Dear Author,

Here are the proofs of your article.

- You can submit your corrections **online**, via **e-mail** or by **fax**.
- For **online** submission please insert your corrections in the online correction form. Always indicate the line number to which the correction refers.
- You can also insert your corrections in the proof PDF and **email** the annotated PDF.
- For fax submission, please ensure that your corrections are clearly legible. Use a fine black pen and write the correction in the margin, not too close to the edge of the page.
- Remember to note the **journal title**, **article number**, and **your name** when sending your response via e-mail or fax.
- **Check** the metadata sheet to make sure that the header information, especially author names and the corresponding affiliations are correctly shown.
- **Check** the questions that may have arisen during copy editing and insert your answers/ corrections.
- **Check** that the text is complete and that all figures, tables and their legends are included. Also check the accuracy of special characters, equations, and electronic supplementary material if applicable. If necessary refer to the *Edited manuscript*.
- The publication of inaccurate data such as dosages and units can have serious consequences. Please take particular care that all such details are correct.
- Please **do not** make changes that involve only matters of style. We have generally introduced forms that follow the journal's style.
  Substantial changes in content, e.g., new results, corrected values, title and authorship are not allowed without the approval of the responsible editor. In such a case, please contact the Editorial Office and return his/her consent together with the proof.
- If we do not receive your corrections **within 48 hours**, we will send you a reminder.
- Your article will be published **Online First** approximately one week after receipt of your corrected proofs. This is the **official first publication** citable with the DOI. **Further changes are, therefore, not possible.**
- The **printed version** will follow in a forthcoming issue.

Please note

After online publication, subscribers (personal/institutional) to this journal will have access to the complete article via the DOI using the URL: http://dx.doi.org/[DOI].
If you would like to know when your article has been published online, take advantage of our free alert service. For registration and further information go to: http://www.link.springer.com.

Due to the electronic nature of the procedure, the manuscript and the original figures will only be returned to you on special request. When you return your corrections, please inform us if you would like to have these documents returned.

Metadata of the article that will be visualized in OnlineFirst

ArticleTitle	Learning about the customer for improving customer retention proposal of an analytical framework	
Article Sub-Title		
Article CopyRight	The Author(s), under exclusive licence to Springer Nature Limited (This will be the copyright line in the final PDF)	
Journal Name	Journal of Marketing Analytics	
Corresponding Author	Family Name	**Simões**
	Particle	
	Given Name	**Dora**
	Suffix	
	Division	Institute of Accounting and Administration, Digimedia
	Organization	University of Aveiro
	Address	Aveiro, Portugal
	Phone	
	Fax	
	Email	dora.simoes@ua.pt
	URL	
	ORCID	http://orcid.org/0000-0002-9380-4475
Author	Family Name	**Nogueira**
	Particle	
	Given Name	**Joana**
	Suffix	
	Division	Institute of Accounting and Administration
	Organization	University of Aveiro
	Address	Aveiro, Portugal
	Phone	
	Fax	
	Email	joanasgnogueira@gmail.com
	URL	
	ORCID	
Schedule	Received	
	Revised	28 March 2021
	Accepted	13 July 2021

Abstract

The market faces new challenges in retaining customers, since they have very high expectations, which translate into the demand for a swift response and intransigence to empty promises on the part of brands. These requirements result from the ability to disseminate and infuse information, which in turn makes customers more informed, more participative, and more uncompromising. This change in behavior implies redesigning the strategic management of the brands, in terms of the relationship with the customer. In view of this challenge, the relevance of developing an adequate differentiation model for customer retention prevails. Based on this premise, this paper presents a proposal based on RFM and ABC analytical methods applied to customer relationship management and contextualized in a particular case of the printing industry. The proposed model defines a set of metrics aimed at customer segmentation, which improves

	the customers knowledge. The outcomes will allow to define more assertive marketing strategies for customer loyalty and to increase the volume of a brand's revenue.
Keywords (separated by '-')	Customer relationship management - Customer segmentation - Business-to-business - Data mining analysis - RFM metric - ABC curve
Footnote Information	

Journal of Marketing Analytics
https://doi.org/10.1057/s41270-021-00126-7

ORIGINAL ARTICLE

Learning about the customer for improving customer retention proposal of an analytical framework

Dora Simões[1] · Joana Nogueira[2]

Revised: 28 March 2021 / Accepted: 13 July 2021

Abstract

The market faces new challenges in retaining customers, since they have very high expectations, which translate into the demand for a swift response and intransigence to empty promises on the part of brands. These requirements result from the ability to disseminate and infuse information, which in turn makes customers more informed, more participative, and more uncompromising. This change in behavior implies redesigning the strategic management of the brands, in terms of the relationship with the customer. In view of this challenge, the relevance of developing an adequate differentiation model for customer retention prevails. Based on this premise, this paper presents a proposal based on RFM and ABC analytical methods applied to customer relationship management and contextualized in a particular case of the printing industry. The proposed model defines a set of metrics aimed at customer segmentation, which improves the customers knowledge. The outcomes will allow to define more assertive marketing strategies for customer loyalty and to increase the volume of a brand's revenue.

Keywords Customer relationship management · Customer segmentation · Business-to-business · Data mining analysis · RFM metric · ABC curve

Introduction

It is unquestionable that marketing activity reflects the way by which organizations or brands stablish the relationships with their customers. Acquiring customer knowledge to improve the marketing and the customer relationship management (CRM) is one of the most important strategic objectives of companies today. A marketing plan is a strategic instrument to orient the brands in this complex process (Kotler and Keller 2012). This gives solid guidelines to guide the marketing professionals to the discovery of the most relevant knowledge about internal and external environment where company is operating.

One part of developing process of an marketing plan is, at level of micro-environment, the customer analysis. To do this, although several existing analytical methods have advantages, they have some drawbacks that limit the ability of managers to accurately assess customer value (Keiningham et al. 2006). So, based in a case study in the printing industry, this paper presents a proposal of improving the customer knowledge sustained in RFM (Recency, Frequency and Monetary value) and ABC (Pareto Rule) analytical methods. A combination of these data mining methods allows processing data from the customer behavior and can create an effective knowledge base for manager access to CRM system (Kumar and Reinartz 2019; Peppers and Rogers 2017; Panuš et al. 2016).

To report the research carried out, the paper is organized, after this introduction, in six most relevant sections. First, the state of the art is presented about the foundation of customer knowledge discovering supported by a marketing plan, following the orientation of a marketing guru (Kotler and Keller 2012). Consequently, focusing on customers analysis, the original concepts of RFM metric and the ABC curve are presented. After, the analytical framework to support this study applied in the printing industry case is described. Then, the research methodological procedure is described, and the main outcomes are reported and discussed. Finally, we present the most relevant conclusions

✉ Dora Simões
dora.simoes@ua.pt

Joana Nogueira
joanasgnogueira@gmail.com

[1] Institute of Accounting and Administration, Digimedia, University of Aveiro, Aveiro, Portugal

[2] Institute of Accounting and Administration, University of Aveiro, Aveiro, Portugal

and the business and academic implications and contributions of this research.

Marketing plan oriented to customer retention

Since its origin (e.g., Pires 2008; Keller 1993), marketing has been cataloged as the science associated with the relationship management between the organization and the market, in which it acts to achieve the proposed objectives, as well as satisfying the needs of the market. More recently, the commonly known father of marketing—Philip Kotler—reinforced being concerned with guaranteeing and satisfying customer needs and generating profit for organizations/brands. Adding yet to mention activities of innovation of the offer, of overcoming the competition and, consequently, improvement of the position of the products in the market (Kotler and Keller 2012). Also, Lindon and colleagues (Lindon et al. 2013) corroborate the previous definitions, saying that marketing is defined through a set of means that the company must sell its products to its customers, with profitability. To enhance the defined concepts, the author Grönroos (2014), in turn, mentions that marketing is a planning process that aims at executing, designing, promoting, and distributing ideas to publicize goods and services to meet individual and organizational objectives. The same author adds that this concept is not exclusive to the activity of planning and implementing a certain set of mediums and strategies to attack the competition, but rather to establish and develop relationships with customers in order to retain the best customers and increase profitability. So, to achieve these goals, learning from customer knowledge is crucial.

On marketing premises, their activities are fundamental for the development and growth of organizations or brands, since they mirror the bidirectional interaction, in which it involves the implementation of tactics with the aim of satisfying the needs and preferences of customers, generating value and profit for the brands. Also, and following the lines of thoughts of Nunes and Cavique (2008), a marketing plan is intended to be an instrument that aims to materialize the strategies in actions with the aim of reaching the organizational objectives and, simultaneously, to satisfy the target audience in order to build loyalty. A marketing plan aims to guide and coordinate companies or brands, based, according to Kotler and Keller (2012), on 2 levels: strategic and tactical. Strategic marketing indicates the target market and the value proposal that are defined considering the best market opportunities. Tactical marketing determines strategies at the marketing-mix level. So, the structure defined by the authors for a marketing plan is as follows:

1. Executive summary
2. Situation analysis
3. Marketing strategies
4. Financial data
5. Control

In stage 1—executive summary—a summary of all contents of the marketing plan is presented. Stage 2—situation analysis—is divided into two essential parts: internal and external analysis. The internal analysis consists of the characterization of the company / brand, while the external analysis covers the market, the sector, the customers and even the competition. In addition to these analyzes, the SWOT analysis is also carried out—which consists of a description of the strengths, weaknesses, opportunities and threats, as these factors help to define the strategic objectives. Thus, the stage 3—marketing strategies—aims to determine the specific goals to be achieved, followed by the definition of the targets, positioning and strategies at the marketing-mix level. Subsequently, in stage 4—financial data—the structure and definition of each tactic to be implemented are presented, with the respective budget and responsible. In the last stage—control—the criteria that monitor the implemented goals is presented, and this control allows to evaluate the efficiency of the objectives (Kotler and Keller 2012). In step 2—situation analysis—and, particularly on the external level, the customer analysis is applied. This analysis aims to find out what external signs must the company be aware of in order to make more strategic decisions to improve customer service. These focus on analyzing the market and the macro- and micro- environment. The macro-environment analysis is divided into two specific analysis: PEST (Political, Economic, Social, and Technology) and about the sector in which the brand is inserted. The micro-environment analysis includes two key sub-analysis: customers and competition. In this paper, the research focus is on micro-environment analysis, specifically in customer analysis.

CRM analytical methods

To manage the relationship between the customer and the organization, it is possible to use many different methods from different fields. One of the fundamental domains is data mining (Kumar and Reinartz 2019; Peppers and Rogers 2017). Given the fact that CRM often contains much data, data mining and its methods is a suitable tool for the execution of the analysis. Thus, to understand the different approaches where the methodology of customer segmentation is applied, a literature review was performed in Scopus database to identify the most relevant works and developments supported in RFM metric and ABC curve. Innovative benefit is connecting analytical methods used in marketing and in customer relationship management with data mining

methods used for clustering. The reason why we made such combination is huge amounts of data, for which data mining techniques are suitable. These methods can be used for customer grouping in segments with different attributes. These segments are a base for aimed building of relationships with individual groups of customer within CRM. Nevertheless, a search on Scopus database made using "RFM" and "ABC" terms applied on CRM domain, resulted in only one document that reports to research work using the RFM and ABC curve analysis to customer segmentation. It refers to use of data from a IT company offering advisory services. It is a paper of Panuš and colleagues (Panuš et al. 2016), published in the proceedings of the IEEE International Conference on Information and Digital Technologies. The authors also sustained their research in that the customer value can provide valid knowledge for more targeted and personalized marketing strategies. In addition, the segmentation makes management's decisions easier, enhancing that the company can decide which type of customers they want to target.

The RFM model measures when people buy, how often they buy and how much they buy (for example, Chiang 2017). The combined analysis should evaluate the customer according to the purchasing behaviour (RFM analysis) point of view, and from the other important factors for each given community type (ABC curve analysis).

The ABC curve (also known as Pareto Rule) is a classic quality tool, which aims to improve and consolidate quality in various aspects, such as: reduction of defects, breakdowns and costs, reduction of deadlines, among other factors (Pinto et al. 2010). In light of this advantage, the method can be applied in the analysis of customers, using metrics such as revenue, frequency of purchase, quantity ordered, among others. Thus, making it possible to identify and differentiate the value of customers. This method is based on dividing customers into 3 classes. Class "A" customers are more relevant. Customers who are in class "B" represent an intermediate level of importance. "C" customers represent low or zero relevance. This method assists in making strategic decisions, hence the relevance of carrying out monthly and annually analysis to create a history, in which the progression on its propensity to retention is perceived.

The RFM metric has been one of the most widely used method to identify best customers for the past 30 years—particularly by direct marketers (Zhou et al. 2011; Wei et al. 2010; Hughes 1994). It assumes that past purchase behavior can pinpoint a firm's best customers. Originally, it uses three main variables to identify the best customers: (1) recency (R), which describes how recently the customer made a purchase; (2) frequency (F), which describes how frequently the customer makes a purchase; and finally (3) monetary value (M), which essentially indicates the revenue generated by the customer. The assumption is that the most recent, most frequent, and largest spending customers are the best customers since it is assumed, they will act similarly in the future as well. RFM analysis is based on the analysis of the individual entries of performed purchases.

The biggest problem with RFM, however, is that it assumes that how recently, how frequently, and how much a customer spends are the only three variables that determine the value of a customer. Clearly, there could be numerous other alternate and/or supplementary factors that determine "best" customers that should be taken into consideration when identifying customers for acquisition or retention efforts (e.g., Sun et al. 2021; Chiang 2017, 2014, 2011; Khajvand and Tarokh 2011; Khajvand et al. 2011; Keiningham et al. 2006). Reviewing the articles about the RFM metric and the extended RFM metrics to show how RFM can be combined with other variables and other models provided a fruitful insight to develop the analytical framework described in following. In fact, RFM model has been proven to be very successful in a variety of business areas, but its combination with other metrics like payment time is particularly relevant in business-to business industries. These metrics grounded on fundamentals of ABC curve sound an unavoidable rule in this business market typology.

Analytical framework

Grounded in a combination of ABC curve and RFM analytical methods, the applicability of a marketing plan to the study of customers can then be explained by the following framework whose variables and questions are:

- Revenue: Who are the main customers who contribute the most to the revenue generated by the brand?
- Frequency of purchase: Who are the main customers who participate the most in ordering units from the brand?
- Quantity ordered: Who are the main customers who contribute the most for the quantity of units ordered from the brand?

The metric is applied by segmenting customers into three classes ("A", "B" and "C"), as shown in Table 1 (Reis 2008).

Methodologic procedure

Consow1lidating this investigation in a case study approach (Yin 2011, 2014), in which the elaboration of a marketing plan is diligent, the work reported here reflects the application of the analytical framework described in the previous section, for the analysis of customers in an anonymized printing industry case. This had as main objective the creation of guidelines, in the sense of defining concrete strategies

Table 1 Analysis based on ABC classes

Variable	Class	Description
Revenue	A	Corresponds to 20% of customers who contribute to 80% of the brand's revenue
	B	Corresponds to 30% of customers who contribute to 15% of the brand's revenue
	C	Corresponds to 50% of customers who contribute to 5% of the brand's revenue
Frequency of purchase	1	Corresponds to 20% of customers who contribute to 80% of the purchase orders
	2	Corresponds to 30% of customers who contribute to 15% of the purchase orders
	3	Corresponds to 50% of customers who contribute to 5% of the purchase orders
Quantity ordered	1A	Corresponds to 20% of customers who contribute to 80% of the quantities ordered
	2B	Corresponds to 30% of customers who contribute to 15% of the quantities ordered
	3C	Corresponds to 50% of customers who contribute to 5% of the quantities ordered

Additionally, a "payment time" variable is considered to rank the customers

that meet the objectives of the business of loyalty among the most valuable customers.

So, reporting to the stage 2—situation analysis—of marketing plan (Kotler and Keller 2012), and particularly to the customer analysis (at the level of microenvironment analysis in external analysis diagnosis), the data sources are qualitative and quantitative from an internal brand database (supported in GGWEB Print management software). With these data, the analyzes of the ABC curve were carried out, which were based on hybrid RFM metric, including the following variables: revenue, frequency of purchase, quantity ordered, and payment time. After the compilation of all information, customers were segmented according to the market in which they operate: B2B (business-to-business) or B2C (business-to-consumer) and subsequently, they were segmented again according to 3 criteria: geographic location, product type (book, package, and business communication) and type of work (offset printing, digital printing, digital & offset printing, and finishing's). The results of this stage (which in the context of another investigation should also include analysis of competition, PEST analysis and sector analysis) should "feed" stage 3—marketing strategies—which is subdivided into 4 crucial components, namely: objectives, segmentation, target audience, and positioning and marketing strategies. The results will make possible to rank the customers "A" by profitability, based on revenue. These outcomes complemented with the analysis of the variable's frequency of purchase, quantity ordered, and payment time, will allow to define the target audience of the brand—personas. Thus, the global marketing strategy should reflect the following policies: product, price, distribution, communication, people, processes, and physical evidence.

In summary, the methodological procedure applied in the analysis of customers is divided into four essential points: objectives, sample, collection, and instruments and procedures of analysis. Thus, the overall objective of this case study was to determine the best customers for two consecutive years, according to the parameters specified above, and to which the payment time is added. In this sense, the study seeks to achieve the following specific objectives:

- Characterization of the purchasing behavior pattern of customer "A" (referring to the revenue variable) of B2B in segments "publisher/book" and "industry/package".
- Classification of customers according to a typology, integrating the variables revenue, frequency of purchase, quantity ordered, and payment time.
- Definition of the target audience for each segment.
- Identification of customers who purchase most frequently.
- Identification of customers who are in compliance with the payment deadlines agreed and those who are not.
- Recognition of customers who place the highest number of orders.
- Recognition of customers who most significantly contribute to the brand's revenue and profitability.

After grouping data by year (2017 and 2018), the sample was classified and clustered according to the type of market: B2B (business) and B2C (final consumer) (see Table 2). The analysis was performed supported in IBM SPSS v.21 software and MS Excel 2016 software. The 2017 sample consisted of 254 final customers, 221 enterprises (corresponding to 87% of total customers) and 33 final consumers (13%). In relation to 2018, it consisted of 281 customers, of which 237 (84%) enterprises and 44 (16%) final consumers. Concerning the product type, in the B2B cluster, in 2017, it was found that 90 (41%) customers belong to the "publisher/book" segment, 30 (14%) customers were included in the "industry/package" segment and 101 (46%) customers in "industry/business communication". In the B2B segment, in 2018, 102 (43%) customers were registered in the "publisher/book" segment, 31 (13%) customers in the "industry/package" segment and 104 (44%) customers in "industry"/communication business. In the B2C cluster, in 2017, it was possible to notice

Table 2 Sample classification by market type and product type

Year	Market type	Product type			Sample	Frequency (%)
		Book	Package	Business communication		
2017	B2B	90	30	101	221	87
	B2C	24	0	9	33	13
Total					254	100
2018	B2B	102	31	104	237	84
	B2C	27	0	17	44	16
Total					281	100

the existence of 24 (73%) customers in the "publisher/book" segment and 9 (27%) customers in the "industry/business communication" segment. In 2018, there were 27 (61%) customers belonging to the "publisher/book" segment, including the remaining 17 (39%) customers in the "industry/business communication" segment.

Following, it was possible to design tables with the variables revenue, frequency of purchase and quantity ordered, including the attributes: "customer number", "taxpayer", "salesperson", "geographic area", "product type", "kind of work ","market (customer)", "revenue", "frequency of purchase", "quantity ordered", "percentage", "accumulated percentage" and "class ABC". To the variable "payment time" analysis, other attributes were added, such as: "compliance / non-compliance with conditions", "limit exceeded (in days)", "exceeds 120 days" and, finally, "the classification".

After clustering the customers according to the B2B and B2C typologies, a new segmentation was elaborated according to (the procedure followed is summarized in Fig. 1):

- Product type: publisher (book) and industry (package or business communication).
- Kind of work: offset printing, digital printing, digital & offset printing, and finishing's).
- Salesperson: name.
- Geographic location: district and county.

Then, the ABC curve analysis were performed for the following variables: revenue, frequency of purchase, quantity ordered, and payment time.

All customers were identified and ranked in ascending order in terms of revenue, frequency of purchase, quantity ordered, and payment time, respectively. In this way, customers were classified by association of different scores: class "A" —3 points, class "B" —2 points and class "C" —1 point. After this phase, the classifications obtained (sum of the scores) were represented in tabular form (due

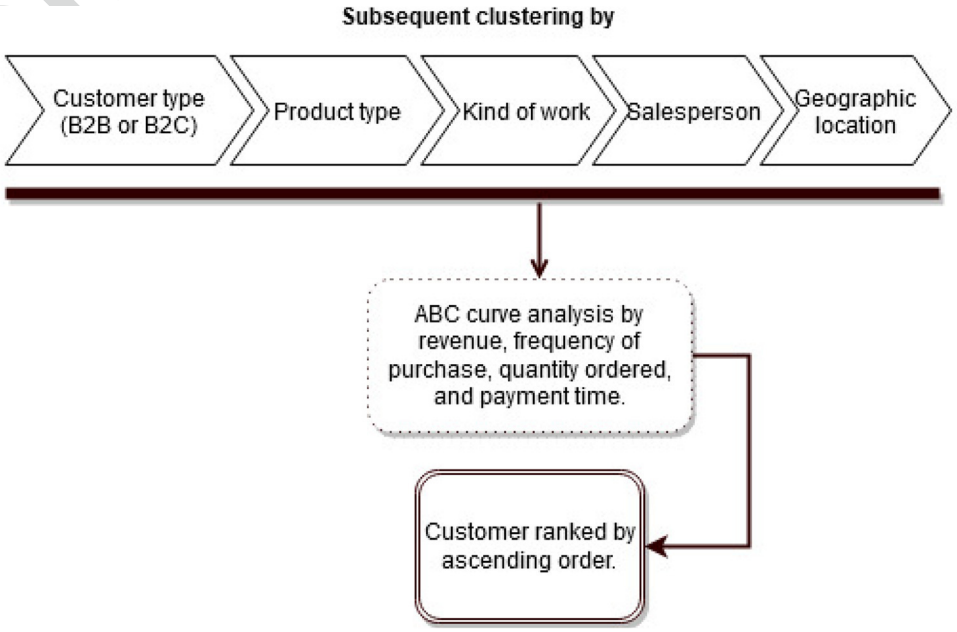

Fig. 1 Customers clustering procedure

its large size it cannot be included in this document), to obtain a ranking according to the criteria presented. After carrying out the aforementioned analysis, the purchasing behavior model of customer B2B "A" was proceeded (referring to the revenue variable). Thus, the study is presented under a correlational analysis by the attributes "customer number", "revenue", "frequency of purchase", "quantity ordered" and "payment time". As stand-alone variables were chosen: "product type" (book, package, and business communication) and "type of work" (offset printing, digital printing, digital & offset printing, and finishing's). In this way, it was possible to define the target audience to be reached in each segment (book, package, and business communication).

Outcomes and discussion

The results related to customers B2B "A" are presented here, since they are significantly more representative, contributing on a larger scale to revenue (around 80%) and brand profitability. The analysis presented is the result of the integration of the following variables: "revenue", "frequency of purchase", "quantity ordered" and "payment time" per "product type" and "kind of work". The results of the years 2017 and 2018 that characterize the customer in the "publisher/book" and "industry/package" segment are presented by graphs. It was decided to not characterize the customer in the "industry/business communication" segment, as it turns out that this did not significantly contribute to the brand's revenue and profitability.

Books category

In 2017, the B2B "A" customers were distributed as followed: 4 in digital printing, 8 in offset printing, 2 in digital & offset printing and 1 in finishing's. In 2018 there were a total of 6 customers in digital printing, 7 in offset printing, 2 in digital & offset printing and 1 in finishing's. Therefore, the results show that there was a slight increase in the number of customers between 2017 (15) and 2018 (16) (Fig. 2).

Regarding the revenue (Fig. 3), it was found that in 2017, on average, each customer of digital printing and digital & offset printing contributed with more than 60,000.00 €. It was also found that each customer of offset printing spent more than 75,000.00 € and each customer of finishing's contributes with 16,000.00 €. In 2018, it was found that each customer of digital printing contributed with more than 45,000.00 €, while those of offset printing invested more than 77,000.00 € (on average). It is also verified that each customer of digital & offset printing participated financially with more than 50,000.00 € and that each customer of finishing's contributes with more than € 14,000.00 (on average). Thus, it can be concluded that the offset printing' work generates the most revenue for the brand. Comparing the 2 years, it is possible to conclude that, in financial terms, the year 2017 presented a sales volume significantly higher than the year 2018.

For the frequency of purchase (Fig. 4), in the years 2017 and 2018, it was found that the customers who presented higher values belonged to the areas of digital printing, offset printing and digital & offset printing. Still, in 2017, the customer who purchased the most frequently was included in digital printing' work, while in 2018, this place was occupied by offset printing' work. Through comparative analysis,

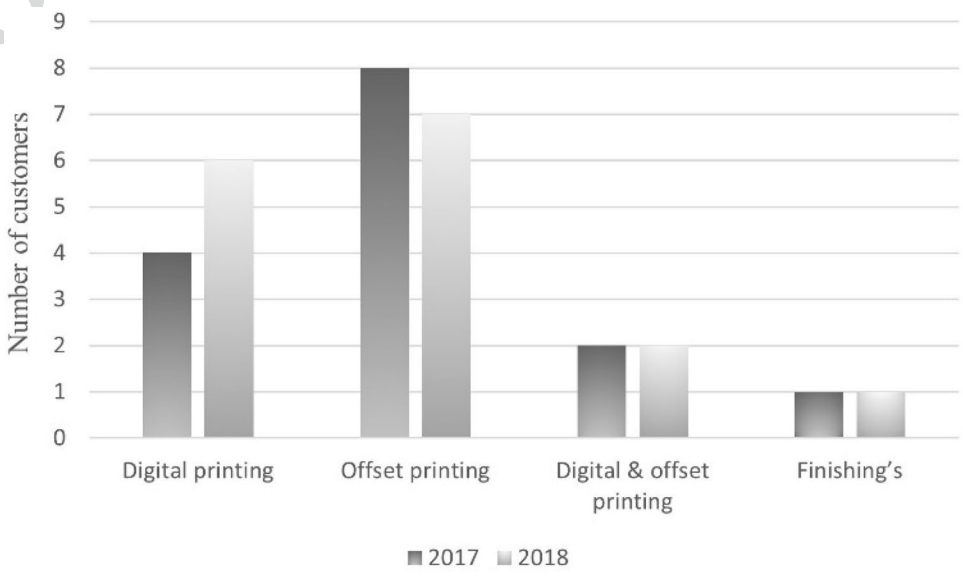

Fig. 2 Customer B2B "A" of "publisher/book": number of customers per kind of work

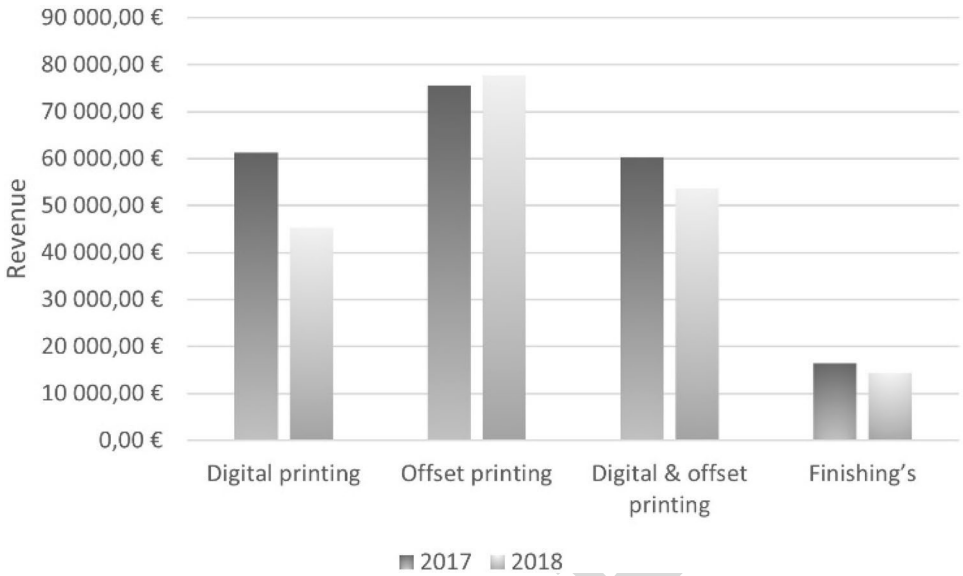

Fig. 3 Customer B2B "A" of "publisher/book": revenue per kind of work

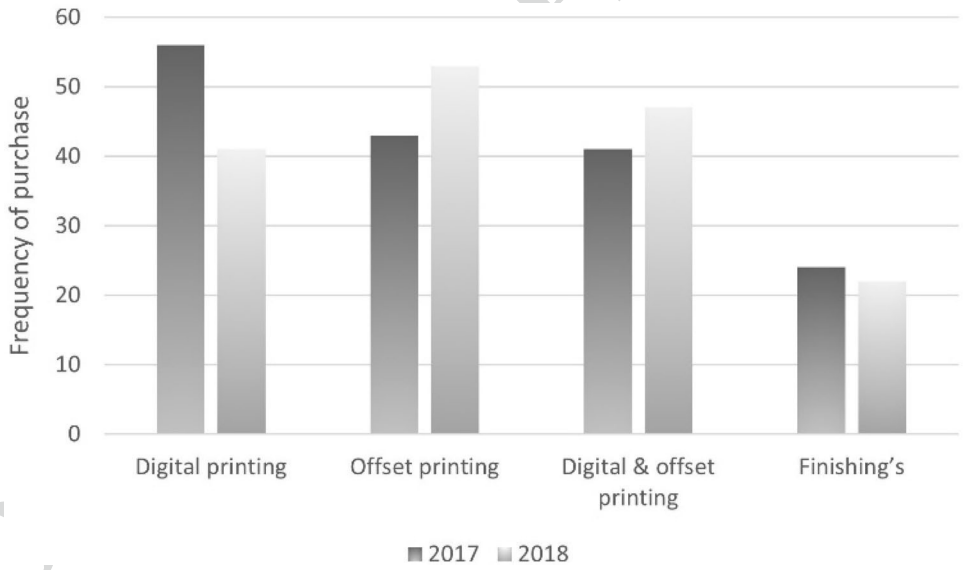

Fig. 4 Customer B2B "A" of "publisher/book": frequency of purchase per kind of work

it is possible to infer that in 2018 there was a significant decrease in the frequency of purchase compared to 2017.

Regarding the quantity ordered (Fig. 5), it was noticed that in the years 2017 and 2018, customers in works of offset printing and finishing's ordered a greater number of units compared to those of digital & offset printing and digital printing. Through the comparative analysis, it is added that in 2018, the customer of offset printing ordered more units than the same customer in 2017. Parallel to this, the digital & offset printing' customers also registered a higher number of orders in 2018 compared to 2017.

For the last "payment time" variable, it was found that in the years under study, all customers paid off their debts, even though most of them made it outside the conditions agreed with the brand, causing a non-compliance with the payment terms (Fig. 6). The offset printing' customer was the one that most exceeded the agreed deadline. In 2017, it exceeded the payment term limit, on average, by 47 days, when the agreed conditions were 45 days, verifying that the customer paid off his accounts at 92 days. In relation to 2018, this period was exceeded by 75 days, with settlement being made at 120 days (on average). The best paying customers were confirmed to be of the digital printing' work.

In short, it can be mentioned that in the "publisher/book" segment there is a greater number of customers of the offset printing' work. These customers being the ones that most contribute to the brand's revenue. These customers contribute substantially to the production of the brand, although they take longer to pay off their debts.

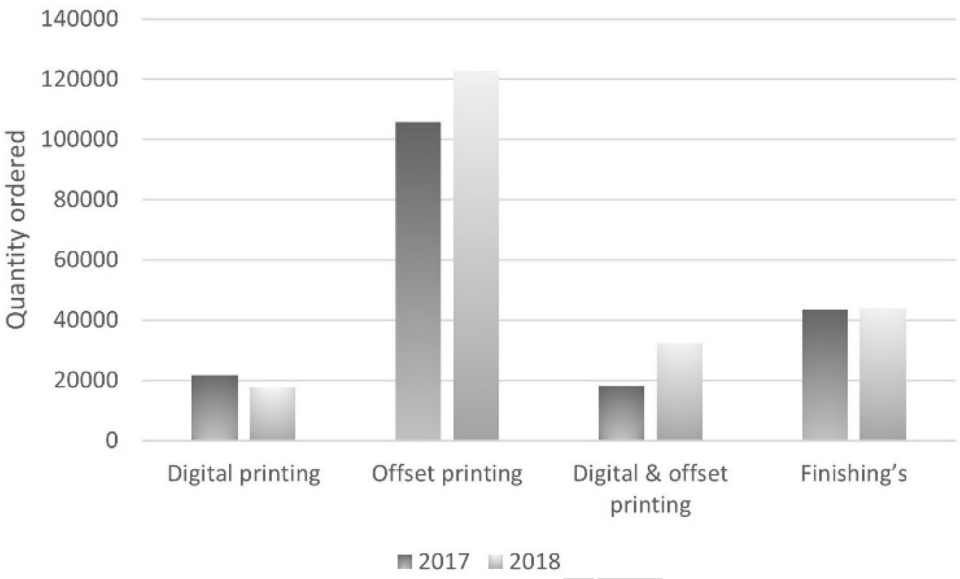

Fig. 5 Customer B2B "A" of "publisher/book": quantity ordered per kind of work

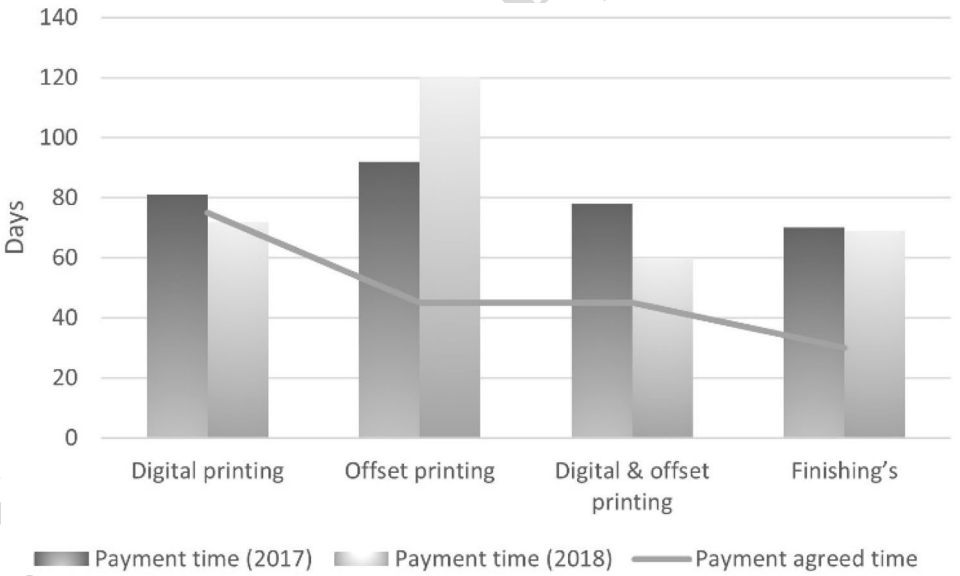

Fig. 6 Customer B2B "A" of "publisher/book": payment time per type of work

Packages category

From the data collected on the "industry/package" category, there was a growth trend in the number of customers, with 13 customers registered in 2017 and 16 customers in 2018. However, the same growth trend was not seen in relation to sales volume (Fig. 7). There was a decrease in revenue from 2017 to 2018. In 2017, each customer in this segment contributed, on average, more than 56,000.00 € annually, while in 2018, the value was around 39,000.00 €.

In "industry/package", it was found that the relationship between frequency of purchase and quantity ordered (Fig. 8), between 2017 and 2018, was inversely proportional. In 2017, on average, the frequency of purchase was 214 and in 2018 only 147. In contrast, the quantity ordered increased between 2017 and 2018. In 2017, orders totaled 88 319 units, while in 2018 they reached 543 792 units.

Concerning the last variable— "payment time" —it was found that in 2017 and 2018 all customers settled their debts outside the conditions agreed with the brand, leading to a non-compliance with the payment term. When the agreed conditions were 45 days, on average, payments were made at 123 and 125 days, respectively, in 2017 and 2018. The limit was thus exceeded by more than 70 days.

The infographic, shown in Fig. 9, summarizes illustratively the analysis performed, constituting as a communicational tool that facilitates the process of understanding and interpreting the most relevant results.

Complementarily to the results described above, observing the Fig. 9, we enhance the factors that the customers

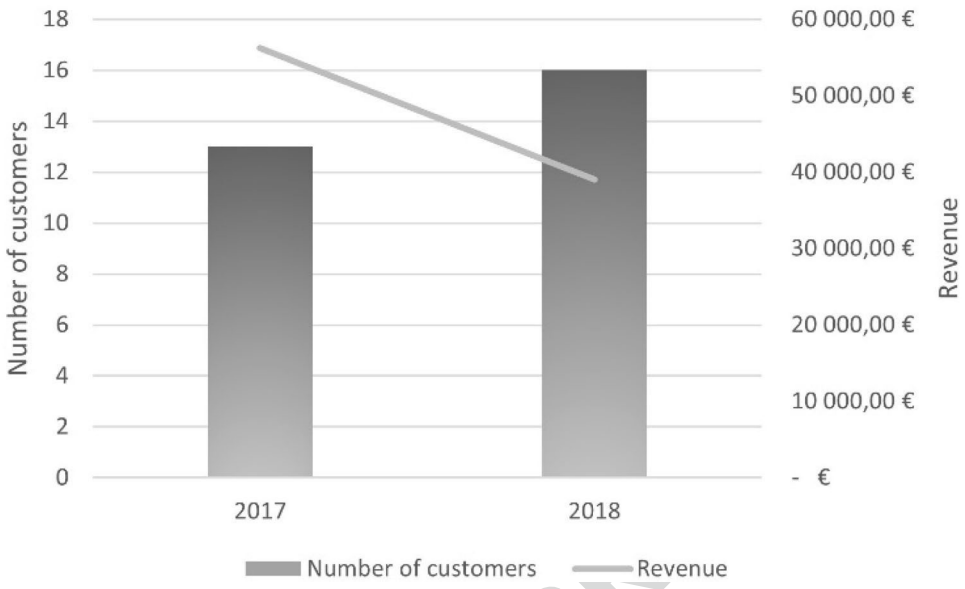

Fig. 7 Customer B2B "A" of "industry/package": number of customers vs revenue

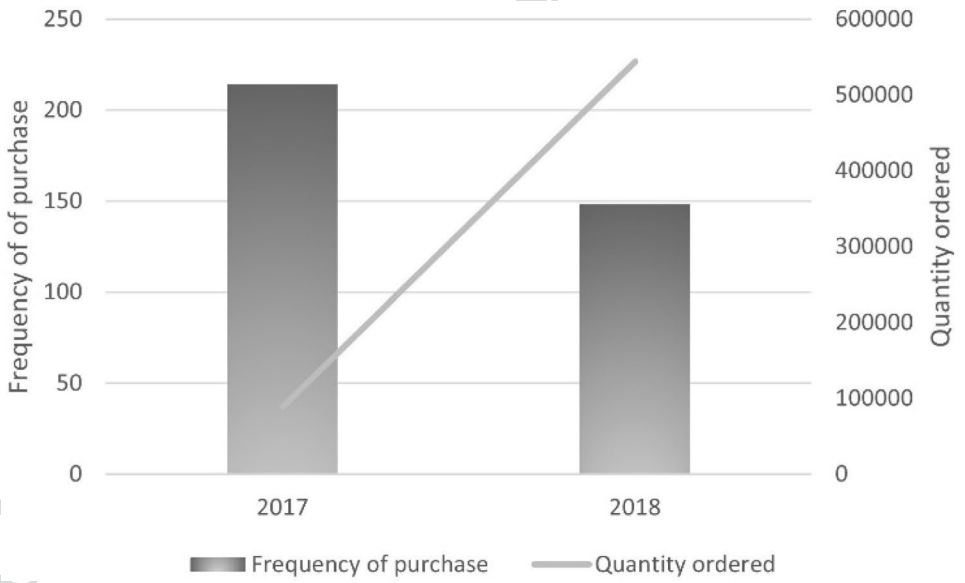

Fig. 8 Customer B2B "A" of "industry/package": frequency of purchase vs quantity ordered

most expect to experience from the brand: a good "price/quality" ratio and the accomplishment of the delivery deadlines.

Additional outcomes

A complementary analysis to customer B2B "A" (revenue' variable) was made, adding a re-classification to each customer as customer "1" (frequency of purchase' variable), customer "1A" (order quantity' variable) and customer "A1" (payment time' variable).

The diagnosis of the "payment time" variable was made by analyzing, in addition to this variable, the payment agreed time (days), its compliance or non-compliance, the number of the days exceeded (in case of non-compliance), and if it exceeds 120 days. After this verification, customers were classified according to the typology "A1", "B2" and "C3", following the criteria:

- A1—customers who paid in advance or within the agreed payment terms.
- B2—customers who exceeded the limit of payment terms but did not exceed the limit of 120 days.
- C3—customers who exceeded the limit of payment terms and the limit of 120 days.

To complement the analysis carried out, a correlation was made that relates the 4 variables per type of product. In this way, it was possible to determine the growth or decrease of each cluster, in each variable, and to present the ranking of

Fig. 9 Infographic of customer B2B "A" to "publisher/book" and "industry/package" segments

Table 3 Customer B2B "A": revenue per product type

Year	Variable	Product type			Total
		Book	Package	Business communication	
2017	Number of customers	15 (41%)	13 (35%)	9 (24%)	37 (100%)
	Revenue	987 039,16 € (52%)	731 629,49 € (38%)	194 762,82 € (10%)	1 913 431,47 € (100%)
2018	Number of customers	16 (41%)	16 (41%)	7 (18%)	39 (100%)
	Revenue	937 367,14 € (55%)	624 466,36 € (36%)	152 831,20 € (9%)	1 714 664,70 € (100%)

the best customers according to the integration of all variables. The "revenue" variable aims to determine the 20% of customers who contribute to 80% of the brand's revenue (Pareto Rule). It was found that in 2017 and 2018 (Table 3) the customers who contributed most to the brand's revenue belonged to the "publisher/book" and "industry/package" segments. There was also a growing trend in terms of the number of customers in these two areas of activity. However, from 2017 to 2018, despite the increase in the number of customers B2B "A", the revenue generated by them decreased.

The "frequency of purchase" variable aimed at identifying the 20% of customers who contributed to 80% of orders. In view of this objective, it was found that in 2017 and 2018 (Table 4), the customers who placed the most orders were included in the "publisher/book" and "industry/package" segments. In line with the growth trend in terms of the number of customers B2B "A" in these 2 segments, there was also progress in terms of the number of customers who purchased more regularly, with 28 customers registered in 2017 and 32 customers in 2018.

The "quantity ordered" variable was intended to identify the 20% of customers who contributed to 80% of the quantity ordered of books, packages, and communication tools. Thus, it was found that the customers who ordered the largest quantities belonged to the "industry/package", either in 2017 or 2018 (Table 5). There was also an increase in the number of customers in this segment, between the two years.

The "payment time" variable aimed to identify customers who paid their debts in advance or within the agreed payment terms (customer "A1"). It was found that in 2017 and 2018, the most customers who paid in these conditions belonged to the "publisher/book" segment. While the customers from the "industry/package" segment were the ones who least paid within the agreed payment terms.

Final remarks

Through the analysis of the revenue aspect, it was found that the customers of the "publisher/book" segment contributed more to the brand's revenue and profitability. These customers share some characteristics, such as satisfaction, loyalty, and seniority (data obtained in complementary studies, carried out to complete the marketing plan). However, based on the analysis of the ABC curve, particularly the variables "frequency of purchase" and "quantity ordered", it is possible to conclude that there is a greater number of customers in the "industry/package" segment compared to the "publisher/book" segment. Regarding the "payment time" variable, it was verified that the customers who were most late in paying are type "A" (revenue variable), although they are the ones who contribute to about 80% of the brand revenue. However, customers in the "publisher/book" segment are more punctual to settle their debts compared to those in the "industry/package" segment. These outcomes are relevant to the sales force, since with this instrument it is possible to redefine strategies and improve tactics of involvement with the customer, and consequently, establish a relationship of greater trust.

The study also made it possible to ascertain the existence of differences in the ranking of best customers, when compared to the global analysis and the analysis of the "revenue" aspect. In the global analysis—2017 and 2018 (Table 6) —it is possible to retain that the best customers belong to the "industry/package" segment whereas if we consider only

Table 4 Customer B2B "1": frequency of purchase per product type

Year	Variable	Product type			Total
		Book	Package	Business communication	
2017	Number of customers	9 (47%)	17 (89%)	2 (11%)	28 (100%)
	Frequency of purchase	624 (17%)	2976 (81%)	76 (2%)	3676 (100%)
2018	Number of customers	10 (31%)	20 (63%)	2 (6%)	32 (100%)
	Frequency of purchase	634 (20%)	2469 (78%)	61 (2%)	3164 (100%)

Table 5 Customer B2B "1A": quantity ordered per product type

Year	Variable	Product type			Total
		Book	Package	Business communication	
2017	Number of customers	2 (7%)	12 (43%)	1 (4%)	15 (100%)
	Quantity ordered	751,374 (7%)	9,760,490 (91%)	260,423 (2%)	10,772,287 (100%)
2018	Number of customers	2 (12%)	14 (82%)	1 (6%)	17 (100%)
	Quantity ordered	679,966 (7%)	8,623,698 (89%)	359,746 (4%)	9,663,410 (100%)

Table 6 Customer B2B "A": comparison between global data and revenue data

Year	Variable	Product type			Total
		Book	Package	Business communication	
2017	Global	12 (38%)	17 (53%)	3 (9%)	32
	Revenue	15 (41%)	13 (35%)	9 (24%)	37
2018	Global	15 (38%)	20 (51%)	4 (10%)	39
	Revenue	16 (41%)	16 (41%)	7 (18%)	39

the "revenue" variable, the best customers belong to the "publisher/book" segment. One of the main reasons for such evidence seems to be due to the variables "frequency of purchase" and "quantity ordered" —customers in the "industry/package" segment order more regularly and larger quantities, assigning consequently a maximum score on these variables. It is important to highlight that these customers scored such a classification in the variables "frequency of purchase" and "quantity ordered" due to the type of product purchased being much more consumable—packages like bags and some others packaging boxes, compared to the books. In addition, the best customers in the "industry/business communication" segment registered significantly low values in the global analysis, especially due to the "frequency of purchase" and "quantity ordered" variables.

In short, it appears that customers in the "publisher/book" segment have a different pattern of behavior comparatively to the customers in the "industry/package" segment. This conclusion makes it possible to outline the next market prospecting actions, more oriented to the target audience that is intended to acquire and retain. The strategy may involve attracting new customers through current customers. Loyal customers could be guested to invite potential customers to the brand, both of which can enjoy advantages in terms of payment terms, delivery, and price discounts.

Conclusion

The paper presented, based on a case study marketing plan strategy, an analytical framework to determine the value and differentiate each customer based on ABC curve and RFM metrics. Customer value can provide basic information for more targeted and personalized marketing. In this paper, combination of ABC curve and RFM metrics is used to customer segmentation. Results show possibility to use these combinations for customer segmentation and the results for different segments can be used to explain marketing strategies of company. This found to be a solid instrument to be applied, particularly in the context of business-to-business markets, as it was demonstrated by its application in the case study of the printing industry. The main objective was to develop and apply an instrument that can be used by brands as a guideline in the process of improving the customer knowledge, especially on the identification of the most valuable and the most growable customers as sustained, for example, by Peppers and Rogers (2017). Consequently, to improve the process of acquiring new customers and retaining of existing ones, which will allow to contribute to increase the volume of brand' revenue. In addition to these competitive advantages, the method proposed also allows to anticipate the control of production plan management with weekly and / or monthly reports. Thus, it is possible to contribute to the continuous improvement of the organizations.

The segmentation makes management's decisions easier. A company can decide which type of customers they want to target, and consequently react to the selected segment based on its strong attributes, as defended by, for example, Kotler and Keller (2012) or Kumar and Reinartz (2019). That will help them differentiate from other competitors. With the proposed model, it was possible to discover customer knowledge for such as finding the optimized customer targets for printing industry. To implement their marketing projects, this business-to-business market can filter the customer database to find optimized target market via the segmentation results. In addition, following the guidelines validated with the example presented, the printing industry can easier implement different marketing plans to different customer segments. Despite of the proposed method had been developed to be applied in this industry, the authors are confident that the procedure of this research can be applied in other business-to-business industries (such as logistic or manufacture) for discovering customer values, aiming at their target markets more accurately for implementing marketing plans.

The cost of developing a new customer is much more than retaining an existing customer (Kotler and Keller 2012). Therefore, the analytical framework proposed can help the industry in study and others, particularly congeners, to retain existing customers via dynamic online CRM systems. Hence, this research can easily help the industry to use their online CRM systems to estimate their customers' values, focusing on different target markets according to customer values. As well, these industries (business-to-business, in general) should not mind combining this optimized knowledge about their customers with a customized service as enhancing the service is an important issue for retaining existing customers and attracting new customers. In addition, the industry can increase the existing customer value generating more businesses and revenues. That is, for example, the printing industry can increase the lower customer values of middle level and increase the middle level to the

higher level. The proposal used to target marketing programs for particular customers can allow to improve response rates, revealing that these combination of analytical methods facilitate to choose which customers to target with an offer.

To complement a marketing plan, it is suggested to carry out two communication plans: internal and external, which contain strategies aimed at attracting audiences and more loyalty. These strategic instruments also allow the development of an integrated marketing communication, which seeks to spread an unique message, promoting the brands' identity and notoriety.

In addition, it is important to recognize that the methods for calculating customer lifetime value will continue to evolve, but the analytical framework proposed provides the marketing and managing professionals with a sustainable opportunity to fulfill the fundamental goal of a business: nurture profitable, long-term relationships with valuable segments of customers. These segments are base for aimed building of relationship with individual groups of customer within CRM, also argued by Panuš and colleagues (Panuš et al. 2016). Combination using data mining techniques for synthesis of data gained from ABC and RFM analysis is suitable for utilization within CRM approach to customers. Data mining have lots of application in marketing and CRM field.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

Chiang, W. 2017. Discovering customer value for marketing systems: An empirical case study. *International Journal of Production Research* 55 (17): 5157–5167. https://doi.org/10.1080/00207543.2016.1231429.

Chiang, W. 2014. Mining high value travelers using a new model designed for online CRM systems: A case study in Taiwan. *Aviation* 18 (3): 157–160. https://doi.org/10.3846/16487788.2014.969879.

Chiang, W. 2011. To mine association rules of customer values via a data mining procedure with improved model: An empirical case study. *Expert Systems with Applications* 38 (3): 1716–1722. https://doi.org/10.1016/j.eswa.2010.07.097.

Grönroos, C. 2014. Defining marketing: A market-oriented approach. *European Journal of Marketing*. https://doi.org/10.1108/MRR-09-2015-0216.

Hughes, A.M. 1994. *Strategic database marketing*. Chicago: Probus Publishing Company.

Keiningham, T., L. Aksoy, and D. Bejou. 2006. Approaches to the measurement and management of customer value. *Journal of Relationship Marketing*. 5 (2): 37–54. https://doi.org/10.1300/J366v05n02_03.

Keller, K.L. 1993. Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing* 57 (1): 1–22. https://doi.org/10.2307/1252054.

Khajvand, M., and M.J. Tarokh. 2011. Estimating customer future value of different customer segments based on adapted RFM model in retail banking context. *Paper Presented at the Procedia Computer Science* 3: 1327–1332. https://doi.org/10.1016/j.procs.2011.01.011.

Khajvand, M., K. Zolfaghar, S. Ashoori, and S. Alizadeh. 2011. Estimating customer lifetime value based on RFM analysis of customer purchase behavior: Case study. *Paper Presented at the Procedia Computer Science* 3: 57–63. https://doi.org/10.1016/j.procs.2010.12.011.

Kotler, P., and K.L. Keller. 2012. *Administração de Marketing*, 14th ed. Upper Saddle River, NJ: Prentice Hall.

Kumar, V., and W. Reinartz. 2019. *Customer Relationship Management: Concept, Strategy, and Tools*. 3rd Edition. Berlin: Springer. https://doi.org/10.1007/978-3-662-55381-7.

Lindon, D., J. Lendrevie, J. Lévy, P. Dionísio, and J.V. Rodrigues. 2013. *Mercator XXI: Teoria e prática do marketing*, 15th ed. Alfragide: Publicações Dom Quixote, Lda.

Nunes, J.C., and L. Cavique. 2008. *Plano de Marketing: Estratégia em ação*. Alfragide: Publicações Dom Quixote, Lda.

Panuš, J., H. Jonášová, K. Kantorová, M. Doležalová, and K. Hořačková. 2016. Customer segmentation utilization for differentiated approach. Paper presented at the IDT 2016—Proceedings of the International Conference on Information and Digital Technologies 2016, pp. 227–233. doi:https://doi.org/10.1109/DT.2016.7557178.

Peppers, D., and M. Rogers. 2017. *Managing Customer Experience and Relationships: A Strategic Framework*, 3rd ed. Hoboken: Wiley.

Pinto, C.A.M., J.A.M.S. Rodrigues, A. dos Santos, L.T. Melo, M.A.D. Moreira, and R.B. Rodrigues. 2010. *Fundamentos de gestão*, 3rd ed. Barcarena: Editorial Presença.

Pires, A. 2008. *Marketing: Conceitos, técnicas e problemas de gestão*, 4th ed. Lisboa: Verbo Editora.

dos Reis, R.L. 2008. *Manual de gestão de stocks: Teoria e prática*. Lisboa: Editorial Presença.

Sun, G., X. Xie, J. Zeng, W. Jiang, M. Lin, Y. Huang, and Y. Xiao. 2021. Using improved RFM model to classify consumer in big data environment. *International Journal of Embedded Systems* 14 (1): 54–64. https://doi.org/10.1504/IJES.2021.111976.

Wei, J., S. Lin, and H. Wu. 2010. A review of the application of RFM model. *African Journal of Business Management* 4 (19): 4199–4206.

Yin, R.K. 2011. *Applications of Case Study Research*, 3rd ed. Beverly Hills, CA: Sage.

Yin, R.K. 2014. *Case Study Research Design and Methods*, 5th ed. Thousand Oaks, CA: Sage.

Zhou, X., Z. Zhang, & Y. Lu. 2011. Review of customer segmentation method in CRM. Paper presented at the 2011 International Conference on Computer Science and Service System, CSSS 2011—Proceedings, 4033–4035. doi:https://doi.org/10.1109/CSSS.2011.5974617.

Dora Simões is Adjunct Professor in computer science area and member of the DigiMedia - Digital Media and Interaction Center, at University of Aveiro, Portugal. She received her PhD in Informatics Engineering from in 2008. She published two books by IGI Global: Handbook of Research on Digital Natives Engaging in Higher Education and Smart Marketing with Internet of Things, having several

other publications in books and international and national scientific journals. Her current research interests include information and knowledge management systems, relationship marketing analytics, and digital technologies in education.

Joana Nogueira completed her Master's in Marketing from the University of Aveiro in 2019. During this academic year he published an article entitled "The personality of the brand as a differentiating element in the integrated communication of the brand" at the IV Scientific Meeting of the Research & Development Unit of ISLA, Santarém, Portugal. In 2017 she completed her degree in Secretariat and Business Communication from the University of Aveiro. Her research interests focus on customer relationship management (CRM) and customer analysis.