Manifestation of Marketing Communication*

The structural change of the space of communication and expression of marketing through the appearance of the online communication environment and the spectacular evolution of social networks changed the freedom of expression of marketing communication, integrating from early adoption stages new media and using them creatively.

According to statistics, over 50 million businesses use Facebook as a social media platform to undertake commercial activities such as supplying products and services, running promotional campaigns, running adverts, gathering client feedback, and so on. Customers' involvement and contact with businesses via social media accounts for 30% of the budget of the market's top companies [1]. As a result, the size of the marketing communication space has expanded and relocated, as in an authentic "global village" [2]. According to research reported by Global Index, 82% of respondents interviewed globally in 2021 also use the online environment to access news [3]. On the other hand, supply chains are encountering new concerns and challenges as organizations strive for greater global competitiveness. Increasing pressure is being applied to minimize operational costs, improve quality, improve customer service, and assure supply continuity. Supply chains nowadays are characterized by greater responsiveness to changes in customer behavior, a focus on globalization, the integration of distribution and sales channels, and the broad adoption of new communication technology [4].

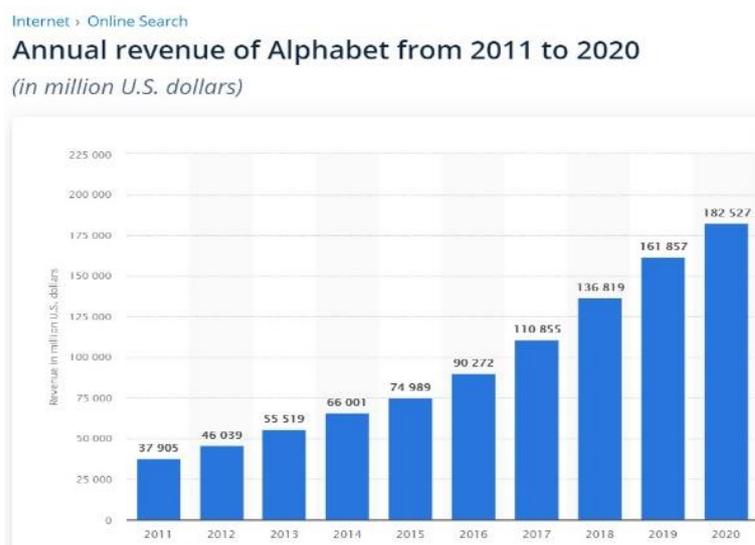
The percentage of the total number of respondents is essential to us, especially because the online environment has become the primary information channel/medium globally, with 18% more respondents declaring that they are informed through the online environment than through Television. In addition, other resources in the literature confirm that the diversity of online supply has a positive influence on sustainable consumption behaviors, especially when innovative practices are high [5].

More than that, after the COVID-19 pandemic, the increase in the number of users accelerated due to the need to maintain social distance. As a result, the number of internet users has increased significantly compared to previous years [3].

The change in media consumption following the COVID-19 pandemic shows an increase in the use and importance of online media and social networks.

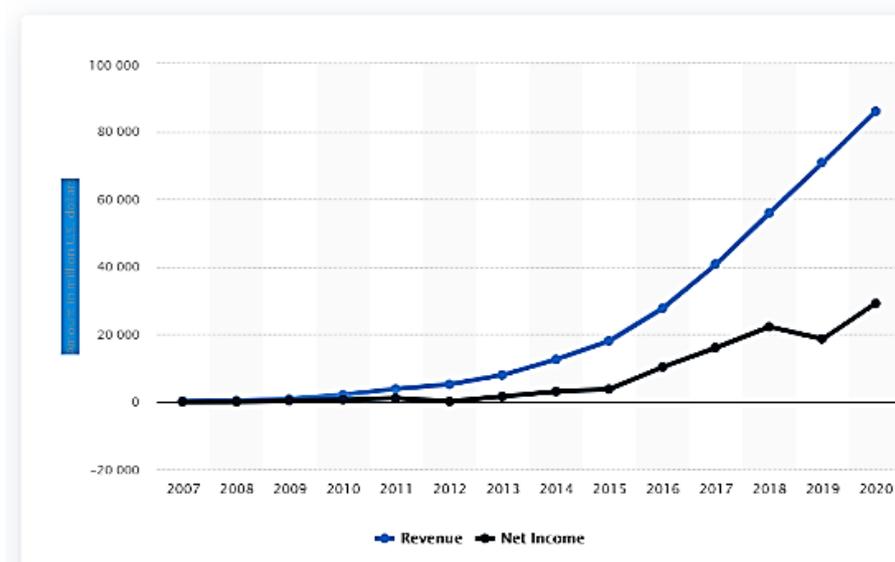
Unlike the classic communication space (Television, Radio, print media), the new media based on electronic communication (Internet) offer the consumer the possibility of quick reactions to any "target" (product, service, personality, theme, etc.).

The accelerated growth in the number of internet users is also reflected in the evolution of the revenues of large companies in the field of technology and the Internet, including Google (Alphabet) and Facebook, which are also the most significant global sellers of advertising (Figures 1 and 2).



**Figure 1.** Annual turnover of Alphabet, the company that owns Google. Source: <https://www.statista.com/>, accessed on 14 January 2022.

## Facebook's revenue and net income from 2007 to 2020 (in million U.S. dollars)



**Figure 2.** Facebook's turnover. (Source: <https://www.statista.com/>, accessed on 14 January 2022).

These figures demonstrate companies' interest in communicating their marketing content through these new media channels. Social networks have become essential destinations for marketing campaigns.

Accessing online space is becoming almost second nature to modern man as the online environment has become a substitute for many human activities. From a simple search for information and sources of information to communicate with friends and the development of social networks, from the search for brands and shopping to education, from entertainment to work (primarily "online", all these are developed after the new pandemic of the COVID-19 virus. As a result, the network environment has become an entire space for integrating most human activities.

As such, the online space becomes a fundamental element of marketing communication. Unlike the classic, one-way environments are two-way communication environments where the consumer/user communicates in turn. Consumer communication often influences other consumers and can dramatically affect companies/organizations in crises. Being the fundamental space of contact, the online environment has become the favorite medium of manifestation of marketing communication. The environment in which most brands express themselves being bidirectional brings the consumer's interest to express their position, dissatisfaction, etc., compared to brands. Technology advances at a rapid pace in today's society, and this rapid advancement has a big impact on people's lifestyles. There are significant changes in marketing activity and consumer perceptions because of this revolution. Marketing communication is currently evolving with an emphasis on boosting client happiness. While finding customers is easier, keeping the same customer is a far more challenging process. The major reasons for this predicament are that in today's digital marketing environment, consumers can obtain the things they want, whenever they want, with numerous options, and they can access user feedback much more simply when picking products. It is said in this regard that the quick advancement of technology innovations plays an active role in the transfer of word-of-mouth marketing communication methods, which are among modern marketing techniques, to the electronic environment. However, because of the decrease in human interaction, particularly in the physical environment, caused by the COVID-19 pandemic, a significant portion of word-of-mouth marketing communication now takes place in the technological environment, and the concept of electronic word-of-mouth marketing has grown in popularity [6].

For this reason, we can see special importance given by companies (but also by customers/users/beneficiaries) to new technologies for attracting and retaining consumers (with the help of the online environment), but also to new techniques for analyzing their needs and preferences. From the analysis of the supply chain and its improvement for efficiency to the inclusion of modern technologies in promotion campaigns and marketing analysis, the new methods represent challenges for the business environment but also increase the need for adaptation.

Sentiment analysis used in marketing analysis to identify consumer needs and preferences is one of the new techniques that can be used to measure satisfaction at any stage in the process of creating a product or service until it is provided. For example, with the help of reviews and by applying sentiment analysis, relevant information can be obtained about their experiences, dissatisfaction felt, or appreciated elements (quality of product or service, method of delivery, methods of communication, etc.). Sentiment analysis is a data mining technique that uses machine learning algorithms to assess textual material systematically. Sentiment analysis, as a marketing research approach, provides an efficient and effective examination of consumer sentiments in real-time. It enables the collecting and analysis of data from a large sample without hindrances, obstacles, or time delays. Marketers use sentiment analysis to capture rich data on attitudes and opinions in real-time while maintaining reliability, validity, and generalizability. Marketers can also collect input on attitudes and opinions as they occur, eliminating the need for lengthy and costly market research efforts [7].

The typical customer is an inquisitive, well-educated individual seeking highly personalized services and products. In this light, the customer has “become the driving force behind many changes that are occurring within the firm and in its business environment”. Customers gain control over products and services by adopting a variety of methods to express their ideas, the most straightforward of which is EWOM [8].

Furthermore, the competitive landscape shifts and the modern corporate environment is tumultuous and often unfriendly.

All of these new changes, which are seen as pressures on firms and organizations, necessitate ongoing monitoring, anticipation, and swift response to any market signals. Organizations must build digital tools to evaluate and govern all key changes in this new environment [8].

## 2. Literature Review

### 2.1. CGC—Consumer-Generated Content—A Key Must of Feedback

Marketing is growing into truly interactive discussions. Once-tidy, regulated marketing communications with distinct, identifiable corporate spokespeople are giving way to a jumble of market-based communications with various authors including customers, competitors, observers, employees, and interested collectives. Among these is consumer-generated content (CGC) that is largely antagonistic to earlier research, which presumed CGC was motivated by personal brand affinity and/or a desire to see discrete-authored CGC promoted, or even by monetary compensation. The authorship of cooperatively produced CGC is virtually untraceable, unknown, and uncompensated monetarily [9]. CGC is the consumer’s content and not only produces and places the online media first. CGC can take the form of text (comments on forums, on marketplaces, on social media posts, blogosphere articles or online media articles, Wikipedia articles, etc.), image, video or “share”, “like”, etc. actions. From within social networks. All these forms of CGC manifestation account for how consumers receive the “target” or the reference and its aspects. The amount of data readily available through social networking is increasing by the hour. Much of this information relates to consumers’ impressions and opinions about firms, and as such, it is of relevance to business intelligence gatherers in marketing, customer relationship management, and customer retention. It will be able to design, create, and build social bots that can analyze customer comments in social media networks using soft computing, notably fuzzy logic. Further programming would enable these social bots

to communicate with customers, and correctly crafted social bots would be capable of disseminating marketing messages [10]. With the increasing volume of brand-related social media interactions, digital marketers have several chances to track and analyze customers' thoughts and opinions about brands, products, or services inherent in user-generated content (CGC). Because of these "Big Data" prospects, human approaches to sentiment analysis are impracticable, necessitating the development of automated technologies to analyze customer sentiment given in text format [11].

In the case of CGC for social networks, its evaluation is performed in purely quantitative terms, and this evaluation is part of the performance indicators for marketing campaigns that use these networks. For example, Engagement for Facebook posts is the primary "metric" for measuring the effectiveness of a post/campaign. And Engagement is the mathematical result of the number of reactions of consumers/readers: shares, comments, responses through emoticons. However, this evaluation is predominantly quantitative, not reflecting the nature of the responses through words, namely whether they are positive or negative regarding the subject of the posts/campaigns carried out.

CGC is how the power of the consumer over the "target" is expressed today, this content being the equivalent of word-of-mouth in terms of Public Relations. This content largely shapes how the "target" is perceived and strengthens the community's perception of it. The fundamental reason for corporations' reluctance to pursue long-term, collaborative CGC is that it implies abandoning significant control over brand communications and brand meanings. Part of the problem stems from corporate skepticism about the professionalism of the resultant consumer-driven advertising. Indeed, little research has been conducted to investigate [9]:

- How productive consumers can be in their advertising creation initiatives;
- How capable consumers are of creating content that resembles—in form, function, and intent—advertising;
- Whether CGC brings new persuasive traction simply because of being consumer-created; or
- If the aspirations of brand content shift with the emergence of consumer-generated brand content.

In this respect, the purely quantitative assessment of the GCC is not sufficient. The qualitative analysis of the opinions clarifies the way of receiving the "target" by the consumer. The qualitative analysis of the views expressed by the consumer concerning the "target" implies the evaluation of the positive/negative opinions/feelings regarding the "target" as a whole or only on certain aspects of the "target".

The qualitative analysis we refer to is called opinion mining, or sentiment analysis, which shows the number of positive/negative occurrences generated by the consumer. It, therefore, has a qualitative dimension—feelings/opinions, and a quantitative one—the number of favorable/adverse events out of the total investigated occurrences. Therefore, the combination of qualitative and quantitative measurements makes sentiment analysis one of the most potent online marketing research tools.

The importance of consumer-generated content for companies has grown as they have begun to use the online environment as a marketplace and marketing communication channel.

Consumer-generated content has outpaced content produced by companies, products, or services, and professional content published in online media articles. This shows that the value of information on the internet has migrated from publishers to consumers [12]. In other words, the focus has shifted from publisher-centric to consumer-centric, indicating an increase in the number of companies capturing the consumer market [12], with both manufacturers' recommendations for their products (through advertising) being very relevant today, and the experiences of other clients (in the form of a written or video review).

The growth of social networks has undoubtedly accelerated the capture of the target audience and the development of brand partnerships, as a result, it has long gone beyond the old one-way street, based on product advertising [13].

The term “consumer”, in its current context, refers to anyone who is not a professional writer, journalist, or publisher but has purchased (or received for testing) a particular product or service.

Consumer communication messages are sometimes anonymous [14] (usually if they are posted directly on the manufacturer’s or supplier’s page) but are generally public and even express in video format what were the positive or negative elements of the experience of using a product. or service.

WOM is characterized as personal statements that are not paid for by sponsors and are motivated, spontaneous, transient, and informal in structure [15]. Although there is still disagreement about the conceptual differences and the theoretical use of WOM and CGC ideas, they can still be considered interchangeable when applied to the online context.

With the growth of markets, forums, and social networks, consumer ratings are becoming more important, especially when it comes to “experiential” items or services (those products with a high degree of intangibility that you can experience after purchase). According to some researchers, customer reviews are the most important way to experience products in the consumer market [16,17]. According to research conducted by Nielsen Global Trust in Advertising in 2013, online consumer reviews are the second most credible source of information about brands—70% of global consumers confirm this statement. The winning media, such as WOM or the recommendations of friends and family, above all other advertisements, was cited as the most trusted source by 92% of consumers globally by respondents, so consumers are more likely than advertisers or marketers to trust each other [12].

In essence, the authors claim that, in the new reality of marketing communication, CGC becomes the essential element to analyze both quantitatively and qualitatively to extract the data to guide the marketing decision process truly.

Because the distribution of information in the online environment and especially in social networks is effortless and fast, and the temptation to distribute fake news can be significant (phony news as a product of the naive or malicious consumer), to limit the impact of these “Fake CGC” several authors have even researched blockchain mechanisms to identify them. Thus, “In some cases, false news is more attractive than true news. Thus, people are manipulated. Using the advantages of Blockchain’s peer-to-peer networking concepts, the authors discuss “a way to detect fake news on social media” [17].

## 2.2. Sentiment Analysis—Conceptual Framework

The sentiment expressed in comments, feedback, or critiques can be used for a variety of purposes. These feelings can be classified as either positive or negative or on an n-point scale, such as very good, good, satisfactory, bad, or very bad. A sentiment analysis task can be viewed in this light as a classification task, with each category representing a sentiment. Sentiment research allows businesses to measure the amount of product acceptance and develop methods to improve product quality. It also makes it easier for policymakers or politicians to analyze public attitudes toward policies, public services, or political issues [18]. Sentiment analysis is also known as opinion mining. Although there is a semantic difference between feeling and opinion, in essence, by the analysis of feeling or opinion mining, we refer to the analysis of the expression of a subject (author) about an object (theme), person, brand product, etc.) [19].

There are more complex definitions of opinion/feeling. Still, for simplicity, we will consider that an opinion is a vector with five dimensions: (T, F, S, A, t), where: T—the opinion (or sentiment) target (organization, brand, product, theme, decision, etc.), F—is the aspect (subcomponent or feature) of T about which A states S, S—represents the sentiment regarding the target, A—the opinion holder and t—is the time at which the opinion/the sentiment was described [19]. This definition, while concise, may be difficult to use in practice, particularly in the arena of online product, service, and brand reviews, because the full description of the target can be complex and may not even exist in the same sentence.

Although there is a whole debate about how to define S and that more complex definitions can be helpful for research (rational positive/negative, emotional positive/negative,

the intensity of feeling expressed, etc.) [19], for our purpose, we will simplify. First, we will consider that  $S$  can have only three values: positive, negative, and neutral (+1, -1, 0) [19].

Sentiment analysis applies to all occurrences in the online environment about a  $T$  target. It can capture the entirety of an author's text, or it can go down to the level of each sentence. Interesting, however, is, in the opinion of the authors, the feeling transmitted by a text in its entirety (the message of the text regarding the target, message in the sense of communication theory); therefore, the analysis of feeling to which we do not refer is the one the feel of the whole text about it. We will not consider the sentiment analysis lowered at the level of subsets of communicative actions for our purpose. Still, we will view a text in its entirety or a communicative action within social networks as manifesting a feeling of an author  $A$  at a time (interval) of time  $t$ .

One of the most common uses of Natural Language Processing is sentiment analysis (NLP). The term "sentiment analysis" refers to the process of identifying people's emotions and views through written language. It is focused on extracting information from any text based on polarity in social conduct, whether positive, negative, or neutral [20]. The key difficulties in sentiment analysis are determining how sentiments are conveyed in texts and whether the utterances reflect positive (favorable) or negative (unfavorable) attitudes about the subject. To improve the accuracy of sentiment analysis, the semantic links between sentiment expressions and the subject must be correctly identified [21]. Sentiment analysis as a component of the Natural Language Processing domain involves a much broader approach that includes complex algorithms and Machine Learning tools. However, our goal is to look for the usefulness and meaning of the product of sentiment analysis in marketing decisions.

### *2.3. The Usefulness of Sentiment Analysis, a Fundamental Component of Business Intelligence*

The sentiment analysis application on the occurrences of a "target" shows at the level of the whole universe of public expression the general opinion about a subject/organization/brand. This analysis becomes fundamental in the new reality of communication and marketing. There is virtually no public communication without a reaction from the public, whether we are talking about the specialized public (ex. Journalists) or the general public, including consumers.

The reaction of the public becomes manifest in the online environment in two dimensions, similar to the stages of Paul Lazarsfeld's theory of "two-step communication": opinion leaders (influencer) and the general public (influenced) [22].

Given the technical possibilities of public communication captured directly or indirectly by opinion formers, the critical discovery of opinion leader competition and the introduction of a feedback loop between the public and opinion-formers opened the theorizing of Lazarsfeld's theory. New possibilities. The audience, and winning this fight is in line with the public opinion. The public's perception of "objective" will affect the position of opinion leaders' discourse on "objective".

The reality of communication shows practically no meaningful act of communication that does not appear in textual format. Moreover, this format allows the analysis of the feeling included.

The expression of the opinion regarding a brand/topic is done in everything that means online media, blogs, social networks (Facebook, LinkedIn, Twitter, Youtube, Reddit, etc.), discussion forums, product consumer forums inside the marketplace- and numerical indicators (grades given) given by consumers to the products.

We could even say that there are reasons to believe that the online environment has become preeminent for a specific type of public discourse compared to classical media discourse. When sentiment analysis is applied to a particular geographic/linguistic market (Romanian market or Romanian language market), the meanings that can be extracted are significant.

In addition to analyzing the distribution of positive/negative opinions about a particular brand, sentiment analysis allows comparisons between brands in the same category

(or substitute categories) that may reflect positioning errors, the need to improve the service/product, its strengths elements relevant to the public but not used by marketing. All these sentiment analysis results bring an essential value for marketing planning and even for realizing the product/service.

Moreover, through its positive and negative contextual definition component (positive and negative word cloud/tag cloud), the sentiment analysis reflects in a highly intuitive way the attributes associated with the public expressing themselves online with the brand, either under negative or positive aspects.

Even though it often seems like just a component of the executive dashboard placed as a “by-product” of sentiment analysis, T\_Cloud highlights the general context of communication and the positive/negative contexts related to the brand, including comparisons with other competing brands. Furthermore, the conclusions of these T-Clouds have a strategic significance of particular importance showing at the time  $\theta$  when the public is expressing the brand; in other words, what is the social representation of the brand at a time well defined (or within a well-defined time), generating insights that can often escape the marketing researcher.

Moreover, contextual words can lead to conclusions about the effectiveness of public communication, slogans, and discursive positioning. The consumer’s takeover of keywords/representation, introduced by marketing communication, leads to a reinterpretation from the perspective of neuromarketing of discursive tactics (the effectiveness of communication keywords).

The sentiment analysis on the general themes of a research universe essentially shows the expectations and the social pyramid of needs in a temporal context. This contextual evolution of the fundamental themes and the feelings that the research universe has on them shows the researcher an evolutionary tendency that leads either to the consolidation of the marketing strategy or to its adaptation, or even to modifications of the products/services.

The importance of sentiment analysis lies in assessing the impact of the theme/product/service on the general public and highlighting changes in tone (feeling), and increased intensity of communication (PTA—people talk about), which are possible symptoms of a communication crisis. Changes in the manner of a single medium, the increase in negative occurrences in a single medium, warn of the onset of a possible communication crisis, defined in terms of sentiment analysis as a negative feeling of intensity.

The communication crisis can be defined on two different levels. First, the product/service/organization affects the perception and is correlated with economic performance, but the most interesting to study is the political/social crisis. The intensity of the negative feeling can lead to action and mobilization. This analysis of the threshold of negativity of feeling in the research universe, which is expressed by textual means or assimilated with them (emoticons, dislikes), from which it can be concluded that a mobilization “against” something remains to be investigated by modeling periods in which such phenomena have occurred.

Moreover, an extremely important application of sentiment analysis is predicting the evolution of cryptocurrencies built on the blockchain system through sentiment analysis. Given that these coins are entirely dematerialized and that their value is given only by the play of supply and demand, without a Central Bank or a Government acting to protect their weight, “sentiment analysis is an essential perspective for the prediction of the price of the cryptocurrency, due to the interactive nature of financial activities” [23].

Although there are providers of automated sentiment analyzers on the Romanian language market (3 companies state on their websites that they sell these services), an investigation shows that, for the commercial field, no such service is available at a certain level of automation and performance to lead us to the conclusion that it is worth considering. However, fundamental in the case of operating with a lot of data and feedback from consumers, the analysis of sentiment is missing from the marketing analysis tools within companies in Romania.

The significant risk of the technological delay is the capture of the market by actors with a much higher technical capacity, especially in the context of the structural changes in the Romanian market due to the competitive pressures of the international companies. “Strategies provide opportunities for SMEs to recombine existing resources and create new ones in a long-term approach” [24].

### 3. Materials and Methods

In this article, to highlight the potential impact of the implementation of sentiment analysis in the Romanian marketing activity, two kinds of research were elaborated. First, qualitative research on marketing specialists (from the management board of the companies of interest) aimed to identify the degree of digitalization of companies to measure the possibilities of implementing sentiment analysis in marketing activities.

The second research was conducted in order to perform the analysis by structural equations (respectively a proposed conceptual model), to identify the perceived benefits of implementing sentiment analysis in marketing activities.

For each of the two kinds of research, the stages of the research and their methodology are presented in a structured way. In Section 4, however, the results obtained in the research are presented.

#### 3.1. Qualitative Research Methodology

Our qualitative research aims to analyze among 10 marketing specialists from 10 Romanian companies to what extent they understand the need and use sentiment analysis as an essential element of the marketing decision and the possible consequences of use/non-use. Thus, the proposed purpose is to identify the extent to which they understand and aim to use sentiment analysis in marketing activities, as well as to determine the benefits recognized by them. The proposed objectives are listed below, and, depending on the established objectives, the interview guide used to collect the participants’ answers was elaborated. Following the collection of their answers, a content analysis was elaborated through which the main ideas extracted from the participants were highlighted, which included forming an overall idea on the perception of the use of sentiment analysis in marketing activities in Romanian companies. The research was conducted between January and February 2022.

In terms of the number of study participants required to be relevant to the issue, many specialist studies have decided that, in the case of qualitative research, any number between 5 and 50 participants is acceptable [25]. Participants were asked for their consent and desire to engage (agreement) to participate in the study and were then interviewed using online survey platforms (their responses were anonymous). Both the interview and the invitation to participate began with a summary of the research project, including its aim and objectives and the method for collecting and evaluating the data.

##### 3.1.1. Research Objectives

- O1. Identifying the implementation of digitization programs within 10 Romanian companies
- O2. Identifying the results following the implementation of digitization programs within 10 Romanian companies.
- O3. Identify tools for measuring digitization programs.
- O4. Identify the differences between measuring paid advertising campaigns and measuring end consumer opinions.
- O5. Identification of promotion techniques within 10 Romanian companies.
- O6. Identifying ways to measure the effectiveness of marketing campaigns.
- O7. Identifying feedback from end consumers.
- O8. Identify ways to seek feedback from end consumers.
- O9. Identify ways to analyze feedback from end consumers.
- O10. Identifying the impact of marketing companies on sales.

### 3.1.2. Interview Guide Design

In our qualitative research, we used in-depth interviews. The topic of discussion was the understanding and use by Romanian companies of sentiment analysis using business intelligence on marketing activity. The interviewed participants are marketing directors from 10 different fields.

### 3.1.3. Participant Selection Methodology

Our qualitative research involved 10 marketing specialists (6) and business owners (4), given the following criteria for selecting the target group (Table 1):

**Table 1.** Structure of the sample (Qualitative research).

Sample Structure		
City	Bucharest	100%
Age	Below 45	88%
	45–56	12%
Type of organizations	specialists in private organizations	50%
	public organizations	50%
Seniority in work	marketing specialists	60%
	business owners	40%
Incomes	over RON 10.000 (very high income)	100%
	1–5 million euros	20%
Turnover	10–20 million euros	30%
	20–100 million euros	20%
	over 100 million euros	30%
Age of organizations	private companies from the privatizations of the early 90s (they are older than 30 years)	20%
	company established in the early 90s	10%
	found in the early 2000s but which was acquired by an international group in recent years	10%
	companies established after 2012	60%

### 3.1.4. Data Collection—Conversation/Interview Guide

Generic discussion about the implementation of digitization programs and ways to analyze market feedback (sentiment analysis) (30 min)

1. What digitization programs have they implemented?
2. Periods + duration of these digitization programs? Does the company have a Marketing department? If so, how is the performance of this department measured?
3. Digitization at the level of the Marketing department Have they implemented digitization elements/programs? Has the pandemic brought about changes in marketing? What have they done in the field of digital marketing? Did they implement their solutions, or did they purchase them? Have they changed products/distribution channels?
4. The importance of feedback from consumers/buyers Is it important? If so, to what extent? What changes has consumer feedback led to?
5. Ways to collect feedback from consumers/buyers How do you collect feedback?
6. Feedback analysis How does it analyze consumer feedback? If there are large volumes of data, how do you analyze them? Do I understand what sentiment analysis is? Does sentiment analysis apply to volumes of data received as consumer feedback? What conclusions do I draw? What dashboards do they have?

### 3.2. Marketing Model Regarding the Factors That Contribute to the Satisfaction of the Analysis of the Feeling and the Connections between Them

In the second part of the research on the need and perception regarding the integration of sentiment analysis as an essential element in marketing decisions, a study based on structural equations (SEM) was developed to highlight the factors that contribute to satisfaction with the analysis of feeling and the connections between them.

In this sense, quantitative research was organized on 108 respondents (who carry out activities in the marketing area (employees/freelancers/entrepreneurs)), having the socio-demographic characteristics highlighted in Table 2. The research was conducted between November 2021 and February 2022.

**Table 2.** Structure of the sample (Quantitative research).

Sample Structure		
Gender	Women	48%
	Man	52%
Level of education	bachelors, masters, doctorates	88%
	secondary education	12%
Occupation	employees or entrepreneurs	85%
	pupils/students	15%
Incomes	below RON 2500	11%
	over RON 2500	89%
Environment of residence	urban areas	89%
	rural areas	11%

The analysis by structural equations PLS-SEM is based on a method of gathering information, quantitative research. A questionnaire is used to gather information (a tool usually used in quantitative research). The difference occurs when the research objectives are established: if in the case of quantitative research, the questions asked through the questionnaire have the role of providing answers to the proposed objectives, in the case of analysis by structural equations the questions are formulated in order to define the proposed variables. and the answers to the questions represent the foundation that builds a certain variable).

Although it seems small for quantitative research, the number of respondents is enough for an analysis based on structural equations because, based on the literature, we can see that the overall complexity of a conceptual model made using structural equations is not dependent on the size of the sample. The explanation was that several recent studies evaluated the performance of PLS-SEM with a small sample size, and the results were very good. The same paper, however, is presented the perspective of other authors who apply the “rule of 10”, respectively the general conclusion of the literature on the appropriate size of the sample for PLS-SEM analysis. Thus, according to this rule, it is applicable if the most significant variation was chosen between two multiples of ten (i.e., the number of connections between the variables in the model or the number of formative indicators used to evaluate a given construct multiplied by ten) [26]. In this article, we will see that we have 6 connections between the variables in the model (corresponding to a minimum number of 60 respondents) and 7 training indicators as the maximum number for composing a variable (corresponding to a minimum number of 70 respondents), a fact for which, the sample size is considered suitable for the analysis performed.

The analysis by structural equations was performed using WarpPLS 8.0 by importing the database in excel format. Proposed variables for analysis. As well as the items used in their formation were the following:

- notoriety—that is, the notoriety of software and applications that can be used for sentiment analysis in the field of marketing (the variable measured by the question “Which of the following software are known to you? (Several possible answers)”)
- benefits—i.e., the perceived benefits of using software and applications that can be used to analyze marketing sentiment (items used in the formation of this variable were: (1) Understanding how the public feels about your product or service, (2) Determining new opinions about your product or service, (3) Possibility of analyzing your competition, (4) Customer/beneficiary feedback processing and automatic interpretation)
- perceptions—i.e., the perceptions of users or potential users towards software and applications that can be used for sentiment analysis in the field of marketing (items used in the formation of this variable were: (1) Understanding how the public feels about the product or service is essential to any marketing strategy. feelings analysis can also reveal customers who are actively satisfied with the product/service offered, (5) Sentiment analysis can highlight the strengths and weaknesses of the products or services provided, and (6) Sentiment analysis transforms the vague feeling that the target audience has about the product/service offered in numbers and helps us to create better marketing strategies, (7) Sentiment analysis contributes to the awareness of the level of presence in the online environment)
- reason—i.e., the reasons that lead to the use of software and applications that can be used for sentiment analysis in the field of marketing, the items used in the formation of this variable were similar to those of the variable “perceive”, but the question was about the reasons for implementation)
- satisfied—that is, the satisfaction felt after knowing or implementing the software and applications that can be used for sentiment analysis in the field of marketing, the items used in the formation of this variable were similar to those in the variable “perceive”, but the question was about elements that gave the highest degree of satisfaction after implementation).

A Likert-type measurement scale or semantic differential was used for each variable, with 5 levels of expression (From 5—Total agreement to 1—Total disagreement).

Based on the variables defined for the proposed conceptual model and on the links between them, a series of objectives were formulated, as well as the hypotheses corresponding to the present study, as follows:

O1. Determining the intensity and direction of the connection between the notoriety of software and applications that can be used for sentiment analysis in marketing and the perceived benefits of using them.

I1: There is a direct link between the notoriety of software and applications that can be used to analyze marketing sentiment and the perceived benefits of using them.

O2. Determining the intensity and direction of the connection between the notoriety of software and applications that can be used for the analysis of feelings in the field of marketing and the perceptions of users or potential users towards them.

I2: There is a direct link between the notoriety of software and applications that can be used for marketing sentiment analysis and the perceptions of users or potential users towards them.

O3. Determining the intensity and direction of the link between the perceived benefits of using software and applications that can be used to analyze marketing sentiment and users ‘or potential users’ perceptions of them.

I3. There is a direct link between the perceived benefits of using software and applications that can analyze marketing sentiment and the perceptions of users or potential users towards them.

Based on the Theory of Rational Action (TRA) [26], which was explicitly designed to model the acceptance by specific categories of users of certain types of information technology (e.g., software and applications that can be used for sentiment analysis in the field of marketing), we can argue the formulation of the first three proposed hypotheses (I1, I2, I3). Thus, it seems that the use of software or IT applications is directly determined

by the behavioral intention to use, which, in turn, is influenced by the attitudes of other users [19].

O4: Determining the intensity and direction of the connection between users 'or potential users' perceptions of software and applications that can be used to analyze marketing sentiment and the reasons for their use.

I4. There is a direct link between users 'or potential users' perceptions of software and applications that can be used to analyze marketing sentiment and the reasons for their use.

O5: Determining the intensity and direction of the connection between users 'or potential users' perceptions of software and applications that can be used to analyze marketing sentiment and satisfaction with knowing or implementing them.

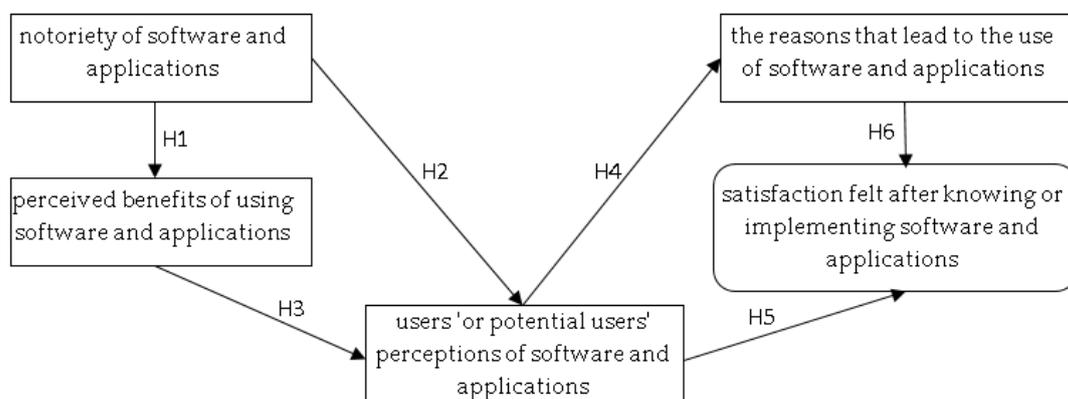
I5. There is a direct link between users 'or potential users' perceptions of software and applications that can be used to analyze marketing sentiment and satisfaction with knowing or implementing them.

According to the literature, the more knowledge or experience a person has in using or implementing software or applications in the IT field, the greater the satisfaction they will feel after using them. In addition, the perceived ease of use gives the person the confidence that their implementation will be effortless and with remarkable results [20] (for example, the performance of software and applications that can be used for sentiment analysis in marketing), which contributes to the argumentation of the hypotheses I4, I5, and I6.

O6: Determining the intensity and direction of the connection between the reasons that lead to the use of software and applications that can be used to analyze sentiment in the field of marketing and the satisfaction felt after knowing or implementing them.

I6: There is a direct link between the reasons that lead to the use of software and applications that can be used for sentiment analysis in marketing and the satisfaction felt after knowing or implementing them.

The proposed conceptual model was transposed in graphic form based on the drafted objectives and hypotheses. Thus, each hypothesis is graphically highlighted in the form of an arrow, its direction indicating the influence between the two factors (Figure 3).



**Figure 3.** Proposed conceptual model of satisfaction felt after knowing or implementing software and applications.

## 4. Results

### 4.1. Qualitative Data Analysis and Qualitative Research Conclusions

Following the qualitative research, the following conclusions were drawn:

40% of the interviewed organizations implement or use digitization programs, and 60% of them do not currently have digitization plans but notice the pressure of the need for digitization.

The older the organizations, the more dependent they are on consolidated market relations and view the marketing component as a component without a significant contribution to the organization's performance.

In most researched organizations, the price is not set by/with the marketing department but within the “Commercial” department.

Most companies (6 companies) have never done marketing research on sentiment analysis.

There is a significant difference between Romanian companies and those with international shareholders, in the sense that the latter develop consistent marketing and digitization (including digital marketing) programs. Romanian capital companies are based on “market intuition”. Other studies on the Romanian market also show that intuition is considered a high ability in life. Unfortunately, we confuse it with speculation and shepherding, which does not always lead to the expected results [24].

The main results of the digitization programs following the implementation by the 40% of those interviewed are the following:

Increasing sales, adapting more quickly to the market trend generated by the pandemic, adapting the marketing strategy through the feedback obtained from the market through online communication channels (tools), and adapting internal processes (operating programs) through customer feedback.

Organizations state that they do not have specific marketing tools for measuring digitization programs but consider sales campaigns’ effectiveness.

The primary promotion technique within the 10 organizations was sales promotion.

Measuring efficiency is done through sales.

The interviewed companies collect the feedback from the final consumers either through call centers, through complaints, or from the online environment, and depending on this, they establish their marketing decisions or even the improvement of products/services.

The frequency of the negative aspects analyzes the final feedback received.

#### 4.2. Results Obtained from the Analysis by Structural Equations (PLS-SEM)

According to the Theory of Planned Behavior, a person’s behavior in performing specific actions is influenced primarily by his behavioral intention (and the reasons identified for taking action) and then by his attitude and other subjective norms felt (perceptions, knowledge, experiences) [27].

To develop a representative SEM analysis, researchers must evaluate the accuracy of the data and the complexity of the variables utilized (the quality of the items used and the extent to which each analysis is complete), and their consistency and validity. This method uses evaluation metrics like Cronbach’s alpha and extracted average variants (Table 3).

**Table 3.** Latent variable coefficients.

	Notorious	Benefits	Collectible	Reason	Satisfy
Cronbach’s alpha	0.304	0.340	0.883	0.879	0.916
Average variances extracted	0.332	0.384	0.589	0.582	0.667
Q-squared	-	0.107	0.139	0.571	0.698
R squared	-	0.095	0.146	0.554	0.691

The Cronbach’s alpha indication is used to assess the measurement’s dependability, defined as how error-free and consistent the results are. To measure internal consistency [28], the indicator must be presented as a number between 0 and 1, which is satisfied in the table.

The WarpPLS software highlights the relationships between the variables, and their validity and confirmation are evaluated by the correctness of the items on which they were produced. Consequently, the AVE’s average validity test is applied; if it satisfies the categorization in coefficients criterion, it shows that the measurements are of excellent quality and may be used to validate the convergence. In addition, dependability coefficient values must surpass 0.5 thresholds and be higher than any other values provided in each column [28].

The discriminant validity was met, suggesting that the measurements were suggestive of the definition and use of variables within the proposed conceptual model, as shown in Table 4.

**Table 4.** Correlations among latent variables with the square root of AVEs (average variance extracted).

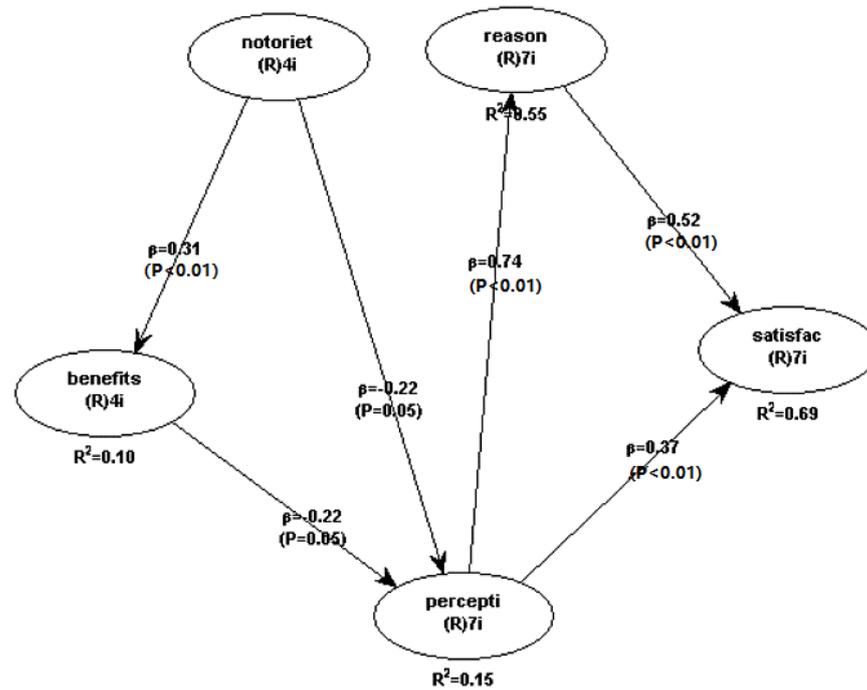
	<b>Notorious</b>	<b>Benefits</b>	<b>Collectible</b>	<b>Reason</b>	<b>Satisfy</b>
Notorious	(0.577)	0.552	0.567	0.513	0.532
Benefits	0.552	(0.620)	0.537	0.570	0.570
Collectible	0.527	0.537	(0.767)	0.734	0.743
Reason	0.513	0.570	0.734	(0.763)	0.725
Satisfy	0.522	0.570	0.743	0.755	(0.816)

The primary assumptions of the study are based on descriptions of the links between the latent components of the proposed model. The binding coefficients (Beta-standardized coefficients) for each causal connection in the model are first calculated and assessed. The Beta coefficients reflect the strength and direction of the correlation between the variables; the hypotheses are supported when the linked Beta coefficient is greater than 0.1 at a significance threshold of  $p$  0.05 (Table 5).

**Table 5.** Validation of the leading hypotheses by the connection  $\beta$  coefficients.

	<b>Main Hypotheses</b>	<b><math>\beta</math></b>	<b><math>p</math></b>	<b>Validation</b>
1	the notoriety of software and applications → perceived benefits of using software and applications.	0.31	<0.01	Yes
2	the notoriety of software and applications → users 'or potential users' perceptions of software and applications	0.22	=0.05	Yes
3	perceived benefits of using software and applications → users 'or potential users' perceptions of software and applications	0.22	=0.05	Yes
4	users 'or potential users' perceptions of software and applications → the reasons that lead to the use of software and applications	0.74	<0.01	Yes
5	users 'or potential users' perceptions of software and applications → satisfaction felt after knowing or implementing software and applications	0.37	<0.01	Yes
6	the reasons that lead to the use of software and applications → satisfaction felt after knowing or implementing software and applications.	0.52	<0.01	Yes

Therefore, we note in Table 4 that all the hypotheses formulated for this article have been validated, highlighting several direct and strong links between the factors that contribute to the formation of satisfaction felt after using software for sentiment analysis for marketing purposes. In Figure 4, we can also see the link indicators and the related probabilities (Beta and  $p$ ), which confirm the validity of the hypotheses, graph resulting from the analysis software used WarpPLS.



**Figure 4.** A validated model of satisfaction felt after knowing or implementing software and applications.

## 5. Discussion

A range of value-creating activities takes place in brand communities [29]. Many studies have shown that members of brand communities are capable of considerable brand content development [30]. Indeed, the rise of socially integrated, empowered customers is now a business reality [31]. Customer evangelism is known by a variety of terms, including “creative consumers” [32], “homebrew ads”, “folk ads” [33] “open source” branding, and “vigilante marketing” [33]. While many marketers have begun to actively solicit consumer-generated content (CGC) for occasional, ad hoc use in advertising campaigns, few have:

- Systematically employed consumer-created content in their long-term marketing campaigns;
- Considered the firm’s role in facilitating long-term marketing campaigns;

Given these aspects, it is even more obvious that analyzing the content created by consumers (sentiment analysis) is an increasingly relevant tool for increasing the effectiveness of marketing campaigns.

This article presents a manner that attempts to cover a wide range of opinions regarding the use and implementation of software that uses and performs sentiment analysis to extract marketing information. The article begins with a review of public statistics on sentiment analysis, starting with the help of the Internet, to argue the need and usefulness of marketing. Then, qualitative research among the specialists in the field is performed, resulting in the degree of their digitization and the perception of the integration of the sentiment analysis software in the marketing activity.

The qualitative analysis results highlighted that a lot of companies in Romania, respectively belonging to 40% of the participants in the study, have already implemented technologies and digitization programs to streamline the activities carried out. This result is also identified in other research conducted in different markets that highlights the benefits of digitalization, defining it as using digital technologies to create value for a company [34]. For example, a study of KIBS based on service and knowledge innovation by adopting digitization programs shows that digital tools increase business performance [35]. Furthermore, the main results of the qualitative research also highlighted a series of benefits identified after the implementation of digitized processes, including increased sales, more accessible adaptation to the market trend generated by the pandemic, transformation of marketing strategy through market feedback through channels (tools) online communica-

tion, adapting internal processes (operating programs) through customer feedback. At the same time, the literature highlights several benefits (closely related to those identified in this research), such as cost savings, substantial reduction of human error, and production efficiency [36]. Nowadays, modern firms use various business analytics techniques, such as sentiment analysis, to improve business functionality and support decision-making processes. Sentiment analysis, also known as opinion mining, allows for the collection and analysis of opinions about a specific product or service [34]. Another research proposes using sentiment analysis classification as an efficient way of assessing textual data from a range of internet resources. Sentiment analysis is a data mining methodology that assesses textual data using machine learning algorithms. Because of the vast array of user opinions, reviews, feedback, and suggestions available on the web, it is critical to identify, analyze, and integrate their perspectives for better decision-making. Sentiment analysis provides an effective and efficient opinion of consumers in real-time, which can considerably influence company decision-making. They have observed an increase in activity over the previous ten years, with an emphasis on exploratory research methodologies [37].

Regarding the quantitative analysis, following which structural equations were performed in the study, we can easily see that the results obtained can be centralized in the form of a graph that indicates in a usual way the influence links between the variables considered. Furthermore, the literature also highlights the impact of intentions on satisfaction [38] or the connection between the knowledge held in a field and the desire to work in that area of interest [39].

This study's findings corroborated prior research, which found that social media platforms play essential roles in enhancing consumer involvement, interactions, customer experience, trust, brand image, positive word-of-mouth, and information sharing [40]. We can thus consider that the results obtained in this article contribute significantly to the enrichment of the literature with several fundamental additions on the implementation of technologies (digitization, sentiment analysis) in marketing, highlighting the benefits of this activity.

Sentiment Analysis is a novel machine learning technique that extracts opinion orientation (positive, negative, or neutral) from a text segment produced for any product, company, person, or other entity. Sentiment Analysis can be used to anticipate people's moods, which have an impact on stock prices, and hence can aid in the prediction of real stock movement. Other authors [40,41] did sentiment analysis on tweets related to Apple products retrieved from StockTwits (a social networking site) from 2010 to 2017 in order to capitalize on the benefits of sentiment analysis in the stock market industry. Along with tweets, they used market index data from Yahoo Finance for the same time period. Sentiment analysis of tweets using SVM was used to calculate a tweet's sentiment score. As a result, each tweet is classified as either bullish or bearish. The sentiment score and market data were then utilized to construct an SVM model that predicted the next day's stock movement. The results reveal that there is a positive relationship between people's opinions and market data, and the proposed work has a stock prediction accuracy of 76.65 percent [35]. We note, therefore, that as highlighted in this article, the use of sentiment analysis depends on the technical knowledge and trust of users but can provide relevant and valuable results for improving the company's business.

## 6. Conclusions

We can conclude by saying that the technologies that can be used in marketing are still in continuous development, representing an evolving and volatile field. What a few years ago was considered an innovative element now seems outdated. Indeed, this trend, at least in marketing, will continue in the future, developing more and more technologies and tools to contribute to streamlining work and achieving significant and increasingly relevant results. This article presents the results obtained in two types of research regarding the beneficiaries' perception of the use and implementation of digital tools in marketing activity, improving the literature with new approaches and perspectives.

Following the proposed conceptual model, the factors that can contribute to the satisfaction of the beneficiaries of digital tools in marketing (analysis of sentiment for obtaining data relevant to marketing) were highlighted, and the links between them and the force of action.

The conclusions of this research offer a series of practical implications for managers in Romania and not only regarding the adoption and integration in marketing activities of sentiment analysis. It can be seen from the results obtained that sentiment analysis is one of the new technologies that can be used for marketing purposes for a clearer and closer knowledge of the needs and desires of consumers, as well as their suggestions for improving goods and services (or related items or services that contribute to the overall experience and satisfaction). It may not indicate a high level of satisfaction even if the product itself is as expected). Moreover, through the proposed conceptual model, managers can observe the links between the proposed variables and can make a series of action or financial predictions for the implementation of sentiment analysis in their own marketing actions.

From the point of view of the usefulness of research for the scientific community, it is obvious that this can be an essential starting point for other research in related fields. The scientific literature is enriched with a series of information collected and selected from other specialized works, forming an overview of the concept of sentiment analysis in the current context of online business development (highlighting the evolution of consumers in the decision-making process of others, as expressing opinions and experiences through profile platforms or social networks). According to theories of social interaction and social influence, social media is the most essential marketing tool for marketers and decision-makers to improve interactive communication, customer connection, and engagement at a lower cost and in a shorter amount of time [42]. Previous research, on the other hand, demonstrated that consumer engagement is more than just interactions and participation, and is linked to the relationship and engagement with things such as a brand [43,44]. This study looked at users' social media activities beyond purchases. These findings support this study, which shows that customer engagement on social media is more than just interaction and involvement; it also depends on interactions with the brand based on previous experiences with that brand. Some limitations must be acknowledged, as with any study. First, the sample's features limit the generalizability of the study's findings since (1) data were obtained from Romanian company representatives and (2) data were collected through an online environment. As a result, more study is needed to test the suggested model in different geographical locations and with different data collection methods. Second, this study was done in the business (marketing) sector; researchers are invited to conduct additional studies in other industries to broaden the reach of the model provided in this study.

## 7. Implications

The connection between the use of sentiment analysis in the marketing activities of companies and the idea of sustainability consists precisely in order to determine a technology that will make it more efficient in the long run. It is obvious that for a company to be sustainable, it must exist and maintain a certain quality level on the market. Through the analysis of sentiment and new technologies used in the field of marketing, favorable long-term results can be obtained (increasing sales volume, knowing customers, adapting products and services to demand).

Based on the findings of this article, managers and business organizations are advised to evaluate their business processes and practices in the field of business models. By analyzing revenue and utilizing new technologies, they can consider the impact of new digital technologies and global markets on business innovation in emerging countries. Furthermore, given the importance of career counseling in company innovation, managers should identify and capitalize on employees' professional development skills (including IT knowledge) to promote corporate innovation.

Academics should also research the interaction between digital technologies and corporate marketplaces using various mediation variables such as knowledge management, market capacity, and so on. Furthermore, due to a scarcity of studies on efficiency factors and the consequences of focusing on business innovation, comparable research in this area is required.

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