Journal of EMERGING TRENDS IN MARKETING AND MANAGEMENT

Marketing School, The Bucharest University of Economic Studies
Bucharest
2023

Vol. I, No. 3/2023
ISSN: 2537 - 5865
ISSN-L: 2537 - 5865

The Bucharest University of Economic Studies Publishing House
6 Romana Square, 1st district, Bucharest, Romania
Postal Code: 010374
E-mail: editura@ase.ro
Phone: 021.319.19.00 / 021.319.19.01 int. 401
Website: https://editura.ase.ro/

The Bucharest University of Economic Studies Publishing House

ISSN: 2537 - 5865

ISSN-L: 2537 - 5865

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A Bundle Pricing Approach for Mobile Telecommunication Services: Method and Data Analysis

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Article history
Received 17 June 2023 | Accepted 16 August 2023 | Published online 21 August 2023.

Abstract
The bundling of goods/services is a technique many firms use to influence product demand, generate higher revenues, and enhance consumer surplus. In the telecommunications industry, offering incentive bundles of different mobile phone services is an effective technique to reach such goals in a competitive market. This paper presents a bundle pricing approach for mobile services, which determines the optimal content of service bundles in terms of the type and number of services offered to different customer segments. The proposed model aims to maximize the total firm's revenue and total consumer surplus, as the main mobile service operator's objectives. The model recognizes differential pricing as a useful tool in revenue management. First, an efficient segmentation of customers in terms of their taste and willingness to pay for different mobile services is conducted using the k-means clustering technique. Next, to handle customer buying behavior, the customer reservation price is considered based on the customers' arrival rates and their statistical distribution. Finally, the bundles' content and prices are optimized considering the type and number of services offered to different segments. Our computational experiments using sample data show the effectiveness of the proposed model toward the improvement of revenue as well as consumer surplus.

Keywords: Bundling, Telecommunication industry, Differential pricing, Consumer surplus, k–means clustering.

JEL classification: M10, M21, M30.

1. Introduction

Firms must make an essential decision to price goods/services to preserve potential customers and market share while maintaining profits. In many industries, however, production can only sometimes be balanced with demand, which could lead to lost revenue potential (van Ryzin and Talluri, 2005). The bundling of physical or non-physical goods/services is among the ways firms influence customer demand. This technique typically puts together products that are mainly replaceable by each other. At the same time, their demand distribution functions have an inverse relationship and are set at a lower price than the summation of their prices. Therefore, customers may be encouraged to buy more items, which would lead to the firm's strong position in the market and improved profitability.

In the literature, there are various definitions of bundling or bundle selling. Adams & Yellen (1976) considered bundling as selling products in a unit package. Guiltinan (1987) defined bundling as selling a bundle of two or more products at a specific price. Stremersch & Tellis (2002) distinguished between price bundling and product bundling. Price bundling was defined as selling products in a non-physical bundle with a specific discount. In contrast, product bundling was defined as selling two or more products in a physical bundle at a single price. A recent study on emerging trends identified bundling as a strategy where two or more

products, physical or non-physical, are offered together at a discounted price. (Rao *et al.*, 2018). In this paper, a different characterization of bundling is considered, where the frequency of goods/services is considered as well. Hence, we define bundling as putting together two or more physical or non-physical goods/services, which may differ in number but are the same in price.

Introducing a bundle can alter the range of choices available to consumers, thereby, given the context, impacting their purchase behavior (Yin, Jiang and Zhou, 2023). Bundling has several potential benefits for both sellers and buyers (customers), including the improvement in income and profit. For sellers, it could provide benefits such as receiving the total price of each bundle at the beginning of the sales period, helping to introduce new products to the market, reducing the transaction cost, exploiting the economies of scale, extending the economies of scope, monitoring sales and inventory more efficiently, reducing the intensity of competition in the market, and achieving partial monopoly power. On the other hand, customers could benefit from the convenience of payment (one bill for several products), enhanced surplus, and purchase discounts (Chopra and Meindl, 2007; Derdenger and Kumar, 2013). Because of the benefits mentioned above, bundle selling has traditionally been applied in many businesses. A well-known example is the software bundle of Microsoft Office, which contains several applications. Tour services (e.g., tickets and accommodation), food packages, and even data plans offered by mobile carriers are other examples of bundles commonly used in practice.

While bundling can be practical, sellers must decide which strategy would be more efficient and how to put products into a bundle and price them. Several factors would add to the complexity of such decisions, such as the variety of products, the broader aspects of market competition, and the importance of paying attention to the intelligent behavior of customers in the market (Venkatesh and Mahajan, 2009). For example, customer behavior may include the willingness to pay for organic and/or fairtrade products (Nicolae & Roșca, 2022; Pracejus and others, 2022). Moreover, as more expensive products are generally more profitable and have lower demand than less expensive alternatives, sellers, including service-providing firms, always look for optimal ways to supply cheap and expensive products together according to their available capacity (Yang and Ng, 2010).

Bundling has been used in the mobile telecommunication industry for a considerable duration, and the corresponding decisions are relevant and critical (Sridhar and Sridhar, 2019). From a mobile telecommunication service provider's perspective, an appropriate service bundling technique could benefit the firm and its customers significantly.

The general research question we aim to address in this paper is how to bundle mobile services to benefit the firm and its customers. More specifically, we present a three-phase methodology to optimize mobile service bundles and their prices, in terms of revenue and consumer surplus, given the type and number of services. While the literature on the narrower domain of mobile telecommunication service bundling consists of studies on customer perceived value (Klein and Jakopin, 2014), customers' present and future choices (Üner, Güven and Cavusgil, 2015), and customer preferences for service improvements (Dagli and Jenkins, 2016), none directly addresses our specific problem and modeling approach. The proposed model is consistent with heterogeneous customer tastes and aims to maximize the total firm's revenue and total consumer surplus as the leading mobile service provider's objectives. Given the importance of price differentiation in revenue management, first, an effective segmentation of mobile customers in terms of their tastes and willingness to use services is carried out. A *k*-means clustering approach is used to group customer purchase behavior. Customer buying behavior is then described using reservation price, and appropriate bundles are prepared to

increase willingness to use services. The goal is to maximize total revenue and consumer surplus separately. Computational experiments are provided to investigate performance.

The rest of the paper is organized as follows. Section 2 provides a review of the most relevant literature. In section 3, the proposed mobile bundle pricing methodology is presented. Sample data and numerical analyses are discussed in section 4. Finally, conclusions and future research directions are outlined in Section 5.

2. Literature Review

The most relevant literature is discussed in the following paragraphs. We start this section with the research works generally related to bundling and continue our discussion with the literature more specific to the bundling of information goods and mobile services.

Selling goods and services as a bundle has traditionally been used in many businesses to generate higher revenues. However, the first scientific research in this area was conducted in the early 1960s: Stigler (1963), for the first time, argued how a customer's willingness to buy a bundle of two negatively interdependent goods could increase the seller's profit. Adams & Yellen (1976) considered a monopolist firm selling two different products in a specific bundle; they determined optimal sales strategies under the assumptions of technology (the marginal cost of supplying products in the bundle is the sum of its component costs), indivisibility (the marginal utility from the second unit of product is equal to zero), and independence (the customer's willingness to pay or customer's reservation price for a bundle is equal to the sum of its items' reservation prices). Schmalensee (1984) improved the model proposed by Adams & Yellen (1976) through a bundling model for a monopolist who sells two types of products, where reservation prices follow a two-variable Gaussian distribution.

Hanson & Martin (1990) were the first researchers to present a method for calculating optimal bundle prices for multi-product firms. Salinger (1995) analyzed how bundling can affect a firm's profitability by comparing bundle demand and contents. Brooks et al., (2001) optimized a bundle pricing model for variable and unpredictable customer demands. Hitt & Chen (2005) discussed customized bundling, where consumers can choose a bundle from many products to attain its price discount. The existing literature has also studied competition and investigation of duopoly markets (Vaubourg, 2006; Thanassoulis, 2007). Eckalbar (2010) studied a monopolist selling bundles of two different products to a group of customers that have uniformly distributed reservation prices. For a more detailed review of relevant works on optimal bundling, we invite the reader to consult Fuerderer, Herrmann, & Wuebker (2013), Vamosiu (2018), and Rao et al. (2018).

In recent years, the development of new technologies, e-commerce, and the entrance of new competitors to the market have led to different applications of bundling. The bundling of information goods with a low marginal cost such as mobile telecommunications services is one of them. In this domain, Bakos & Brynjolfsson (2000) investigated bundling strategies for a multi-product monopolist firm supplying information goods; they found that bundling lots of information goods could be surprisingly profitable for the firm. Wu & Anandalingam (2002) presented a model to optimize the number of software bundles and their prices toward the design of a new market for information goods. Also, Venkatesh & Chatterjee (2006), Shiller & Waldfogel (2011), and Crawford & Yurukoglu (2012) studied the optimal bundling and pricing strategies of journals (printed and electronic), music tracks (album), and television channels, respectively. The research works conducted by Hiller (2017) and Banciu, Ødegaard, & Stanciu (2022) can be mentioned as a couple of more recent studies on information goods bundling.

Investigating mobile telecommunication services, as information goods, is an attractive area in the bundling and pricing literature. In this regard, Juha & Minna (1970) studied the properties of mobile service markets that use bundling strategies in Finland and the

Scandinavian market. Bouwman, Haaker, & De Vos (2007) investigated the bundles of mobile services that were more attractive to customers, and using continuous analysis, they evaluated the best combinations of services and price levels. Yang & Ng (2010) defined a mixed price bundling problem in the context of mobile wireless telecommunication, where the bundle prices were determined in such a way that the total seller's profit is maximized. Bundling in telecommunication services has also been studied as a measure for customer churn reduction (Prince and Greenstein, 2014). Klein and Jakopin (2014) investigated how users perceive the utility of mobile service bundles and their willingness to pay for such bundles. Through empirical research conducted in the Turkish market, Üner, Güven and Cavusgil (2015) analyzed consumers' present service bundle choices and their future intentions. Finally, Dagli and Jenkins (2016) utilized a choice experiment to assess consumers' willingness to pay for enhancements in mobile services, with a specific focus on 4G upgrades and roaming services.

Based on our review, the bundling technique is increasingly growing in selling information goods, e.g., mobile telecommunication services. Given the relevance and importance of this topic, this paper presents a methodology for bundle pricing in the widespread and highly competitive mobile telecommunication markets, where various services are offered. Although the existing literature covers various topic dimensions, none directly pertains to our specific problem and chosen modeling approach. In the next section, we introduce our proposed bundling method.

3. Method

Effective segmentation of a mobile service operator’s customers in terms of their tastes and willingness to use different services is considered the first step toward a proper bundling method (Phase I). While it is important to consider customer buying behavior, its comprehensive analysis requires extensive effort and time, e.g., for data acquisition through direct ways or experimental designs; therefore, as an alternative technique, probability distributions are used to describe customer buying behavior in each segment (Phase II). Then, a mathematical optimization model is solved to maximize the total firm's revenue and total consumer surplus (Phase III).

3.1. Assumptions

The model assumptions are listed below:

1. The mobile customer community has diverse tastes and varying willingness to pay for each service. This taste heterogeneity is among the most critical elements of business price management.
2. Customer demand in each period is similar to that of previous periods. This assumption helps us decide current consumption according to prior periods' demand.
3. The proposed bundles are perishable. It means that when a period is expired, the bundles cannot be transferred to the next period.
4. Each bundle is active only for one consumer, and sharing one bundle between two or more customers is impossible.
5. For each customer in each segment, there is only one opportunity to use services in the form of a bundle and its discount. It means that every customer will meet his/her extra needs only by individual buying.
6. The bundles offered to each segment are dedicated only to that segment, and other segments cannot access them.
7. Since mobile telecommunication services are placed among the information goods, the marginal cost to produce them is low and assumed to be zero. Naturally, the mobile service operator is faced with multiple fixed costs such as setup, installation, and

maintenance services costs. However, these types of costs are not considered in this study.

8. Customer demand follows a normal distribution.
9. The distribution of reservation prices for each service in each segment has a normal distribution with unknown parameters. It is necessary to explain that this assumption has a strong foundation; in most studies, asymmetric Gaussian distribution (generally having the right skewness) was obtained as an empirical distribution for reservation prices based on actual data (Schmalensee, 1984). Moreover, various types of asymmetric Gaussian distribution with different parameters can easily be converted to a standard normal distribution. According to Schmalensee (1984), the frequent use of Gaussian distribution in social sciences to represent customer tastes is a good reason for using this distribution to describe customers' reservation prices.
10. Customers are connected to the mobile network according to a Poisson process.
11. Different units of service have independent value from the customer's perspective. This assumption is essential to consider since ignoring it in some cases (e.g., consumer goods with a long life or some goods with relatively high appearance importance) could lead to bad decisions in price management. For instance, consider a bundle of two similar suits; the reservation price of the bundle increases less than expected because people are rarely willing to buy two similar suits. However, the abovementioned assumptions are valid for consumer goods with a short life or low appearance importance, such as food items.
12. The customer's reservation prices can be added together. In other words, each bundle's total customer reservation price can be calculated by the sum of its components' reservation price.
13. The mobile service operator has monopoly power in the market. It is assumed true as long as there is no significant difference between the price offered by the operator and its competitors. Hence, customers are unwilling to receive services from them due to the additional cost of subscribing to other operators.
14. Customers in each segment only purchase a bundle that would lead to a surplus and need at least all units of one of the service types in the offered bundle.

3.2. High-level Methodology

The proposed approach includes three distinct phases as follows (Figure 1):

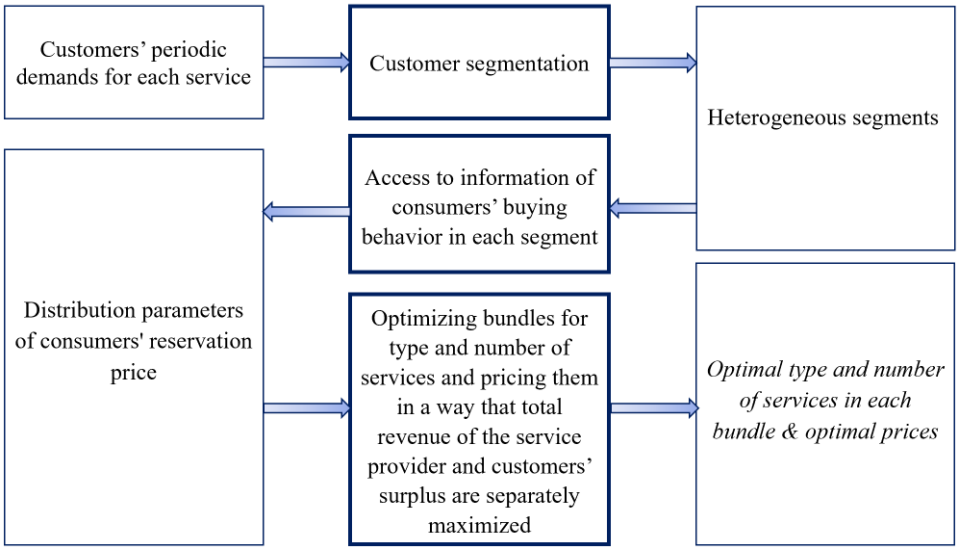

Figure 1: The proposed modeling approach for bundle pricing of mobile services

- *Phase I*- Customer segmentation based on customer consumption data.
- *Phase II*- Determining customer buying behavior in each segment and estimating the distribution parameters of customer's willingness to pay.
- *Phase III*- Optimizing the proposed bundles considering the type and the number of their services and pricing them for each segment such that the mobile service operator's total revenue or consumer surplus is maximized.

To find more information on the mathematical details of the abovementioned phases, see Appendices A (notations), B (clustering), C (reservation price), and D (optimization problem).

4. Data Analysis and Discussion

In this section, we illustrate the application of our proposed methodology using a sample data set. The sample data set contains local voice calls and short message services (SMSs) of a random sample of 2,000 active mobile customers in two monthly billing periods (collected from Hamrah-e-Avval, a major telecommunication service provider in Iran); the sample was randomly drawn from 300,000 active customers who held permanent SIM cards of the company. While only these two service types, i.e., voice call and SMS, are considered here for illustration purposes, the proposed methodology is capable of including other services such as multimedia messages or mobile internet as well.

To evaluate the model's performance, the dataset is analyzed. The customer community is segmented using *k*-means clustering, a simple yet effective algorithm for partitioning and segmenting customers (Kansal *et al.*, 2018). Results and discussion focus on total revenue and consumer surplus.

4.1. Customer Segmentation

Data clustering was performed on a sample of 2,000 active mobile customers for 20 distinct clusters using *k*-mean clustering; while we did not explore other segmentation procedures, we invite the readers to consult Leisch, Dolnicar and Grün (2018) for a comprehensive review of segmentation methods. The clustering criteria were customer demand for two services, i.e., local voice calls per minute and SMSs (the data was standardized to make each clustering criterion a free scale).

Table 1. Clustering results

Cluster number	Number of customers	Average voice call (per minute)	Variance of voice calls	Average demand for SMS	Variance of demand for SMS	Upper bound of demand for voice calls	Upper bound of demand for SMS
1	2	5,811	300.52	814	82.02	6,023	872
2	2	201	41.72	4,203	304.76	230	4,418
3	7	2,831	336.70	751	242.09	3,326	1,215
4	193	734	126.22	69	68.83	1,009	252
5	5	3,894	243.47	200	215.90	4,169	553
6	86	1,222	147.42	165	117.38	1,550	475
7	18	1,096	260.36	1,469	227.73	1,670	1,806
8	58	200	127.30	592	123.33	436	859
9	8	1,838	253.32	953	328.84	2,234	1,383
10	3	593	231.56	3,152	193.47	860	3,315
11	31	448	237.96	1,095	168.14	929	1,458
12	846	97	64.84	29	35.91	237	164
13	396	372	89.63	47	48.31	556	207
14	2	898	7.78	3,725	101.82	903	3,797
15	65	742	192.48	445	138.94	1,245	763

16	12	2,914	307.73	115	78.09	3,315	263
17	3	997	469.16	2,177	156.84	1,360	2,308
18	2	4,893	167.58	172	36.77	5,011	198
19	223	214	119.19	237	70.26	527	406
20	38	1,924	274.80	104	106.06	2,415	399

After 58 iterations, clustering reached the result (Table 1). According to our experiments, 20 clusters allowed for more detailed analysis, and none of the clusters consisted of just a single member. The latter implies the absence of an outlier in the data. Figure 2 presents the scatter plot of voice calls and SMSs in the obtained clusters by different colors.

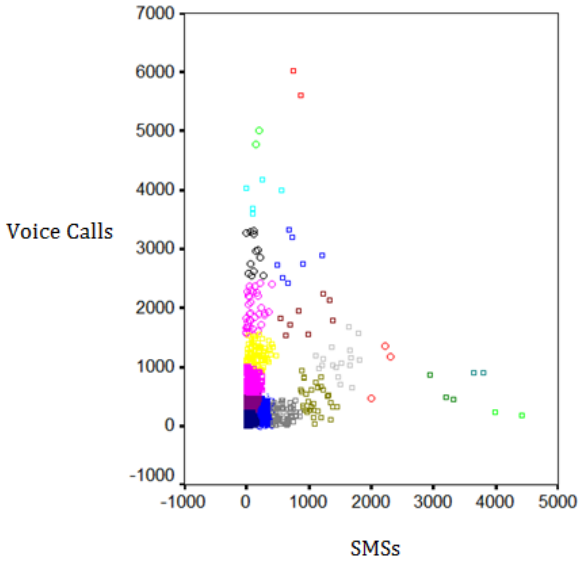

Figure 2: The scatter plot of voice calls and SMSs in the obtained clusters from the first phase

Following the completion of the first phase, probability distributions were used to evaluate the customer's willingness to pay (Audzeyeva, Summers and Schenk-Hoppé, 2012) in the second phase, where their reservation prices were determined. Finally, the optimal bundle configuration and pricing were determined in the third phase, using Simulated Annealing (SA), a metaheuristic solution algorithm (Talbi, 2009). Two scenarios are explored below.

4.2. First scenario: Bundling to maximize total revenue of mobile service operator

The first scenario is to maximize the mobile service operator's total revenue. Single SMS and one-minute voice call cost 134 and 447.5 Iranian Rial (IRR), respectively. Table 2 shows the detailed results of the first scenario. The optimal total revenue of 506,500,682 IRR is reached in 17.4626 seconds.

Table 2. Computational results (first scenario)

Cluster number	Reservation price for offered bundle	Amount of voice calls per minute	Number of SMS	Bundle prices (IRR)	Surplus for cluster
1	2,795,083	6,000	800	2,750,000	90,166
2	680,779	200	4,400	640,000	81,558
3	1,533,357	3,300	400	1,490,000	303,501
4	461,243	1,000	100	430,000	2,093,309
5	1,901,747	4,100	500	1,860,000	83,495
6	457,517	900	400	430,000	2,366,545
7	904,923	1,600	1,400	850,000	604,157
8	230,631	400	400	210,000	1,196,632

9	1,147,153	2,200	1,300	1,100,000	141,460
10	801,358	800	3,300	760,000	82,717
11	520,391	900	900	490,000	881,355
12	87,253	200	0	80,000	6,136,719
13	224,098	500	0	210,000	5,582,846
14	886,055	900	3,600	840,000	92,111
15	563,751	1,200	200	530,000	2,193,855
16	1,478,688	3,300	100	1,410,000	480,817
17	851,492	1,300	2,000	800,000	154,478
18	2,239,371	5,000	0	2,120,000	238,743
19	233,504	500	100	220,000	3,011,609
20	1,055,232	2300	300	1,010,000	226,164

The second column of Table 2 includes the optimal value of the average customer's willingness to pay or the customer's reservation price for the offered bundle to each cluster. This value for all clusters is higher than the price of the offered bundle, which implies that the offered price to customers is reasonable. The third to fifth columns correspond to optimal values of the number of voice calls per minute, number of SMSs, and price of each bundle as the optimization model variables. For example, if the mobile service operator presents a bundle of 800 text messages and 6,000 minutes of voice calls with the price of 2,750,000 IRR to the first cluster, it will lead to maximum revenue. The sixth column of Table 2, accounting for those customers who are willing to buy the offered bundles, shows the cluster-specific consumer surplus amounts.

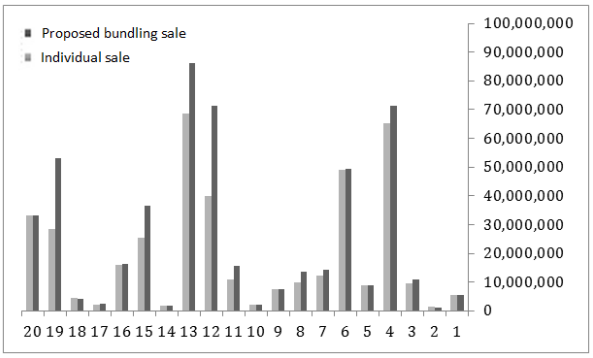

Figure 3: Revenue comparison between the proposed bundling sale and individual sale (first scenario)

Figure 3 compares the results of the proposed bundling methodology vs. individual sales by dark and light columns, respectively. The generated revenues from the proposed method in most of the clusters are more than those of individual sales. Based on the results, the total revenue of the mobile service operator using the proposed method is 506,500,682 IRR, which shows significant improvement over that of individual sales (i.e., 401,662,223 IRR). Moreover, the total consumer surplus is obtained at 26,042,237 IRR. Our observations are consistent with previously conducted studies such as Derdenger and Kumar (2013), as they show how proper bundling could lead to both improved firm profitability and enhanced consumer surplus.

4.3. Second scenario: Bundling to maximize total consumer surplus

In addition to generating revenue through bundle selling, other objectives can be important for a firm. One of these objectives is maximizing consumer surplus in all or some clusters. For example, a new mobile service operator may want to increase its share in the market or keep its loyal customers. In such cases, the operator may accept losing some potential profit and instead aim for increasing surplus for such customers. Moreover, the operator may want to attract customers who show a desire for a newly launched service and are a good market for it. Therefore, the operator maximizes the total consumer surplus as the second objective of

the pricing strategy. In this regard, an important issue is optimizing consumer surplus, which requires the lowest possible amount of feasible price for each proposed bundle. We assume that the maximum amount of discount for each bundle is 15% of the sum of contents values.

The model maximizes total consumer surplus with equal cluster weights. Table 3 shows the second scenario results: 57,037,663 IRR in 16.8496 seconds.

Table 3. Computational results (second scenario)

Cluster number	Reservation price for offered bundle	Amount of voice calls per minute	Number of SMS	Bundle prices (per IRR)	Surplus for cluster
1	2,795,083	6,000	800	2,380,000	830,166
2	680,779	200	4,400	580,000	201,558
3	1,238,033	2,400	1,200	1,050,000	1,316,237
4	284,140	600	100	240,000	7,768,718
5	1,633,918	3,500	500	1,390,000	1,219,595
6	489,582	1,000	300	420,000	5,775,342
7	594,744	900	1,400	510,000	1,525,408
8	230,631	400	400	200,000	1,776,632
9	838,821	1,500	1,300	720,000	950,574
10	787,997	800	3,200	670,000	353,993
11	390,501	600	900	340,000	1,515,051
12	87,253	200	0	80,000	6,136,719
13	224,098	500	0	200,000	9,542,846
14	899,432	900	3,700	770,000	258,865
15	563,751	1,200	200	480,000	5,443,855
16	1,478,688	3,300	0	1,260,000	2,624,258
17	851,492	1,300	2,000	730,000	364,478
18	2,253,222	5,000	100	1,920,000	666,445
19	233,504	500	100	210,000	5,241,609
20	702,771	1,500	300	610,000	3,525,314

In this scenario, the firm's total revenue increased significantly from IRR 401,661,781 in individual sales to IRR 463,365,737 in bundle selling. The generated revenue in the second scenario is lower compared to the first scenario, which is expected as the revenue is not being maximized in the second scenario. Despite our expectation of losing revenue in bundle selling, the revenue has increased. It is consistent with the observations in the first scenario and shows how bundle selling could be a win-win strategy whether revenue or consumer surplus is maximized.

Figure 4 compares revenue obtained from the proposed bundling procedure and individual sales. While in most clusters, the generated revenue through individual sales is more than the bundling sales, significant growth in total revenue is evident. Again, our observations show how bundling could be an effective strategy for firm profitability as well as consumer surplus improvements. While we do not illustrate additional scenarios, one could do so by combining the revenue and consumer surplus components with different weights and solve the resulting problem.

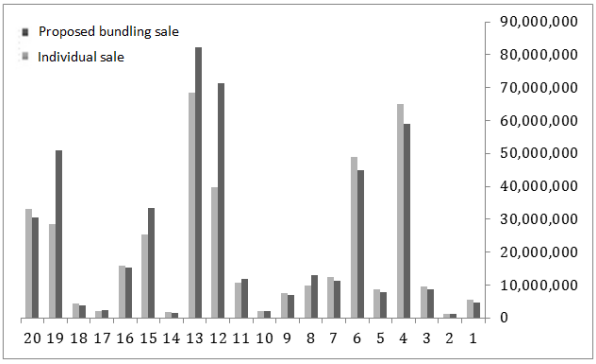

Figure 4: Revenue comparison between the proposed bundling sale and individual sale (second scenario)

5. Conclusion

Product bundling is a common practice in the telecommunication industry, where different mobile phone services are bundled and offered to various customer segments. This approach can influence product demand, generate higher revenues, and improve consumer surplus. This paper presents a bundle pricing approach for mobile services to determine the optimal content of service bundles offered to customers.

Based on our literature review, bundling is an increasingly growing and effective technique for selling information goods, e.g., mobile telecommunication services. Given the relevance and importance of this topic, we focused on bundle pricing in the mobile telecommunication markets, where there is a variety of services provided for customers.

We included three distinct phases in our proposed modeling approach. In the first phase, customers were segmented based on their taste and their willingness to pay for different mobile services; such segmentation was conducted using a simple *k*-means clustering technique. In the second phase, to account for customer buying behavior, customer reservation prices were determined given the customers' arrival rates and their statistical distribution. Then, the content of offered bundles and their prices were optimized in the third phase considering the type and number of services offered to different segments.

To test the effectiveness of the proposed model toward the improvement of revenue as well as consumer surplus, we conducted computational experiments on sample data. Two different scenarios were considered. In the first scenario, the model objective was maximizing the total revenue of the mobile service operator. Then, maximizing the total consumer surplus was investigated as a second scenario. To this end, the proposed model was applied to the sample data according to the three phases of the model. Consistent with previous studies, our findings demonstrated the potential effectiveness of bundling as a strategy to enhance firm profitability while also benefiting consumer surplus.

As the study undertaken in this paper is associated with certain assumptions and limitations, it can be extended in different ways. For instance, customer willingness to pay could be investigated through continuous analysis and various econometric methods for different mobile services. Further, the customer community could be segmented using methods and algorithms other than *k*-means clustering, and factors such as age, gender, and occupation could be included in the segmentation. Using larger relevant data sets on customer demand and preferences could also lead to additional useful insights. Finally, other considerations such as bundling costs, the importance of service quality, and limitation on types of offered services could be incorporated into the model.

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Appendix A – Notations

The following notations (model parameters and decision variables) are used in the proposed methodology:

Parameters

TI: Length of the billing period or the amount of credit bundle per minute.

N_i: Total number of customers in cluster *i* $(i = 1, \dots, I)$.

PR_k: The real price of service *k* $(k = 1, \dots, K)$.

C_i: The cost of the offered bundle to cluster *i.*

τ_k: Time interval between two successive uses of service *k.*

λ_{ik}: Customer arrival rate to cluster *i* for using service *k.*

$W_{ik}^{m_i}(t)$: The number of service *k* which is bought by each customer of cluster *i* in time interval *t.*

$U_{ik}^{m_i}$: The amount of demand for service *k* requested by the customer m_i of cluster *i* in the billing period TI, which is normally distributed with parameters $(\mu_{ik}, \sigma_{ik}), m_i = 1,2, \dots, N_i$.

$R_{ik}(\tau_k)$: The average willingness to pay or reservation price of customers within cluster *i* for service *k* provided that the time interval between two successive consumptions of service *k* be equal to τ_k.

v_1: Rounding coefficient of offered bundle price to cluster *i*.

v_2: Rounding coefficient of the number of service *k* in the offered bundle to cluster *i.*

w_i: The weight of each cluster, based on its importance in terms of survival in the customer community.

γ_1: Coefficient of total revenue.

γ_2: Coefficient of total consumer surplus.

Decision Variables

n_{ik}: The number of service *k* in the offered bundle to cluster *i.*

p_i: Price of the offered bundle to cluster *i*.

S_i: Surplus created for customers of cluster *i* in the case of purchasing the offered bundle to the cluster.

RE_i: Customer's reservation prices of cluster *i* for the offered bundle to this cluster.

$H_{ik}^{m_i}$: A binary variable which is one if the customer m_i of cluster *i* has a demand for service *k* more than what is included in the offered bundle to this cluster.

$X_i^{m_i}$: A binary variable which is one if the customer m_i of cluster *i* purchases the offered bundle.

Appendix B – Clustering

To segment customers, a *k*-means clustering algorithm is used, which contains five steps as follows:

1- An appropriate number of clusters is chosen.
2- For each cluster, a point is randomly selected as an initial guess for the cluster center.
3- All data are allocated to the clusters based on distance criteria.
4- The new center of each cluster is obtained by averaging the cluster members.

5- Steps 3 and 4 are repeated until all clusters are stable and there is no change in the clusters.

Let I show the number of clusters. Then, customer clustering can be performed by minimizing the following objective function:

$$Min\ Distance = \sum_{i=1}^{I} \sum_{Customer} \left\| u_{i.}^{Customer} - center_{i.} \right\|^2 \quad (1)$$

In the above equation, $\| \|$ is the distance criterion based on the Euclidean system. The $center_{i.}$ is the center of the i^{th} cluster and $u_{i.}^{\boldsymbol{Customer}} = u_{i1}^{\boldsymbol{Customer}}, \dots, u_{iK}^{\boldsymbol{Customer}}$ is the normalized demand vector of each customer for each service during the *TI* period. It is a value in the range [0,1], which is obtained as below:

$$u_{ik}^{\boldsymbol{Customer}} = \frac{U_{ik}^{m_i} - min(u_{ik})}{max(u_{ik}) - min\ (u_{ik})} \quad (2)$$

In equation (2), $U_{ik}^{m_i}$ is the amount of demand for service *k* requested by the customer m_i of cluster *i* in the billing period TI.

Appendix C – Reservation Price

Customer reservation price is considered in relation to the time intervals between purchases, focusing on products with a short lifetime that can be bought multiple times within a planning horizon.

Let PR_k represents the price of service *k* proposed by the mobile operator in a situation of individual sale. Each customer of cluster *i* enters the system according to a Poisson process with an *average call rate per minute* λ_{ik} for buying service *k*. It is assumed that the users who enter the system would buy at least one service. Consider $W_{ik}^{m_i}(t)$ as the number of service *k* bought by each customer of cluster *i* at time interval *t*. The probability of selling *w* number of service *k* to a customer m_i of cluster *i* at price PR_k in time interval τ_k, can be calculated as follows:

$$p\left(W_{ik}^{m_i} = w | T \le t \le T + \tau_k\right) = \frac{e^{-\lambda_{ik}\tau_k} \times (\lambda_{ik}\tau_k)^w}{w!} \quad (3)$$

In the above equation, if τ_k approaches to *TI*, then $W_{ik}^{m_i}$ is equal to $U_{ik}^{m_i}$ as the amount of demand for service *k* requested by the customer m_i of cluster *i* in the billing period TI.

The customer arrival rate to the system can be used to calculate the probability of entering customers who have a reservation price greater than the current one, which could in turn help us estimate the distribution of customers' reservation prices. A customer's reservation price is considered to be equal to the maximum price that a customer is willing to pay for a given product. Based on this definition, when the product price in a given time interval is below the customer's reservation price, the customer tends to buy or use it in that time interval. Consequently, "higher reservation price than set price" and "not increasing the time interval between purchases" can be interpreted as two equivalent events. Therefore, the probability that customer m_i in time interval $T \le t \le T + \tau_k$ at least once attempts to use the service *k* at price PR_k, and the probability that the time interval time between two purchases at the price PR_k does not increase are the same:

$$p\left(W_{ik}^{m_i} \ge 1 | T \le t \le T + \tau_k\right) = p\left(R_{ik}^{m_i}(\tau_k) \ge PR_k\right) \quad (4)$$

Using equation (3), equation (4) can be rewritten as follows:

$$p\left(W_{ik}^{m_i} \ge 1 | T \le t \le T + \tau_k\right) = \sum_{w=1}^{\infty} \frac{e^{-\lambda_{ik}\tau_k} \times (\lambda_{ik}\tau_k)^w}{w!} = 1 - \frac{e^{-\lambda_{ik}\tau_k} \times (\lambda_{ik}\tau_k)^0}{0!}$$

So we have:

$$p\left(R_{ik}^{m_i}(\tau_k) \geq PR_k\right) = 1 - e^{-\lambda_{ik}\tau_k} \quad (5)$$

Equation (5) can be also derived in another way as follows. Assume variable T_{ik} shows the time interval between two consecutive uses of service *k* in cluster *i*, which follows an exponential distribution with parameter λ_{ik} namely*:*

$$T_{ik} \sim \exp(\lambda_{ik}) \quad (6)$$

Therefore, the probability that the price of service *k* equal to PR_k keeps T_{ik} less than τ_k can be obtained as follows:

$$p(T_{ik} \leq \tau_k) = 1 - e^{-\lambda_{ik}\tau_k} \quad (7)$$

Equation (7) is equal to the probability that the reservation price of each customer in cluster *i* during the time interval τ_k is higher than the price PR_k, or $p\left(R_{ik}^{m_i}(\tau_k) \geq PR_k\right)$. Therefore, equation (7) is the same as equation (5).

It is assumed that the reservation price for each customer in each cluster follows a normal distribution. In this regard, parameters $R_{ik}(\tau_k)$ and $\sigma_{ik}^2(\tau_k)$ are respectively the mean and the variance of the normal distribution, which correspond to the customer's reservation price within cluster *i* for service *k*. So, $R_{ik}^{m_i}(\tau_k) \sim N\left(R_{ik}(\tau_k), \sigma_{ik}^2(\tau_k)\right)$. The standard normal distribution of reservation price for each customer of cluster *i* for service *k* is presented in equation (8):

$$\frac{R_{ik}^{m_i}(\tau_k) - R_{ik}(\tau_k)}{\sigma_{ik}(\tau_k)} = z_{ik}^{m_i}(\tau_k) \quad (8)$$

Therefore, the value of $p\left(R_{ik}^{m_i}(\tau_k) \geq PR_k\right)$ can be calculated as follows:

$$p\left(R_{ik}^{m_i}(\tau_k) \geq PR_k\right) = p\left(z_{ik}^{m_i}(\tau_k) \geq \frac{PR_k - R_{ik}(\tau_k)}{\sigma_{ik}(\tau_k)}\right) = 1 - \varphi\left(\frac{PR_k - R_{ik}(\tau_k)}{\sigma_{ik}(\tau_k)}\right), \quad (9)$$

where φ represents the standard normal cumulative distribution function. If the right side of equation (5) is set equal to that of equation (9), we have:

$$1 - e^{-\lambda_{ik}\tau_k} = 1 - \varphi\left(\frac{PR_k - R_{ik}(\tau_k)}{\sigma_{ik}(\tau_k)}\right) \Rightarrow \frac{PR_k - R_{ik}(\tau_k)}{\sigma_{ik}(\tau_k)} = \varphi^{-1}\left(e^{-\lambda_{ik}\tau_k}\right) \quad (10)$$

Based on equation (10) and concerning non-negative customers' reservation prices, the average customer's reservation price of cluster *i* for service *k* when the average time interval between two consecutive uses (purchases) of this service is at least τ_k, is equal to:

$$R_{ik}(\tau_k) = max\left\{PR_k - \sigma_{ik}(\tau_k).\varphi^{-1}\left(e^{-\lambda_{ik}\tau_k}\right), 0\right\} \quad \forall i = 1, \dots, I \ , \ k = 1, \dots, K \quad (11)$$

Therefore, in each cluster and for each proposed price, the relationship between the mean and the variance of reservation price subject to the time interval between two purchases can be expressed by equation (11). This relationship for different groups of consumers with various tastes can be justified. For example, if in a given cluster during the *TI* period, none of the customers show a tendency to use service *k* (assuming the standard deviation of the customer's reservation price of cluster *i* is the same for all customers), then λ_{ik} is very small and tends to be zero. Thus, $\varphi^{-1}\left(e^{-\lambda_{ik}\tau_k}\right)$ will approach infinity and consequently $R_{ik}(\tau_k)$ becomes zero. In contrast, if in this cluster, the customers' willingness to use service *k* is increased until λ_{ik} is more than $\frac{-\ln(\varphi(0))}{\tau_k}$, the customer's reservation price for the service *k* will be more than the current price, *i.e.*, $R_{ik}(\tau_k) \geq PR_k$. In this situation, if the mobile service operator offers a price more than the current price (PR_k) and less than the customer's reservation price $\left(R_{ik}(\tau_k)\right)$, the customer's willingness to buy would not be less than the current situation.

The above definition of the customer's reservation price not only covers customer willingness to use a service but also is directly relevant to their needs, income levels, and

anything that would affect customer demand. So, it is logical to consider the distribution of customers' reservation prices for a service proportional to its demand distribution. For example, it can be expected that in case the demand diversity of a specific service in a given cluster is high, customers of that cluster would have the same diversity of willingness to use the service. This issue can be proved by statistical logic if the customer community follows a normal distribution. It is important to note that the initial assumption of normal distribution of reservation prices is only valid if the reservation price of each customer for each service is a linear combination of his/her demand for that service with a zero y-intercept. For instance, in the case of a quadratic combination, the customer's reservation price would follow a chi-square distribution. Moreover, when a customer does not demand a service, his/her reservation price would be zero; so, the y-intercept would be equal to zero. In this paper, we assume that the customer demand of cluster *i* for service *k* follows a normal distribution with parameters μ_{ik} and σ_{ik}. Now, the standard deviation of the customer's reservation price $\left(\sigma_{ik}(\tau_k)\right)$ can be obtained by calculating the coefficient of variation $(C.V)$ for each cluster. In each community, $C.V$ is the ratio of standard deviation to mean, and it is useful for comparing two free scale variables. For customers of cluster *i*, $C.V$ of reservation price for service *k* provided to τ_k can be calculated as follows:

$$C.V = \frac{\sigma_{ik}(\tau_k)}{PR_k - \sigma_{ik}(\tau_k).\varphi^{-1}(e^{-\lambda_{ik}\tau_k})} \tag{12}$$

Moreover, the demand coefficient of variation for services *k* by customers of cluster *i* in the price level PR_k is equal to σ_{ik}/μ_{ik}. Since the customer demand distribution is proportional to the customer's reservation price distribution, the right side of equation (12) is equal to σ_{ik}/μ_{ik}. So, $\sigma_{ik}(\tau_k)$ will be obtained as the following form:

$$\sigma_{ik}(\tau_k) = \frac{\sigma_{ik}.PR_k}{\mu_{ik} + \sigma_{ik}.\varphi^{-1}(e^{-\lambda_{ik}\tau_k})}, \forall i = 1,\dots,I, \ \ \forall k = 1,\dots,K \tag{13}$$

By replacing equation (13) in equation (11), $R_{ik}(\tau_k)$ will be calculated as follows:

$$\begin{aligned} R_{ik}(\tau_k) &= max\left\{PR_k\left[1 - \frac{\sigma_{ik}.\varphi^{-1}\left(e^{-\lambda_{ik}\tau_k}\right)}{\mu_{ik} + \sigma_{ik}.\varphi^{-1}(e^{-\lambda_{ik}\tau_k})}\right], 0\right\} \\ &= max\left\{PR_k\left[\frac{\mu_{ik}}{\mu_{ik} + \sigma_{ik}.\varphi^{-1}(e^{-\lambda_{ik}\tau_k})}\right], 0\right\}, \forall i = 1,\dots,I, \forall k \\ &= 1,\dots,K \end{aligned} \tag{14}$$

where $\frac{\mu_{ik}}{\mu_{ik}+\sigma_{ik}.\varphi^{-1}(e^{-\lambda_{ik}\tau_k})}$ is the reservation price coefficient provided to τ_k for cluster *i*. It can be observed that $R_{ik}(\tau_k)$ increases as τ_k increases. This means that higher prices of service are acceptable for customers when the time interval between two purchases increases (i.e., there are fewer purchases in a given time interval). By calculating $R_{ik}(\tau_k)$, we can obtain the reservation price of an offered bundle.

The proposed services are considered to have independent values and are not supplements or substitutes for each other. Then, the reservation price for a bundle can be defined as follows:

$$RE_i = \sum_{k=1}^{K} n_{ik}\, R_{ik}(\tau_k), \ \ \forall i = 1,\dots,I \tag{15}$$

where, n_{ik} is the number of service *k* in the offered bundle to cluster *i*. So, the time interval between two successive purchases can be obtained as below:

$$\tau_k = \frac{TI}{n_{ik}}, \ \ \forall i = 1,\dots,I, \ \ \forall k = 1,\dots,K \tag{16}$$

By substituting equations (14) and (16) into equation (15), the customer's reservation price of cluster *i* for the offered bundle to this cluster is obtained as follows:

$$RE_i = \sum_{k=1}^{K} n_{ik}\, PR_k \left[\frac{\mu_{ik}}{\mu_{ik} + \sigma_{ik}.\varphi^{-1}\left(e^{-\lambda_{ik}\frac{TI}{n_{ik}}}\right)} \right], \quad \forall i = 1, \ldots, I \tag{17}$$

The above equation is used as an equality constraint in the optimization problem that follows (i.e., Appendix D).

Appendix D – Optimization Problem

Bundles' contents and prices are optimized in such a way that total revenue and/or total consumer surplus (the two main objectives of the mobile service operator) are maximized. As discussed in the text, we consider bundle composition, encompassing both the types of services included and the number of services offered.

It should be evident that the primary goal of any business is profitability. For information items with low marginal cost, the amount of profit is approximately equal to income. Therefore, focusing on either will lead to similar results. Equation (18) presents the total revenue of mobile service operators over the billing period *TI*.

$$\begin{aligned} Total\ revenue &= \sum_{i}^{I} \sum_{m_i=1}^{N_i} (p_i - C_i) X_i^{m_i} + \sum_{i=1}^{I} \sum_{k=1}^{K} \sum_{m_i=1}^{N_i} PR_k \left(U_{ik}^{m_i} - n_{ik}\right) H_{ik}^{m_i} X_i^{m_i} \\ &+ \sum_{i=1}^{I} \sum_{k=1}^{K} \sum_{m_i=1}^{N_i} PR_k U_{ik}^{m_i} \left(1 - X_i^{m_i}\right) \end{aligned} \tag{18}$$

In the above equation p_i and C_i are the price and cost of the offered bundle to cluster *i*. The binary variable $X_i^{m_i}$ is one if the customer m_i of cluster *i* purchases the offered bundle, which implies that $RE_i > p_i$. The Binary variable $H_{ik}^{m_i}$ will be zero if the number of service *k* is greater than the demand for it, i.e., $n_{ik} > U_{ik}^{m_i}$), otherwise, it will be one. Equation (18) is composed of three terms. The first term is the amount of income obtained from customers who are willing to buy the proposed bundles. In some cases, the amount of customer demand/consumption may be more than what is offered to them ($i.e. U_{ik}^{m_i} > n_{ik}$); so, they satisfy their surplus needs through individual purchases, where the revenue associated with this type of selling is captured by the second term. Finally, the third term is the amount of revenue associated with selling services to customers who prefer individual buying; for such customers, buying a bundle would either not lead to a surplus or probably cause a value loss.

In addition to maximizing revenue through bundle selling, other objectives can be important for a firm. One of these objectives is maximizing consumer surplus in all or some clusters. Consumer surplus can be defined as the difference between a customer's reservation price for an offered bundle to their cluster and the set price of the bundle.

$$S_i = \max\left(RE_i - p_i, 0\right) \qquad , \forall i = 1, \ldots, I \tag{19}$$

According to equation (19), customers in each cluster can be divided into two groups. The first group (I) includes customers whose reservation price for the proposed bundle is higher than the optimal price set by the firm. Thus, these customers will attempt to buy the bundle to attain its surplus. However, the second group (II) includes those customers whose perceived

value for the bundle is less than the price set by the firm; these customers have no willingness to buy the offered bundle and would prefer individual buying instead.

Equation (20) shows the total surplus of the community which is a weighted sum of the consumer surplus over all clusters. The weight of each cluster can be assigned based on the importance that the mobile service operator considers for its customer segments.

$$Total\ surplus = \sum_{i=1}^{I} w_i S_i \tag{20}$$

According to equations (18) and (20), the most important objectives from the mobile service operator's perspective are maximizing total revenue and maximizing total consumer surplus. This calls for a bi-objective optimization problem to evaluate decision alternatives. To handle such a bi-objective problem, we use an aggregate objective function. Assume parameters $\gamma_1$and γ_2 show the objective function coefficients. So, the aggregate objective function can be expressed as a linear combination of the abovementioned objectives, as shown in equations (21) & (22):

$$max\ \gamma_1(Total\ revenue) + \gamma_2(Total\ surplus) \tag{21}$$

Variables $\gamma_1$and γ_2 are determined by the managers of the mobile service operator, where $\gamma_1+\gamma_2 = 1$. Now, the bundle optimization problem can be presented as follows:

$$max\ \gamma_1\left(\sum_{i}^{I}\sum_{m_i=1}^{N_i}(p_i - C_i)X_i^{m_i} + \sum_{i=1}^{I}\sum_{k=1}^{K}\sum_{m_i=1}^{N_i} PR_k\left(U_{ik}^{m_i} - n_{ik}\right)H_{ik}^{m_i}X_i^{m_i} + \sum_{i=1}^{I}\sum_{k=1}^{K}\sum_{m_i=1}^{N_i} PR_k U_{ik}^{m_i}\left(1 - X_i^{m_i}\right)\right) + \gamma_2\left(\sum_{i=1}^{I} w_i S_i\right) \tag{22}$$

$Subject\ to$:

$$RE_i = \sum_{k=1}^{K} n_{ik}\, PR_k \left[\frac{\mu_{ik}}{\mu_{ik} + \sigma_{ik}.\varphi^{-1}\left(e^{-\lambda_{ik}\frac{TI}{n_{ik}}}\right)}\right] \quad \forall\, i = 1, \ldots, I \tag{17}$$

$$S_i = \sum_{m_i=1}^{N_i}(RE_i - p_i)X_i^{m_i} \qquad \forall i = 1, \ldots, I \tag{23}$$

$$\sum_{k=1}^{K} n_{ik}PR_k - p_i \geq 0 \qquad \forall\, i = 1, \ldots, I \tag{24}$$

$$\left(U_{ik}^{m_i} - n_{ik}\right)H_{ik}^{m_i} \geq 0 \qquad \forall\, i = 1, \ldots, I \quad , k = 1, \ldots, K \quad , m_i = 1, \ldots, N_i \tag{25}$$

$$\left(n_{ik} - U_{ik}^{m_i}\right)(1 - H_{ik}^{m_i}) \geq 0 \qquad \forall\, i = 1, \ldots, I \quad , k = 1, \ldots, K \quad , m_i = 1, \ldots, N_i \tag{26}$$

$$(RE_i - p_i)X_i^{m_i} \geq 0 \qquad \forall\, i = 1, \ldots, I \quad , m_i = 1, \ldots, N_i \tag{27}$$

$$(p_i - RE_i)\left(\sum_{k=1}^{K} H_{ik}^{m_i}\right)(1 - X_i^{m_i}) \geq 0 \qquad \forall\, i = 1, \ldots, I \quad , m_i = 1, \ldots, N_i \tag{28}$$

$$(p_i - RE_i)\left(1 - \sum_{k=1}^{K} H_{ik}^{m_i}\right)X_i^{m_i} \geq 0 \qquad \forall i = 1, \ldots, I \quad , m_i = 1, \ldots, N_i \tag{29}$$

$$n_{ik} \leq \max_{m_i} U_{ik}^{m_i} \qquad \forall i = 1, \ldots, I \quad , k = 1, \ldots, K \tag{30}$$

$$p_i - C_i \geq 0 \qquad \forall\, i = 1, \ldots, I \tag{31}$$

$$p_i = v_1 V_i \qquad \forall\, i = 1, \ldots, I \tag{32}$$
$$n_{ik} = v_2 \acute{V}_{ik} \qquad \forall i = 1, \ldots, I \quad , k = 1, \ldots, K \tag{33}$$
$$p_i \geq 0 \qquad \forall i = 1, \ldots, I \tag{34}$$
$$RE_i \geq 0 \qquad \forall i = 1, \ldots, I \tag{35}$$
$$S_i \geq 0 \qquad \forall i = 1, \ldots, I \tag{36}$$
$$n_{ik} \geq 0 : integer \qquad \forall i = 1, \ldots, I \quad , k = 1, \ldots, K \tag{37}$$
$$V_i \geq 0 : integer \qquad \forall i = 1, \ldots, I \tag{38}$$
$$\acute{V}_{ik} \geq 0 : integer \qquad \forall i = 1, \ldots, I \quad , k = 1, \ldots, K \tag{39}$$
$$X_i^{m_i} \in \{0,1\} \qquad \forall\, i = 1, \ldots, I \quad , m_i = 1, \ldots, N_i \tag{40}$$
$$H_{ik}^{m_i} \in \{0,1\} \qquad \forall i = 1, \ldots, I, k = 1, \ldots, K \quad , m_i = 1, \ldots, N_i \tag{41}$$

The objective function is a linear combination of the total revenue of the mobile service operator and the total consumer surplus. Constraint (17) describes the customer's reservation price in each cluster for the offered bundle (obtained in Appendix C). Constraint (23) calculates the total consumer surplus of clusters *i*, in the case of buying the offered bundle. According to constraint (24), the price of each bundle must be less than or equal to the sum of its service prices multiplied by their volume; this constraint is needed to encourage customers to buy offered bundles by considering discounts in the bundle selling strategy. Constraints (25) and (26) are designed to properly initialize $H_{ik}^{m_i}$, and to ensure the adequacy of services within each bundle for satisfying customer demands; in this regard, If the number of service *k* is greater than the demand for it ($i.e.\ n_{ik} > U_{ik}^{m_i}$), then $H_{ik}^{m_i}$ will be zero, otherwise, it will be one. Constraints (27)-(29) are used to initialize binary variable $X_i^{m_i}$, which is one if the customer m_i of cluster *i* purchases the offered bundle ($i.e. RE_i > p_i$). Based on constraint (27), a consumer might purchase a bundle that would lead to a surplus for him/her, and otherwise, the bundle will not be purchased. According to constraint (28), a customer buys a bundle if it leads to surplus and his/her need for at least one service type is higher than the bundle capacity. The constraint (29) indicates that if all services of a bundle exceed than customer's demand, he/she will not show a tendency to buy the bundle. Constraint (30) shows the upper bound for the number of services in each bundle; it is equal to the highest demand for services *k* in cluster *i*. Constraint (31) implies that for each bundle, the offered price must be greater than the cost of the bundle. Constraints (32) and (33) perform price rounding for offered bundles; for this purpose, two integer variables V_i and $\acute{V}_{ik}$ are introduced to round the price of the offered bundle for each cluster and the number of service *k* for the offered bundle to cluster *i*, respectively. Constraints (34)-(41) show the ranges for the model decision variables.

The above formulation is a Mixed Integer Nonlinear Programming (MINLP) model. Generally, in such models, there are numerous local optima, which make it difficult to find the exact solution. Therefore, applying common informed and uninformed search techniques such as branch and bound and cutting plane would be inefficient. Moreover, most of these techniques are very time-consuming. Hence, approaches that could obtain high-quality solutions at a reasonable time would be most useful. In this regard, metaheuristic algorithms have been successfully used to obtain near-optimal solutions for MINLP models. As mentioned in the text, a simulated annealing (SA) algorithm is used to solve the problem.

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How Is Diversity Represented in Basketball Organizations Active in the Romanian National Basketball League

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Article history
Received 03 May 2023 | Accepted 18 August 2023 | Published online 25 August 2023.

Abstract
For years, globalization has been a topic of interest for researchers and basketball organizations alike. Because of globalization, basketball organizations are able to access a wider market for basketball players and can thus choose the most suited for their teams. However, this can also be seen as a challenge for basketball organizations as they need to take into consideration managing diversity in their teams. Considering this, the aim of this paper is to provide an insight into how diversity is represented in the Romanian National Basketball League during the 2022-2023 season. The research question for this paper is "How is diversity being considered by the Romanian Basketball Federation and Basketball Organizations active in the men's senior division?" The method used for this paper is a literature review together with an analysis on the specific data that was gathered by the author from various sources. The results show that countries like USA and Serbia are the source for the majority of the foreign players in the league while many other countries have 1-2 players representing them. However, in regards to gender differences in basketball organizations, there are very few women hired at basketball organizations active in the Romanian National Basketball League during the 2022-2023 season. Moreover, future and more detailed qualitative or quantitative research having as target group: presidents of the basketball organizations could be conducted for more in depth analyses on how they manage diversity in their organizations.

Keywords: diversity, diversity management, basketball, business.

JEL classification: M12, M19.

1. Introduction

Globalization has been a topic of interest for researchers and basketball organizations alike for some years now. One reason for why globalization is important to basketball organizations is that because of globalization, basketball organizations are able to access a wider market for basketball players and can thus choose the most suited for their teams. Regarding globalization, the author underlined the importance of globalization in a previous article: *"Globalization can have a variety of effects on teams (sports or business) such as unique solution finding, improved communication and increase in conflicts. These effects of globalization are visible in every domain: economy, technology, sports, infrastructure etc. In today's economy, companies and basketball clubs alike need to be flexible and adapt their activities according to a continuous changing economic environment"* (Branga 2020).

For a better understanding of the topics at hand, a differentiation between the terms globalization and work force diversity needs to be made. On the one hand, according to Robbins and Judge, globalization has its focus on the differences that occur between cultures from different countries. On the other hand, workforce diversity tackles the differences between people from various parts of a country (Robbins and Judge 2021). Furthermore, according to Robbins and Coulter or Cunningham, workforce diversity refers to *"the ways in which people in an organization are different from and similar to one another"* (Robbins and

Coulter 2016; Cunningham 2019). The two authors also differentiate between two types of diversity (Robbins and Coulter 2016):

- Surface-level diversity – *"easily perceived differences that may trigger certain stereotypes, but that do not necessarily reflect the ways people think or feel"*;
- Deep-level diversity – *"differences in values, personality and work preferences"*;

For the purpose of this study, we will investigate how diversity is represented in basketball organizations active in the Romanian National Basketball League during the 2022-2023 season. One way in which diversity can be observed in these organizations is by looking at the number and country of origin for foreign basketball players. While this aspect can be easily observed in basketball, not the same can be said about business organizations where this aspect is not so easily observable.

Although, globalization and workforce diversity are aspects that have a great impact on the team building of basketball organizations, in the past years the term *"deglobalization"* or certain protectionist measures undertaken by entities such as the Romanian Basketball Federation or the Ministry of Sport in Romania have appeared. In this regard, under protectionist measures we refer to those measures that countries, through their ministries take that have an impact on organizations, basketball or business alike. According to David and David *"Protectionism refers to countries imposing tariffs, taxes, and regulations on firms outside the country to favor their own companies and people"* (David and David 2017). A concrete example for such measures can be taken from the rulebook of the Romanian Basketball League that imposes that two of the five players on court need to be Romanian for the first two quarters and at least one Romanian player for the second and third quarter with no age limit. More so, the rulebook stipulates that each team can use only one naturalized player (a player that has more citizenships including Romanian). Another protectionist example comes from the Romanian Ministry of sport who decided through order Nr. 686/8.VII.2022 that regardless of the sport, 40% of the players on the court/field should be Romanian. Judging by the fact that the Romanian Basketball Federation already had such measures in place, one could state that the Federation was one-step in front concerning protectionist measures.

Considering the previous presented information, the aim of this paper is to provide an insight into how diversity is represented in the Romanian National Basketball League during the 2022-2023 season. Moreover, through the article the author will answer to the established research question for this paper *"how is diversity being considered by the Romanian Basketball Federation and Basketball Organizations active in the men's senior division?"*.

2. Literature Review on Diversity Management in Sport

First, it is important to understand how and if diversity in sport is similar or different analyzed than in business. An extensive work on diversity in sport organization is the work of Cunningham entitled *"Diversity and Inclusion in Sport Organizations"*. In this book, the author quotes different researchers definitions on diversity. From these definitions, he then concludes several key aspects regarding diversity (Cunningham 2019):

- *"Diversity is a construct that is greater than a single individual"*;
- *"Diversity is concerned with differences among people"*;
- *"Diversity is concerned with both objective and subjective differences"*;
- *"Diversity is concerned with socially relevant differences"*;

Similarly, Taylor et al adapt Cunningham's definition of diversity in the workplace: *"the presence of differences among members of a social unit that lead to perceptions of such differences and that impact work outcomes"* (Cunningham in (Taylor, Doherty, and McGraw 2008). The authors than underline a key aspect of Cunningham's definition, which is that *"diversity is a perception and thus differences are in the eye of the beholder"* (Taylor, Doherty,

and McGraw 2008). Comparing these definitions to those in the introductory part of the article we can state that diversity is analyzed from similar points of view concerning sports and business organizations.

Second, an interesting analysis of globalization and its impact on sport management comes from Hoye et al. The authors quote Westerbeek and Smith by stating that the following three factors are *"the most influential drivers of change in regard to the business of sport in a globalized marketplace: economy, technology and culture"* (Westerbeek and Smith in Hoye et al. 2006). However, although these three factors are important to the subject at hand, what about the human capital and the sport (in this case basketball) organizations ability to have access to players from very different and distant markets? In this regard, Taylor et al write about an activity called *"proactive hiring"* who's strategic objective *"is to actively increase diversity in the organization in general, or with respect to a particular surface level attribute (e.g.: gender, age, race, physical disability), with the intent of capitalizing on the potential benefits of a diverse workplace"* (Taylor, Doherty, and McGraw 2008). If we would analyze the basketball organizations active in the Romanian National Basketball League during the 2022-2023 season from the point of view of proactive hiring, we could only see this happening on player level and not or not so much on administrative level. However, Taylor et al consider that there are certain benefits if an organization would capitalize on the potential of a diverse workplace, such as (Taylor, Doherty, and McGraw 2008):

- increased creativity;
- improved problem solving;
- increased understanding of the marketplace (especially if we consider the participation of Romanian basketball organizations in international championships such as those organized by Euroleague (Eurocup) or FIBA (Basketball Champions League, Europecup));
- improved recruiting;

However, there are also challenges about diversity management. Covell et al write that the diversity challenge is a newer and important challenge for sport managers (Covell et al. 2007). Furthermore, concerning the human capital aspect, they note, *"Although the coordination of human resources has never been easy, this growing diversity in the workplace represents a challenge as well as a special opportunity for management"* (Covell et al. 2007). However, one could state that it is up to the management of the basketball organizations to take advantage of this aspect in order for them to ensure hiring of the most suited players/staff for their organization.

Thirdly, according to Jarvie, *"some have argued that it is important to distinguish between international and global sport"* (Jarvie 2013). In this regard, Beech and Chadwick note that, *"There is no commonly held definition of internationalization and so one can generally say that internationalization has taken place when the operations of an organization have ceased to be exclusively domestic"* (Beech and Chadwick 2013). If we would analyze the basketball organizations active in the Romanian National Basketball League during the 2022-2023 season from this point of view, we could say that they are international only from two points of view. First, concerning the foreign players and coaches that they hire, and second, because some of the organizations are also active in European championships such as those mentioned previously. Furthermore, also according to Beech and Chadwick, *"it is only in recent decades that the international nature of sport has increasingly been recognized as a focus for business managers"* (Beech and Chadwick 2013). Although in this article we tackled the topics of globalization and internationalization together, that is because *"the concept of internationalization is inextricably associated with globalization"* (Gulak-Lipka 2020).

As we can see diversity management is as present in basketball organizations as it is in business ones. However, one might state they diversity is more easily visible in basketball because foreign players are often in the spotlight in media and in the social world surrounding the organization. More so, diversity management in basketball is an aspect that is in the interest or focus of international Basketball Federations such as FIBA or the NBA. In the fourth section of this article we will describe in what way the topic is in their focus and how or if the Romanian National League does similar researches.

3. Method

In order to achieve the aim of this paper: *to provide an insight into how diversity is represented in the Romanian National Basketball League during the 2022-2023 season* the author underwent a thorough and extensive research in order to be able to gather the necessary data. In this regard, the author used several sources, such as:

- Official Website of the Romanian National Federation: www.frbaschet.ro;
- Basketball news media website: www.baschet.ro, www.unitedhoops.ro;
- International Database regarding Basketball players: www.eurobasket.com;
- The official websites of the basketball organizations active in the Romanian National Basketball League during the 2022-2023 season;

The reason why so many sources where necessary for this research is the fact that, although all the information necessary should have been available on the Romanian National Federations website, this was not the case. The author was able to export in excel format from the website of the Romanian National Federation the rosters of each team, but the information in most cases, in regard to date of birth, height or even country of origin was either missing or false. After centralizing the information downloaded from www.frbaschet.ro the information was then double-checked, filled in where it was missing or replaced where it was false. Afterwards, the data was ready to be organized into several diagrams and numbers that will be explained in the following section.

4. Diversity Management in Romanian National Basketball League

One of the inspirations for conducting this research started after the author discovered the fact that the International Basketball Federation (FIBA) together with the International Centre for Sport Studies (CIES) develop every year a public report called *"International Basketball Migration Report"* that in 2022 reached its 11th edition. The report has two sources:

- *"FIBA's database of all men's and women's international transfers. This records all movements completed by players who are aged 18 and older between two respective National Federations; which has required a 'Letter of Clearance' to be issued by the Federation of origin to the Federation of destination."*
- *"FIBA's database of all players registered in 16 of the top division men's leagues globally. In order to be eligible for inclusion in the statistics, players must have played at least once during the 2021-22 season and the total sample included 3,834 players."*

In the following figure (Figure 1), we can see which leagues have been taken into consideration for the report. As one can easily observe, Romania has not been taken into account for the report. If we look at the history of FIBA, according to their website, Romania was one of the founding members. However, not including Romania in the report might be caused by the country ranking of FIBA, which places Romania on position 59 in Europe according to their website. Nevertheless, a somewhat similar report only for Romania can be done, as this article shows.

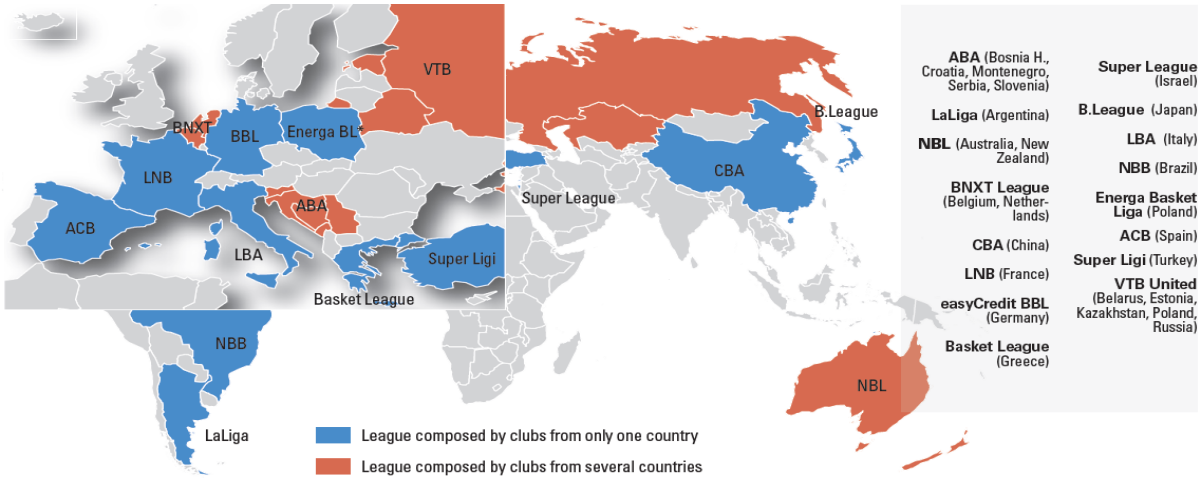

Figure 1: FIBAs 2022 International Basketball Migration Report

Source: https://www.fiba.basketball/news/international-migration-report-2022-and-evolution-report-highlights-globalization-of-the-game

According to the previous mentioned report, the 2022-2023 season established a new record as it was the first time that the total number of international transfers surpassed the 10.000 mark (10.467). The evolution of international transfers can be seen in figure 2 below.

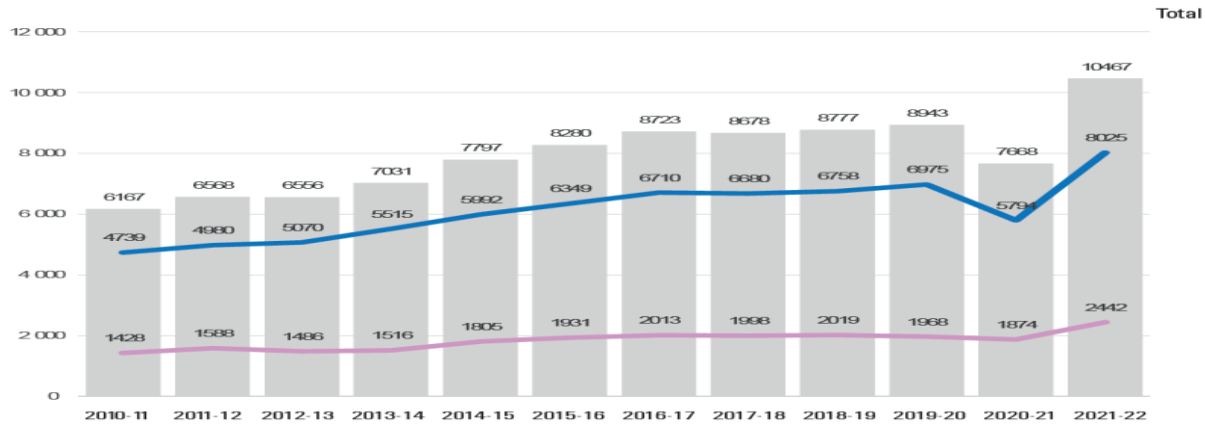

Figure 2: Evolution of International Transfers

Source: https://www.fiba.basketball/news/international-migration-report-2022-and-evolution-report-highlights-globalization-of-the-game

If we look at the flow between each FIBA region, the situation is, according to the report as follows:

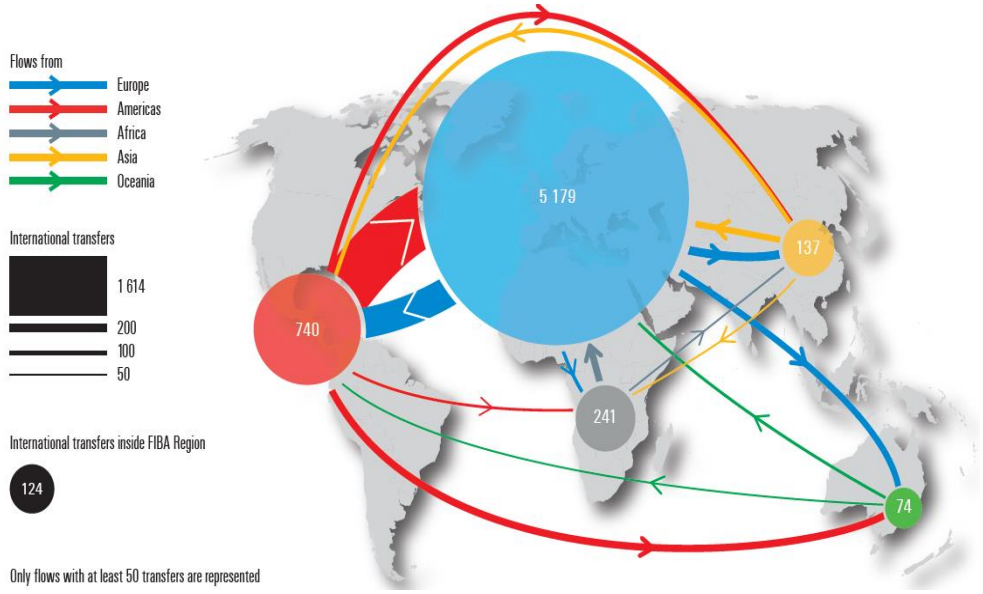

Figure 3: International transfers, by FIBA region

Source: https://www.fiba.basketball/news/international-migration-report-2022-and-evolution-report-highlights-globalization-of-the-game

Taking these three figures, and what they represent, into consideration, the author wanted to find out how the situation in the Romanian National Basketball League for the 2022-2023 looks like. For a better overview, the following numbers contain all (currently active or who have already left the club) players, head and assistant coaches that have been transferred by Romanian basketball organization in the 2022-2023 season. At the moment this article was written, the total number of players that where active in the Romanian National Basketball League during the 2022-2023 season was 298. The number of head coaches is at 24 and that of the assistant coaches at 23. Furthermore, some general information about the players and head coaches can be seen in the following table:

Table 1. General information about the players and head coaches in the Romanian National Basketball League during the 2022-2023 season

Players average age	25.44
Players average height	196.33
Head Coaches average age	47

Source: Designed by the author based on own research

An important aspect to note is the fact that the average height represented above might suffer changes because the author was not able to identify the height for a number of 33 Romanian young players that are part of the rosters for the basketball teams.

Because the aim of this research paper is to provide an insight into how diversity is represented in the Romanian National Basketball League during the 2022-2023 season, we will first have a look at the countries of origin for players, head and assistant coaches. This way we can have a better overview of which the countries that "send" the most players, head and assistant coaches towards Romania are.

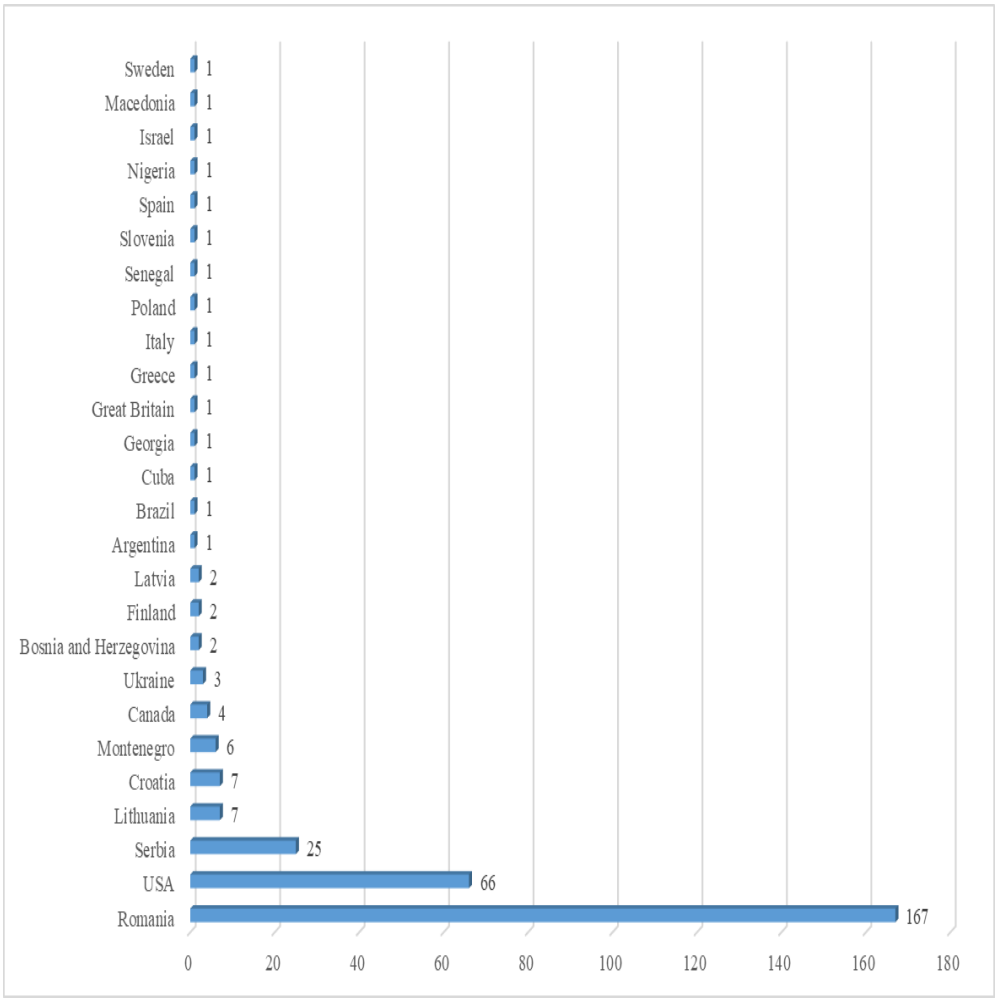

Figure 4: Player's country of origin in the Romanian National Basketball League during the 2022-2023 season

Source: Designed by the author based on own research

As we can see, if we do not consider the Romanian players, USA and Serbia account for the most foreign basketball players "sent" towards Romania with a total number of 84 while the rest of the countries account to a total number of 47. A reason why USA leads this top is the fact that they export a large number of players each year (1563 in 2022 according to the FIBA International Migration Report). Another reason might be the fact that many players come to play in Romania for a smaller value contract in order to get more playing time and gain statistics and experience. This however could be seen by Romanian basketball organization as a lottery. The reason for this statement is the fact, that in some cases, players cannot adapt to the FIBA rules of playing basketball, which are in some aspects different from those in NCAA or NBA. Thus, they might get a very good player for a smaller contract, or they might find themselves in need of looking again on the market if the fit between the team/organization/rules and the specific player is not there.

Concerning the head coaches, again if we leave aside the Romanian ones, the top is led by Serbia with four teams having a Serbian coach employed. The rest is divided between 8 countries as can be seen in the following figure.

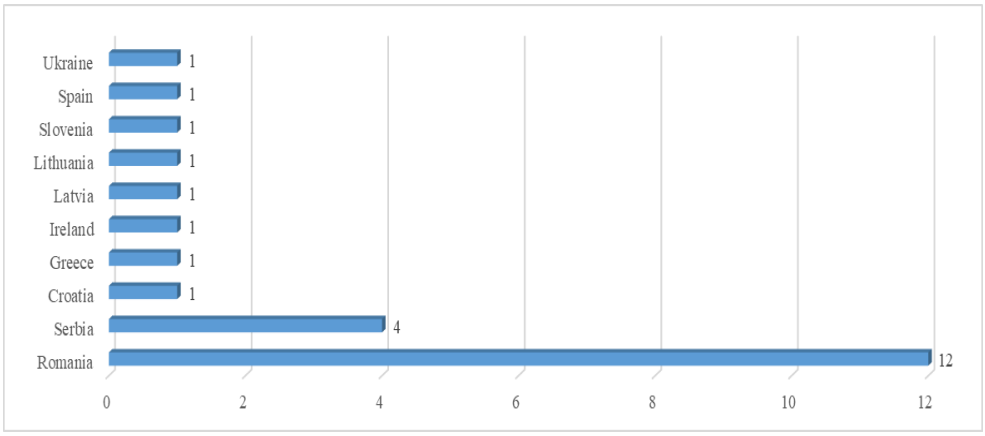

Figure 5: Head Coaches country of origin in the Romanian National Basketball League during the 2022-2023 season

Source: Designed by the author based on own research

The situation is a lot simpler concerning the assistant coaches. From 23, 20 are Romanians, two are Serbians and one is from Spain.

In comparison to the diagram representing the countries of origin for basketball players, we can also look at the flow of players towards the Romanian National Basketball League in the 2022-2023 season. For this, the author centralized the countries in which the players have been active in the season before signing with a Romanian basketball organization, which can be seen in the following figure.

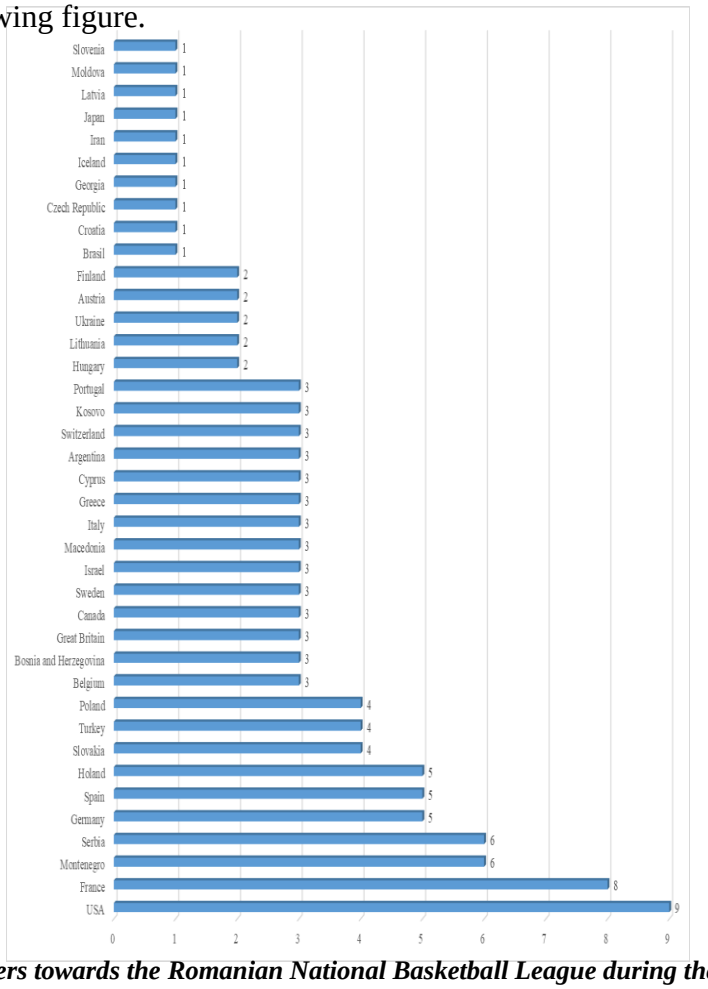

Figure 6: Flow of players towards the Romanian National Basketball League during the 2022-2023 season

Source: Designed by the author based on own research

As one can see, the situation is different if we take figure six into consideration. Although USA still leads the top, the following countries have changed in comparison to figure four. This figure shows that player's movement is a lot more international/global that figure four shows.

A second inspiration for conducting this research comes from the fact that *The Institute for Diversity and Ethics in Sport* released the *2022 National Basketball Association (NBA) Racial and Gender Report Card (RGRC)*. In this report, the NBA received an overall Grade of A that comes from receiving A+ for racial hiring and B+ for Gender Hiring. Although this is also a comprehensive report, we will only try to compare the gender hiring part in the Romanian National Basketball League during the 2022-2023 season.

If we look at how the management of the Romanian Basketball Federation is constituted, from 24 members, 15 are men and nine are women. However, a closer look at the referees department shows that the majority of referees (those that have national and international credentials) are men (24) and only a few are women (3). The number of women hired in basketball organization is even lower if we look at the coaching staff. If from 24 head coaches that have been employed during the 2022-2023 season all are men, in regard to assistant coaches we found that from a total of 23, 22 are men and only 1 women assistant coach. The situation is hard to figure out for the basketball organization active in the Romanian National Basketball League during the 2022-2023 season. The reason for this is the fact that most clubs are public clubs have teams in various sports. As in this paper, we only discuss the situation of basketball teams, the author was not able to clearly identify or not at all, if and how many women are hired in each basketball department of these clubs. In addition, the causes for the shortage of women hired in each basketball department of these clubs has not been a topic for this paper. However, this can be considered as a limitation of this study but also as a potential topic for future researches. Considering this, we can state that from the proactive hiring standpoint, the Romanian Basketball Federation has a good position compared to that of the referees or the basketball clubs that play in the league that it organizes.

Conclusion

At the beginning of this research paper, the research question was stated as being: "how is diversity being considered by the Romanian Basketball Federation and Basketball Organizations active in the men's senior division?" The answer to this question can be given from three perspectives. First, concerning the Romanian Basketball Federation, we can state that at management level, diversity can be found but the same cannot be said about the referees. Second, concerning basketball organizations active in the Romanian National Basketball League during the 2022-2023 season, we can state that diversity is at a very low level and does not represent an area of interest for managers judging by the low number of women hired in coaching or administrative (ex.: management, marketing, public relations etc.) positions for the basketball teams. Third, in regard to the players, as we could see, in the Romanian National Basketball League are players from various parts of the world, which shows a great diversity regarding the cultures present in the league. Considering this, the aim of this paper that was to provide an insight into how diversity is represented in the Romanian National Basketball League during the 2022-2023 season has been fulfilled.

Furthermore, the results show that countries like USA and Serbia are the source for the majority of the foreign players in the league while many other countries have 1-2 players representing them. However, in regards to gender differences in basketball organizations, there are very few women hired at basketball organizations active in the Romanian National Basketball League during the 2022-2023 season. Moreover, future and more detailed qualitative or quantitative research having as target group: presidents of the basketball

organizations could be conducted for more in depth analyses on how they manage diversity in their organizations.

In the end, the author would like to make some recommendations. First, to the Romanian Basketball Federation, the author would recommend to update the information of the roster of each team regarding nationality, age, height of players (especially the younger Romanian players). Another recommendation for the Romanian Basketball Federation would be to try to make refereeing more attractive in order to be able to hire more female referees. This could be done by applying several marketing campaigns such as testimonials by the current female referees. Second, to the basketball organizations, the author would recommend that they should also focus on diversity management in their organizations in order to benefit from what diversity has to offer. Finally, the author would like to mention the fact that the research was finalized on 20.02.2023. Although, the transfer period has not been concluded at this date. This means that the final numbers might be slightly different in reality. However, this should not have a great impact on the overall image presented in this paper.

Acknowledgement

This work was supported by the project "The Development of Advanced and Applicative Research Competencies in the Logic of STEAM + Health"/POCU/993/6/13/153310, project co-financed by the European Social Fund through The Romanian Operational Programme Human Capital 2014-2020.

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Understanding User Motivations for Engaging with Augmented Reality Filters on Social Media: An Exploratory Study

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Article history
Received 02 August 2023 | Accepted 07 September 2023 | Published online 15 September 2023.

Abstract
This research paper aims to investigate the underlying motivations that drive the usage of augmented reality (AR) filters on social media platforms. The study addresses a significant gap in the current academic literature, which lacks comprehensive insights into the motivations that shape the adoption and utilization of AR filters on social media. An exploratory approach was employed, utilizing an online survey to gain valuable insights into users' perceptions and to establish a classification of motivations based on their hedonic or utilitarian nature. The findings of this study provide a starting point for a broader research effort that aims to demonstrate the dual nature of AR filter technology, influenced by both utilitarian and hedonic motivations.

Keywords: social media, AR filters, augmented reality, dual technology.

JEL classification: M31, M39.

1. Introduction

With the rise of social media, marketers have gained new tools to promote their products and services in the online environment. As new technologies are implemented on social media platforms and users adopt them, brands are shifting their marketing efforts towards using them as well to stay up-to-date with the trends.

Among the noteworthy features that have gained substantial popularity and attention are social augmented reality (AR) filters. These filters, also referred to as AR lenses or effects, employ the superimposition of virtual elements onto the physical environment, enabling users to enhance their photographs and videos in real-time. The surge in usage and interest surrounding these AR filters signifies their prominent role in shaping the contemporary digital landscape (Chivu et al, 2022). This technology has been popularized by platforms like Snapchat, Facebook, Instagram, and TikTok, which now offer users a variety of AR filters to improve their visual content (Appel et al, 2020). Understanding people's behaviors in response to this technology has become a topic of increasing significance in academic research as AR filters become more widely available and more appreciated by social media users. In a report published by Snapchat (2021) it is stated that AR is growing at such a rapid pace that by 2025

about 75% of the world's population and nearly all people who have social apps will be frequently using AR.

Although AR filters have been widely adopted and used on social media platforms, a thorough understanding of the underlying motivations behind user engagement with these filters has not yet been provided by academic literature. The few studies that exist present splintered viewpoints and fall short of offering a comprehensive understanding of users' motivations (Ibánez Sánchez et al., 2022; Barta, et al., 2022; Yim, 2019; Orús et al., 2021). Therefore, a more thorough investigation of users' objectives and behavioral patterns in relation to AR filters is necessary.

2. Literature review

The motivations that influence the usage of a technology are usually categorized into hedonic and utilitarian. While utilitarian stimuli are more practical and goal-oriented, hedonic motivations refer to the intrinsic enjoyment and pleasure gained from using a technology (Barnett & Wood, 2012; Sledgianowski & Songpol, 2008). Over the years, academics also identified certain technologies that can have both hedonic and utilitarian characteristics (Stoica et al, 2015). These are called dual technologies. Investigating whether users are influenced by hedonic motivations, utilitarian motivations, or both when engaging with AR filters on social media can provide valuable insights into how this AR-based technology integrates within the context of social media platforms.

AR filters are also used in contexts outside social media and although some characteristics and motivations of use can differ, there are also common grounds that can be taken into account when trying to understand why people really adopt the technology on social media.

According to previous studies (Ibánez-Sánchez et al., 2022; Barta et al., 2022; Yim & Park, 2019), AR filters were mostly evaluated either as entertainment resources, emphasizing their hedonic qualities, or as marketing tools, with an emphasis on their utilitarian aspects. However, an integrated approach that acknowledges both possible characteristics can be beneficial in order to better understand how users take advantage of different features of AR filters depending on their intentions. It was already found that AR technology in general can operate as a source of enjoyment as well as a tool for determining whether or not to buy a product (Hilken et al., 2017). This could also be the case for social media filters - which are a subtype of AR technology.

The characteristics of social media AR filters are key in deciding how they affect users' behavior. With the help of these filters, users can overlay virtual objects on their own faces, bodies or on their surrounding environment, by utilizing the front or back cameras of mobile devices, especially smartphones. The virtual elements used in AR filters vary depending on the intended purpose, ranging from beautifying and aesthetically-enhancing tools to funny face transformations and virtual product try-on experiences (Yim & Park, 2019). Some filters combine multiple types to appeal to a broader audience.

Hedonic features of AR filters

The hedonic features on AR filters have the most recognition from the researchers' community. These features enhance experiences by providing enjoyment, entertainment, and gratification to the users.

Because many AR filters on social media are coded for the front camera, users are usually creating selfies and other visual content that involves the representation of their face and/or body. Researchers found that social media AR filters help users show their creativeness and personal style (Hawker & Carah, 2020).

In a study that focused on the moderating role of body image in AR virtual try-on systems, which are another type of filters that can be used on the web (Yim & Park, 2019), the results show that perceived entertainment is a strong predictor for experiencing satisfaction while using the technology. A study aimed at researching the usage of AR filters on social media (Ibáñez-Sánchez et al, 2022), conceptualized these tools as being mainly hedonic in nature. Results show that perceived entertainment influences WOM recommendations, which is one of the main ways to propagate the technology adoption in the social media context.

Utilitarian features of AR filters

One of the reasons why the social media networks incorporate AR filters is to aid their users in the content creation process. In order to improve their appearance, produce visually appealing content, and express their creativity, users can freely access a library of filters within the platforms' user interfaces (Muntinga, 2011; Boyd, 2007). These utilitarian motivations underpin the practical value that AR filters provide within the social media context.

In an endeavor to find the impact of users' body image on the usage of an AR-based virtual try-on technology, the study conducted by Yim & Park (2018) determined that users with unfavorable body image preferred to test products with AR technology, significantly more than users that have favorable body image. Also, the perceived usefulness was found to be greater among those with less appreciation for their body. The authors explain that a possible reason for these results is the fact that the AR technology gives the possibility to test products directly on their own bodies without having to expose themselves in front of others in the process. Another explanation can be derived from other studies (Orzan et al, 2021) that found the AR technology to increase the consumers' confidence in the quality of products and to decrease the risk of purchasing the wrong products, by trying them first.

Additionally, corporations and companies have developed their own filters to raise awareness, advertise goods and services, and even boost sales. These are often called branded filters and can take many shapes and forms. Some use their actual logo or brand name and simply superimpose it over the user's real environment, creating brand awareness (Bostănică et al., 2022). Others include their products in the filter, either to simply showcase it in a photo or video, or to facilitate the user to test the products to some extent. Moreover, people create and distribute the content generated with AR filters on their social networks. With the association with a desirable product or brand, this leads to the creation of a desired image of the self, reinforcing users' identity (Hawker & Carah, 2020).

Given the current discussion, this article is aimed at disproving the generally accepted idea that social AR filters only serve hedonic needs (although a few studies also acknowledge potential utilitarian usage motivations, as stated before). Therefore, this study, which is exploratory in nature, seeks to explore the hedonic and utilitarian drivers of user interaction with social AR filters. By exploring both hedonic and utilitarian motivations, this study seeks to contribute to a more holistic understanding of AR filters as dual technologies within the social media landscape.

3. Methodology

An exploratory study was carried out utilizing an online survey approach to look into the reasons why people adopt and employ social media AR filters. The reason this study is exploratory is because of the lack of consensus among researchers when it comes to the motivations that lead to AR filters' usage. This study is meant to be part of a larger research, aimed to test an extended TAM model (with perceived enjoyment added), although only the exploratory study is the subject of this paper.

The present study sought to provide a thorough explanation by categorizing these motives into hedonic and utilitarian. The questionnaire targeted social media users who utilise the built-in photo and video filters on social media platforms, and participants were chosen using a convenience sampling approach. This non-probability sampling method used to select participants was employed because of its accessibility and also because of time constraints. To increase the probability of reaching respondents from the target population, participants were recruited on Facebook groups related to social media and AR topics.

A filter question was added at the start of the survey to make sure that only responses from users who were actively using the system were recorded. The questionnaire was only open to participants who confirmed using AR filters at least once over the previous 30 days. All the other respondents were removed from the data sheet used to analyze the results.

To ensure that all survey participants understood what social media AR filters were, a detailed explanation was included in the survey introduction. Participants were also made aware of the anonymity of their answers and the use of their data only for academic purposes.

219 people in total answered the questionnaire. Participants who did not report using social AR filters in the previous month were eliminated in order to concentrate on active users, leaving a final sample of 130 valid responses. Men represented only 28.5% of the sample, while women made up the majority of responders (71.5%). In terms of age distribution, 7% of participants were under the age of 18, 45% were between the ages of 18 and 24, 26% were between the ages of 25 and 34, 15% were between the ages of 35 and 44, and 7% were beyond the age of 45. Using a 5-point Likert scale with a range of "Very rarely" (1-2 times) to "Very often" (daily), the study started by determining how frequently AR filters are used on social media platforms.

Next, a list of possible justifications why people would use AR filters on social media was given to the participants. This list included both hedonic and utilitarian motivations that were either proposed by the author or earlier academic research. Participants were free to choose all the options they thought applied to their usage habits, by clicking on a checkbox placed after each item. In addition, a free-text area was presented to record any extra motivations that weren't covered by the other options.

The following list presents the choices offered to respondents, along with the academic studies from which the motivations were inspired:

- I use filters to improve my appearance (Yim and Park, 2018; Javornik et al., 2021; Lidner, 2021)
- I use filters to increase the overall quality of my photos and videos (proposed by the author)
- I use filters to create content for social media more easily (Lidner, 2021)
- I use filters to create content that's more interesting (proposed by the author)
- I use filters to express my creativity (Hawker and Carah, 2020)
- I use filters to increase the engagement rate on my posts (Fox et al., 2018)
- I use filters to better express how I feel and what I'm doing (Fox et al., 2018)
- I use filters because other people in my social networks use them (proposed by the author)
- I use filters to test real products in a virtual way (make-up, sunglasses, travel destinations) (Hawker and Carah, 2020)
- I use filters because it's a fun activity for me (Ibáñez-Sánchez et al., 2022)
- I use filters because I find it relaxing (Ibáñez-Sánchez et al., 2022)
- I use filters because it's entertaining (Ibáñez-Sánchez et al., 2022)

- I use filters because I'm bored and I want to pass the time (Fox et al., 2018)

The free-text responses were also examined and organized. The investigation led to the discovery of two additional motivations: the usage of AR filters for gaming-like experiences and as a replacement for features offered by third-party photo/video editing tools.

4. Findings

A varied pattern emerged from the research of respondents' usage habits for social AR filters. In the past 30 days, 15% of participants said they had used AR filters very rarely (1-2 times), and 23% had used them rarely. In addition, 25% said they use AR filters sometimes 21%, said they do it often and 17% said they do so very often (daily).

From these findings, it is evident that there is no dominant usage pattern among the respondents. Instead, the data shows that there is a wide spectrum of interaction on social media with AR filters. With 25% of the respondents, the segment of respondents who sometimes employ AR filters was the greatest. This shows that a sizable number of people occasionally use AR filters, including them into their social media activities. Additionally, according to the statistics, a significant percentage of respondents (21%) claimed they often used AR filters, indicating a continuous and regular usage habit. This implies that an important number of users actively employ AR filters into their workflows for creating or sharing social media material. Another interesting result was that 17% of respondents said they used AR filters very often or every day. This reveals a subset of people who commonly use AR filters to enhance their social media postings and interact with their audience.

However, a combined 38% of respondents claimed to utilize AR filters rarely or very rarely, showing a lesser degree of interest in this feature. These people might not consider AR filters to be as important or they might have different preferences for their social media content. Turning to the motivations behind using AR filters on social media, the results were centralized and categorized by their respective hedonic or utilitarian nature, as seen below.

Utilitarian motivations:

- I use filters to improve my appearance: 54.1%
- I use filters to increase the overall quality of my photos and videos: 51.9%
- I use filters to create content for social media more easily: 26.7%
- I use filters to create content that's more interesting for my network: 32.6%
- I use filters to increase the engagement rate on my posts: 15.6%
- I use filters to test real products in a virtual way (make-up, sunglasses, travel destinations): 25.9%

Hedonic motivations:

- I use filters to express my creativity: 34.1%
- I use filters to better express how I feel and what I'm doing: 14.8%
- I use filters because other people in my social networks use them: 13.3%
- I use filters because it's a fun activity for me: 54.8%
- I use filters because I find it relaxing: 12.6%
- I use filters because it's entertaining: 49.6%
- I use filters because I'm bored and I want to pass the time: 25.9%

The analysis of these motivations provides valuable insights into the drivers behind the usage of social media AR filters. It appears that utilitarian motivations, which highlight useful

and goal-oriented characteristics, have a considerable impact on how AR filters are used. The desire to enhance their physical appearance (54.1%) and the general quality of their images and videos (51.9%) are the two most prevalent utilitarian objectives listed by respondents. Additionally, a sizable percentage of respondents (32.6%) admitted to utilizing filters to produce material for their network that is more appealing, demonstrating a practical desire to connect and captivate their audience. Gaining attention through higher post engagement (15.6%) was also mentioned by a sizable percentage of respondents. Additionally, 25.9% of respondents indicated the possibility to virtually test actual products, such as cosmetics, eyewear, and places to vacation, as a utilitarian motivation.

The use of AR filters was also found to be influenced by hedonic motivations, which emphasize pleasure, enjoyment, and intrinsic satisfaction. The two most prevalent hedonic motivations mentioned are that using filters is enjoyable (54.8%) and fun (49.6%). Expressing one's originality (34.1%) was also identified as a significant hedonic reason to use social media AR filters. Moreover, a lesser proportion of individuals mentioned utilizing filters because other people in their social networks were doing so (14.8%) or because they helped them better communicate their feelings and activities (13.3%).

These results suggest that social media AR filter usage is driven by hedonic as well as utilitarian reasons. This contradicts the general acceptance that the use of AR filters has only a hedonic component. Users are driven by the pleasure, satisfaction, and social interactions that AR filters provide, as well as by practical aims like beauty enhancement and content creation. This implies that users' interaction with AR filters on social media sites is influenced by a mix of practical and experiential variables.

Conclusions, future directions and research limits

While this exploratory study sheds light on the motivations behind user engagement with AR filters on social media, there are several limitations that should be acknowledged. These limitations provide opportunities for further research to deepen our understanding of the topic.

Self-reporting bias: The information gathered for this study was based on participant self-reports, which are prone to biases and errors. The validity of the results could be impacted by response bias, memory recall bias, and social desirability bias. Self-report data could be supplemented by observational or experimental techniques in future studies to provide a greater understanding of user motivations to use the technology.

Limited motivations explored: Several hedonic and utilitarian reasons were detected in this study, however there may be other motivations that weren't covered by the survey. To get a more thorough knowledge of why users interact with AR filters, future research should examine additional potential reasons such as social comparison, or escapism.

Differences between social media platforms: Users might have different behaviours depending on the social media platform they are on. Therefore, further research could gather data about the use of AR filters on different platforms and make comparisons between the motivations that drive usage on each one.

Longitudinal studies: This study focused on capturing a snapshot of user motivations at a specific point in time. Researchers may gain insights into the shifting nature of AR filter usage and the effects of technology advancements by conducting longitudinal studies that allowed them to monitor changes in user motivations over time.

When it comes to further research based on this exploratory study, the authors propose to test the TAM model extended with perceived enjoyment concept, using the current results to adapt scale items or create new ones altogether.

To address the shortcomings found and enhance our comprehension of the intricate interactions between user motives, user experience, and the broader societal ramifications of AR filter usage, additional research is required.

In conclusion, this exploratory study offers insightful information on the factors that influence user engagement with AR filters on social media. The study determined that there are hedonic and utilitarian reasons why people use AR filters.

User engagement was found to be significantly impacted by utilitarian motivations like improving appearance, increasing the overall quality of pictures and videos, making content creation easier, and virtually evaluating actual products. Users recognized the usefulness of AR filters in terms of expressing their creativity in their social media posts,as well as in increasing engagement rates on their posts.

Hedonic motives were also discovered to be significant, with users employing AR filters to express their creativity, communicate how they feel and what they do, and keep themselves entertained. The hedonic aspects of AR filters provided enjoyment, relaxation, and a way to pass the time for many users. The social aspect of AR filters was also highlighted, with some users reporting utilizing filters to reinforce their sense of identity and belonging within their social networks.

Understanding the factors that influence the usage of AR filters on social media platforms will help marketers and platform developers to better match their strategies to the different needs of users and produce AR experiences that are perceived as both entertaining and useful.

Acknowledgments

This research was supported through a grant awarded by Bucharest University of Economic Studies, project ID number 332/2023/ASE, DigiStat.

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Transparency and Complexity: Comparative Critical Review of Mixed Methods Approaches in Marketing Research

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Article history
Received 13 August 2023 | Accepted 22 January 2024 | Published online 23 January 2024.

Abstract
Mixed methods enable researchers to yield credible information, data, and results in marketing research. However, the challenge lies in maintaining transparency and comprehensiveness in reporting due to complexities in the process. The objective of this paper is to provide a comparative critical review of three high-quality papers, emphasizing marketing research through a mixed methods approach. A review of mixed methods is explained, followed by the implementation of a comparative critical analysis for three selected journal articles. The first paper (P1) delves into the impact of e-CRM on the performance of SMEs in the UK, while the second (P2) investigates the driving forces behind the adoption of mobile ad blockers. The third paper (P3) analyses the intricate relationship between marketing innovation, R&D investment, and new product performance. Although each paper has a different emphasis on marketing (CRM, mobile ad blockers, and innovation), several similarities are discovered. First, most of the papers' references were connected to their similar earlier paper, focusing on marketing innovation. Second, they shared similar significance for marketers or C-level management in understanding the scientific process of establishing marketing innovation, especially using a digital approach. Third, the sampling procedure is not disclosed which might affect the representativeness. This article helps in understanding the mixed methods approach and assists in developing a more transparent mixed methods approach in marketing research. In conclusion, reviewing, analyzing, and comparing journal articles with similar focus and methods might add methodological and substantial insights in marketing research.

Keywords: Marketing, innovation, mixed methods, critical review.

JEL classification: M31.

1. Introduction

Quantitative and qualitative designs have been employed as the primary research design for centuries, exploring and explaining their own dimension of phenomena. Given the limitations in methodologies and design developments, single-method approaches cannot provide a comprehensive and holistic understanding of phenomena. In response to these limitations, mixed-method emerges as a solution, combining quantitative numerical data with rich qualitative insights (Doyle et al., 2009). Whereby, inferences are obtained in a single study using both qualitative and quantitative approaches (Tashakkori and Creswell, 2007). Data collection and analysis align with the hypothesis and research questions, integrating both qualitative and quantitative methods to provide comprehensive answers (Creswell and Clark, 2018, p.41). Mixed methods bring further diversity in the availability of methods, dealing with various phenomena. It is deemed that mixed methods are more practical in attracting funding for research projects (Giddings, 2006). However, challenges in applying mixed methods are apparent, such as adequate resources, time, and researcher capability (Creswell and Clark, 2018, p.57). This is given that research ethics and transparency are necessary to be fulfilled for research credibility and integrity. Prior research analyzed multi-method and mixed method (Vivek and Nanthagopan, 2021), criticizing mixed methods design (Fàbregues et al., 2021) and

critical review of mixed methods approach in tourism and hospitality (Azer et al., 2022). Understanding that marketing is a huge spectrum and mixed methods are considered a more advanced design compared to merely qualitative or quantitative. Thus, the objective of this paper is to provide a comparative critical review of three distinguished papers in the field of marketing research, focusing on their utilization of a mixed methods approach. A meticulous comparative analysis is employed delving into methodologically selected marketing journal articles, exploring and addressing the diverse spectrum of methodologies within the realm of mixed methods research.

2. The purpose of mixed methods design

Examining mixed methods research design, Schoonenboom and Johnson (2017) explained seven primary dimensions of design which consist of purpose, theoretical drive, timing, integration point, typological and interactive design, planned and emergent design, and design complexity. This article will expound on the first four dimensions as the rest are more complex and suitable for expert mixed methods researchers. Some study examples elaborated on understanding the design of mixed methods. The study might begin with a qualitative needs assessment to identify key questions for investigation. Subsequently, an instrument is designed to measure the program's impact, comparing outcomes before and after implementation. Based on this comparison, follow-up interviews are conducted to gain insights into the reasons behind the program's success or failure (Farmer and Knapp, 2008). Another study started using surveys to gather the data and employed interviews with those who fulfilled the questionnaire, delving into the explanation beyond the quantitative findings (Jellesmark et al., 2012).

First, the main purpose of mixed methods is to strengthen and extend the study using the combination of qualitative and quantitative approaches in answering research questions. The use of mixed methods can be optimized in evaluating at least one research question to understand phenomena in multiple dimensions or several research questions can be applied provided it is related to each other, hence quantitative and qualitative approach could fit with the research question design. Second, theoretical drive. The driving theory of whether they are qualitative, quantitative, or mixed methods researchers will determine the mixed methods design. Quantitative dominance in mixed methods depends on the positivistic view and adds a qualitative approach to complementing the research, while qualitative dominance implements otherwise, relying on interpretive views and recognizing the quantitative data. However, the pure mixed methods researcher position their equal status as they put their mixed methods philosophy as the foundation and believe the qualitative and quantitative approaches will enrich the findings equally (Johnson, et al., 2007). Third, timing consists of simultaneity and dependence (Guest, 2013). Guest (2013) explained that simultaneity classifies parallel and sequential mixed methods designs. Parallel or concurrent design happens when quantitative and qualitative elements are executed simultaneously, while sequential design is when the execution of quantitative elements precedes the qualitative elements or otherwise. Dependence means when the execution of one component depends on the results of other elements' data analysis results. For instance, the quantitative approach cannot be implemented unless the data analysis of the qualitative approach is executed (Toyon, 2021). Fourth, is the point of integration. Mixed methods are not only mixing the results but also integrating them. How and where integration is the essence of this research design. There are two points of integration, the result point of integration and the analytical point of integration (Morse, 2016). The resulting point of integration wrote the findings of the first element and integrated it with the second element. The portrayal of findings from quantitative and qualitative approaches will be displayed as well as its integrative statement. Next, the analytical point of integration involves two analytical stages. In the first phase, qualitative data is used to identify the topics. In the

second phase, those topics are quantified, becoming quantitative data. Fifth, typology utilization design. Typology utilization designs the major construction of mixed methods body which can be used to apply the research. One of the most well-known mixed methods typological designs is introduced by Creswell and Clark (2018) which are convergent, explanatory, and exploratory (p.123). Convergent designs exhibit the results of both components merged and compared, while the explanatory sequential design shows that quantitative components are explained by qualitative components. In addition, the exploratory sequential design gathers qualitative data first and its results to build quantitative measurement (Creswell and Clark, 2018, p. 123).

3. Methodology

A Comparative Critical Analysis has been conducted in this study to analyze the similarities, differences, advantages, and challenges addressing the mixed method approach in marketing research (Coccia and Benati, 2018). Three selected journal articles will be reviewed respectively. The three papers were selected due to the similarities in their research design, addressing a similar phenomenon in marketing. However, different mixed-method approaches and different scopes of marketing are identified. Based on the publication level, citation, and methodological framework, selected journal articles are considered at the same scientific level. To ease the identification within the paper, each paper is assigned P1, P2, and P3, respectively. The first paper titled 'Exploring and Explaining SME Marketing: Investigating E-CRM using A Mixed Methods Approach' (Harrigan et al., 2012) is assigned as P1 followed by 'The Curse of Mobile Marketing: A Mixed Methods Study on Individuals' Switch to Mobile Ad Blockers' (Müller et al., 2017) as P2 and lastly, 'R&D, Marketing Innovation, and New Product Performance: A Mixed Methods Study' (Grimpe et al., 2017) assigned P3. Each paper is reviewed critically based on its objective, significance, methodology, theory, and findings. In every segment, comments are identified for the article's understanding and improvement. Next, comparative analysis is conducted to investigate the similarities and differences among selected journal articles, referring to the results of critical analysis. Comments are made in the comparison section as well.

4. Critical review of selected journal articles

P1 focuses on exploring the use of Internet-Based Technologies (IBTs) by small and medium-sized enterprises (SMEs) in enhancing their Customer Relationship Management (CRM) process (Harrigan et al., 2012). The approach taken by SME entrepreneurs or owner-managers in implementing their marketing is examined as well. However, the research questions, research objectives, and hypothesis are not clearly stated, and the significance of the paper is not explicitly explained. Nonetheless, the findings bring practical and managerial significance as they provide guidelines for SMEs in enhancing their customer-oriented marketing as well as a framework for SME managers to integrate IBTs with their CRM. Additionally, the study does not explicitly mention a specific theory, framework, or model, which can make it difficult to understand the research direction.

Alternatively, a sequential approach to mixed methods research was described, where a qualitative phase was preceded by a single quantitative. This approach to research design enables exploration followed by deeper elaboration of e-CRM (Electronic customer relationship management) in SMEs, whereby the combination of web channels with the overall enterprise CRM strategy ensures consistency in sales, customer service and support, and marketing across all channels. Hence, giving both breadth and depth to the research. The quantitative and qualitative methods are mixed to the extent that quantitative data leads directly to qualitative investigation and subsequent data. More specifically, the qualitative phase served to elucidate and provide more depth to the questionnaire responses. A questionnaire was

distributed to SMEs in the UK to gather the nature of CRM in SMEs, including its potential benefits and challenges of e-CRM with a total of 200 responses. Next, semi-structured interviews with entrepreneurs or owner-managers about the marketing approach were conducted with 20 informants. Gaining insights from the management draws the phenomena better as they were strongly involved with the practical implementation. P1 attempted to gather the major perception about the potential benefits and challenges of CRM in SMEs and complement those data with insights from the C-level management or top management, in relation to the marketing approach. Regression analysis was implemented to examine the relationship between e-CRM and business performance in SMEs. Thematic analysis was used to analyze qualitative data. Also, the independent variable is the use of e-CRM in SMEs and the dependent variable is the potential benefits and challenges of e-CRM in SMEs. The combination of the quantitative and qualitative data provides broader and deeper insights, although P1 did not clearly define the sample demographics that the questionnaire was distributed to, making it difficult to assess the generalizability of the research findings.

The findings indicated a positive and significant impact of e-CRM on the performance of SMEs. The study identifies key dimensions of e-CRM in SMEs, including customer knowledge management, customer interaction management, and customer service management. It's important to note that the study has certain limitations, such as its exclusive focus on UK service-sector SMEs. This limits the generalizability of the findings to other countries. Additionally, a sequential mixed methods approach was employed, with the qualitative phase complementing the quantitative results. This suggests that while the qualitative data may not be as comprehensive as in a standalone qualitative study, it enhances the overall understanding when combined with quantitative findings.

P2 questions the factors that influence individuals' decision to switch to using mobile ad blockers and the configurations of influencing factors that result in individuals' switching to using mobile ad blockers (Müller et al., 2017). The practical significance of this study is that it provides valuable implications for advertisers facing the challenge of rising mobile ad blocker use. By understanding the factors that influence individuals to switch to using mobile ad blockers, advertisers can take steps to address these factors and reduce the use of ad blockers. The pull-push-mooring model was used in this paper to evaluate the factors that influence individuals to switch to using mobile ad blockers. The PPM model is a framework used to explain migration patterns by considering factors that "push" people out of their current situation, factors that "pull" them toward a new situation, and factors that "moor" them in their current situation. This model identifies the configurations of pull, push, and mooring factors that result in individuals' intention to switch. The paper employs exploratory sequential design as it applies a qualitative approach to construct quantitative components. The study aims to address two research questions (RQs) related to individuals switching to using mobile ad blockers. The first RQ addresses the influencing factors of individuals' switching to using mobile ad blockers. A qualitative characterization and methodology were utilized through 42 semi-structured interviews that were recorded anonymously and were then analyzed using descriptive/interpretative coding. The second RQ is about the configurations of influencing factors resulting in individuals switching to using mobile ad blockers. The study used quantitative characterization and methodology through qualitative comparative analysis (QCA). QCA is a research method used in social sciences to analyze complex relationships among variables. It combines qualitative and set-theoretical approaches to identify necessary and sufficient conditions for an outcome. Adding more respondents to the survey brings more comprehensive data as it elaborates the phenomena better, especially since the mobile ad practice will involve numerous people due to the massive use of smartphones and the internet. Analysis was done through fuzzy set QCA. Fuzzy set QCA is an extension of QCA that allows

for degrees of membership in sets rather than binary distinctions. It deals with uncertainty and imprecision in data. It is identified that the independent variables are push, pull, and mooring while the dependent variable is the intention to use mobile ad block.

The study found that individuals switch to using mobile ad blockers due to negative experiences with mobile ads such as intrusiveness, annoyance, and irrelevance. Individuals who use mobile ad blockers tend to be more privacy-conscious and have a higher level of digital literacy. The study also found that the pull, push, and mooring factors have a significant effect on individuals' intention to switch to using mobile ad blockers. Four distinct configurations of influencing factors were identified resulting in the intention to switch: (1) push and mooring factors, (2) pull and mooring factors, (3) push factors only, and (4) pull factors only. The pull factors were found to have the strongest effect on individuals' intention to switch to using mobile ad blockers. The study used the push-pull-mooring (PPM) model to explain a switch of behavior, which is typically used to explain a switch of technologies. However, this is a limitation because the model may not fully capture the complexity of the decision-making process involved in switching to using mobile ad blockers. Additionally, the model may not account for other factors that may influence individuals' decision to switch, such as social norms or personal values.

P3 investigates the role of R&D and marketing innovation in achieving new product performance (Grimpe et al., 2017). The study has three hypotheses. The first hypothesis (H1) is that there is a dis-synergistic effect between investments into technological and marketing innovation on new product performance. The second hypothesis (H2) is that there is a dis-synergistic effect between investments into technological and marketing innovation on new product performance and this effect will be stronger for small firms compared to large firms. The third hypothesis (H3) is that there is a dis-synergistic effect between investments into technological and marketing innovation on new product performance and this effect will be stronger for firms in high-tech industries compared to firms in low-tech industries. A dis-synergistic effect refers to a situation where the combined effect of two or more factors or actions is less than what would be expected if their individual effects were simply added together. It represents a negative interaction. The study's practical significance suggests that firms should carefully consider the trade-offs between investing in marketing innovation and R&D and that pursuing a dual strategy may not always be the best approach. Competence Development and Innovation Diffusion are used as the framework in this paper to examine the people's efforts in either marketing or research and development division for creating product innovation. Competence development refers to the process of acquiring skills and knowledge, often related to technology or innovation diffusion, which is the spread of new ideas, practices, or technologies through a population or organization. The authors argue that pursuing a dual strategy of investing in both marketing innovation and R&D at the same time may increase the complexity of the innovation process, which in turn may lower new product performance. Convergent mixed methods were implemented in this paper as the primary design as qualitative and quantitative approaches were implemented separately without dependency. The qualitative part of the research involves semi-structured interviews with the Manager of Business Development, Manager of Business Intelligence, Marketing Manager, R&D Director, and CEO to answer H2 and H3. The quantitative part involves CIS surveys that target the decision-makers for a firm's innovation activities. CIS stands for Community Innovation Survey, which is a type of survey used to gather data on innovation activities and strategies within businesses and organizations. Typical respondents are CEOs, heads of innovation management units, or R&D departments. Regression analysis was used to test the relationship between marketing innovation, R&D investment, complexity, and new product performance. Thematic analysis was used to analyze the interview results. The dependent variable (DV) is New Product

Performance while the independent variable (IV) or factor variable (FV) is Investment in marketing and Investment in Product. The mediated variable is Complexity. However, the paper does not mention the total number of respondents and informants.

Based on the quantitative analysis, the paper found that investing in marketing innovation is positively related to new product performance, and investing in R&D is positively related to new product performance. However, when firms pursue a dual strategy of investing in both simultaneously, it negatively impacts new product performance due to increased innovation process complexity. Based on the qualitative analysis of interviews with managers and executives, the paper finds that pursuing a dual strategy of investing in both marketing innovation and R&D is challenging due to the need to balance resources and managerial attention. Firms in high-tech industries or large firms are more likely to have higher innovation performance than firms in low-tech industries or small firms. Marketing innovation is a key source of competitive advantage, particularly in industries where technological innovation is difficult or costly. The study has some limitations. It is based on a sample of firms from Germany, which may limit the generalizability of the findings to other countries or regions. The study focuses on a narrow definition of marketing innovation, which may not capture the full range of innovative marketing practices that firms use. The study does not provide detailed insights into how firms successfully introduce marketing innovations, how they may be effectively protected against imitation, and at which point in the life cycle of the firm's product portfolio they should be introduced. The study does not examine the role of other factors, such as organizational culture or external market conditions, that may influence the relationship between marketing innovation, R&D investment, and new product performance. Finally, it is a cross-sectional study and cannot draw causal relationships. A cross-sectional study is a type of research design where data is collected from a group of individuals or entities at a single point in time. It provides a snapshot of a population at that moment.

5. Comparative analysis

In this section, some categories are analyzed in terms of their similarities and differences, such as connected studies, significance, theoretical frameworks, methods, and findings. It helps to discover the nuances of mixed methods research in the marketing spectrum.

5.1. Connected studies

The selected papers were strongly involved with marketing concepts and innovation. Although it is not cited directly, most of the papers' references were connected to their similar earlier paper. The early paper revolves around the early establishment of the concept of innovation diffusion as the theory was about how the product gains the momentum to be disseminated for a specific community, the work was published for the first time in 1962 (Rogers, 1995). In 2004, the early study of the concept, implementation, and measurement of CRM was established and conceptualized as a marketing effort (Reinartz, Krafft and Hoyer, 2004). In 2011, a study about the integration of marketing, entrepreneurship process, and institutional theory was developed (Webb et al., 2011). However, the paper that relates to data-driven marketing was limited as most of the connected studies were about the marketing strategy with less explanation about the data-driven approach. Adding literature related to data-driven marketing provides more spectrum on how the market moves in a specific way and gives insights to the practitioners of whether the strategy was successful with certain measurements.

5.2. Significance of the study

From all selected papers, marketers or C-level management can benefit from understanding the scientific process of establishing marketing innovation, especially using a digital approach. P1 and P3 emphasize CRM and marketing innovation, a digital shift from

product-oriented to market-oriented brought a broader strategy for implementing and measuring the results. P2 assesses the users' behavior toward mobile ads helping practitioners in developing better mobile ad. Using a mixed method, those studies discovered richer phenomena of marketing and innovation as both sides of the school of thought were implemented. Furthermore, the government or authority may use the findings in developing better regulation for marketing, ads, and social media to ensure it is not misused and provides mutual benefits for the company and stakeholders. In addition, academics can benefit in understanding deeper and broader the literature related to marketing innovation, and market behavior. However, the detail and step-by-step detail implications were less explained in benefiting the findings which might be a challenge for the readers and target audience. Additionally, the study would benefit from a more detailed explanation of the implications of the findings, as well as a discussion of how the results may differ in other countries with different business landscapes and ecosystems. This would make the findings more accessible and actionable for a wider audience.

5.3. Theoretical framework

P1, P2, and P3 each employed distinct frameworks centered around marketing and audience analysis. Notably, P2's framework, utilizing the Pull-Push-Mooring (PPM) model, stands out for its clarity and thorough elaboration. The Pull-Push-Mooring model is used to explain a variety of behaviors, including migration, consumer switching, and employee turnover patterns by considering factors that "push" people out of their current situation, factors that "pull" them toward a new situation, and factors that "moor" them in their current situation (Bansal, 2005; Zanabazar et al., 2021). This model comprehensively examines the factors influencing individuals to switch to mobile ad blockers, taking into account user responses of rejection, acceptance, or promotion. Considering the PPM framework's origin in migration studies, integrating specific behavioral theories like the Theory of Planned Behavior or the Technology Acceptance Model could enhance the depth of the study. The Theory of Planned Behavior, rooted in psychology, explains human behavior through attitudes, subjective norms, and perceived behavioral control. Meanwhile, the Technology Acceptance Model focuses on technology adoption, considering factors such as perceived usefulness and ease of use. In contrast, P1 and P3 center around CRM and innovation diffusion theories to explore e-CRM implementation, though with less detailed explanation. Providing a more thorough discussion of the chosen theories and their application in the study would enhance the reader's understanding of the paper's context and direction.

5.4. Comparative procedure

This section will address and compare the three papers altogether to expand the understanding. All three selected papers use mixed methods to address various issues in marketing as P1 focuses on e-CRM and marketing, P2 emphasizes switching behavior to mobile ad blocks, and P3 specifies creating product innovation using R&D and marketing investment. P1 and P3 are more likely to enhance marketing implementation while P2 anticipates the behavior that might hinder marketing goals. Furthermore, all papers' primary audience is marketing practitioners, particularly managers or directors. It makes the papers worth reading for the audience, providing a better and deeper understanding related to the topic. Next, all papers have different designs of mixed methods which are suitable based on their data collection and analysis. However, the sampling procedure is the issue in most papers as they do not disclose their sampling technique, and even P3 does not mention the total numbers of their respondents and informants. It will be difficult to understand the representativeness and data integrity. Mentioning the details in methodology systematically will help the readers to understand the flow and integrity of research papers. In addition, P1 and P3 conducted a study

in Europe, while P2 did not specify the locations of the study. The generalizability of each paper is limited as the results in developed countries may be different than in developing countries, thus conducting a similar study in the developing countries or Asian countries will enrich the study.

5.5. Findings

All three papers address different aspects of marketing and innovation. P1 emphasizes e-CRM and its impact on business performance in SMEs in the UK, while P2 investigates the reasons individuals switch to using mobile ad blockers. P3 examines the relationship between marketing innovation, R&D investment, and new product performance, specifically looking at the implications of a dual strategy. P1 and P3 both find positive findings for their respective factors (e-CRM and marketing innovation, R&D investment) and business performance. On the other hand, P3 identifies a negative relationship between pursuing a dual strategy of investing in both marketing innovation and R&D simultaneously and new product performance. This suggests that while individual investments in e-CRM or R&D can lead to improved business performance, combining the two may introduce complexities that hinder new product performance. P2 explores the motivation of mobile ad blocker usage, identifying negative experiences, privacy consciousness, and digital literacy as influencing factors. While the research doesn't directly relate to business performance, it provides valuable insights for marketers and advertisers on how to improve mobile ad effectiveness and reach their target audience more efficiently. While the three papers present valuable insights, it's worth noting that the cross-sectional designs employed limit the establishment of causality. To enhance the strength of evidence regarding the relationships between the variables under study, future research might consider adopting longitudinal or experimental approaches. This strategic shift could potentially yield more robust findings, enhancing the generalizability of study outcomes and contributing to the advancement of knowledge in the field.

6. Advantages, challenges, and criticisms of the research design

This section will address the advantages, challenges, and criticisms of mixed methods design. As elaborated by Creswell and Clark (2018) mixed methods provide the bridge between two adversarial research paradigms, quantitative and qualitative as the former is more likely to be positivistic while the latter is interpretive (p. 53–54). It answers research questions with more extensive evidence and analysis, contributing to the study and literature expansion. Also, practically, mixed methods help scholars to produce multiple writings from a single study as well as attract more funding opportunities (Giddings, 2006). However, its challenges are prominent as it leads to criticism against mixed methods overall. First, analyzing data using a mixed-method approach might be a lengthy and complicated process. Second, integrating data and methods will be very challenging for some researchers as they need to ensure the right process and time to collect, analyze, and integrate the data. Third, quantitative and qualitative are constructed by different philosophical and epistemological frameworks, hence it will be difficult to combine. Fourth, selecting the most appropriate mixed methods design for a specific study, including maintaining data quality and integrity is not an easy task. When researchers can't handle challenges effectively, the methods may lack credibility and in turn, face criticism. Dawadi et al. (2021) enunciated that data collection and analysis are not sufficient to establish quality conclusions due to their lack of focus, on apprehending the two different philosophical paradigms.

Conclusion

In conclusion, mixed methods design is considered a more comprehensive research approach compared to the sole application of quantitative or qualitative approaches. However,

its implementation is challenging due to the need for sufficient resources, time, and skills. The comparative analysis of the three studies employing mixed methods design provides valuable insights into the strengths and limitations of each paper using this approach. While the papers contribute to the field of marketing by addressing different research topics, there are areas for improvement for all selected papers, such as providing more details on sampling procedures and explicitly stating the frameworks used to enhance its clarity. All papers provide a comprehensive marketing research approach as a mixed-method design employed. In this context, P1, P2, and P3 use different marketing frameworks. P2 stands out for its clear elaboration of the Pull-Push-Mooring model, which it uses to study factors influencing mobile ad blocker adoption, while P1 and P3 provide less explicit explanations of their frameworks. Nonetheless, researchers and practitioners in the field can benefit from this study as it provides insights into the strengths and limitations identified in the analysis of the three examined studies. For researchers, this entails a nuanced understanding of the effective utilization of mixed methods in marketing research and recognizing the intricate interplay between qualitative and quantitative components, enhancing the methodological robustness of their studies. This in turn equips industry practitioners with better academic guidance in mitigating challenges in real-world marketing scenarios.

Limitations and further research directions

This study, while offering insightful findings, acknowledges certain limitations which pave the way for future research opportunities. The comparative analysis was conducted on a select number of articles, providing a focused yet somewhat limited perspective in the vast landscape of mixed methods studies in marketing. Additionally, the scope of marketing concepts addressed was broad, offering a comprehensive overview but potentially needing the nuances of more specific marketing sub-disciplines. To build on this foundational work, future studies are encouraged to expand the selection of articles. Including a larger and more diverse range of papers employing mixed methods will not only enhance the representativeness of the analysis but also provide a more robust understanding of how these methods are applied across various marketing contexts. Moreover, homing in on specific areas within marketing, such as digital marketing, consumer psychology, or sustainable marketing practices, could yield more detailed insights relevant to those subfields. Deepening the level of analysis is another critical avenue for subsequent research. A more thorough examination of the methodological intricacies, such as the integration of qualitative and quantitative data, the theoretical frameworks employed, and the implications of different research designs, would contribute to a richer, more nuanced understanding of mixed methods research in marketing.

Acknowledgment

We extend our heartfelt gratitude to Dr. Norbaiduri Binti Ruslan for her invaluable guidance, support, and feedback in completing this journal article. Our thanks also go to the Department of Communication, KIRKHS, IIUM, for providing an enriching platform for learning and sharing our work.

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The Role of Integrated Communication Strategies with Social Media in Creating and Nurturing Relationships with New Brands: A Consumer Behavior Perspective

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Article history
Received 23 April 2023 | Accepted 25 February 2024 | Published online 06 March 2024.

Abstract
Social Media has become integral to our daily lives in a hyper-connected world where the digital environment becomes an important part of the consumer's life. With the proliferation of new brands in the market, it has become essential for businesses to adopt effective communication strategies that integrate social media to build and maintain relationships with their customers. New brands face great challenges when it comes to establishing themselves in the market and building relationships with customers. Each brand must adapt to the target audience and communicate effectively with them in order to gain long-term loyalty. Understanding how the consumer connects with a new brand is the key to building an effective long-term communication strategy that will bring results from a marketing and business point of view. The purpose of our research is to understand consumer preferences when it comes to new brands on Social Media. We carried out quantitative research by using the survey method focusing on finding out what really matters to the consumer so that we can come to the aid of new brands thereby they can adapt their integrated communication strategies with Social Media. The research findings indicate that respondents place the utmost importance on the inclusion of genuine narratives and customer feedback from previous product or service users when considering the content that new brands should produce. Furthermore, an analysis of the data reveals discernible preferences based on the age demographics of the participants. The results show that irrespective of age, the presence of brands on social media platforms exerts a substantial influence on consumer loyalty and support.

Keywords: Consumer Behavior, Integrated Communication Strategies, Online Advertising.

JEL classification: M30, M31.

1. Introduction

Because of technological development, new brands no longer face the challenges faced by brands 20-30 years ago or even more. They have new communication channels, advanced

technologies to monitor their competition, and intelligent software that can measure the results of their Social Media activities and consumer behavior. It is important to know how much time consumers spent on their website or advertising, if they abandoned their shopping cart or if they like or dislike a certain type of content. These data are extremely important when implementing the marketing strategy (Chivu et al., 2022). But just as brands no longer face the challenges of 20-30 years ago or more, they continue to face consumers' changing behavior: there are consumers who adapt to changes and consumers who do not like changes at all. New brands must understand the consumer, be familiar with the consumer's preferences and offer what the consumer wants so that the brand's objectives are fulfilled (Barbu et al., 2018).

Figure 1. New Brands Strategy
Source: Author's Contribution

The generational cohort is one of the most popular ways of mass-market segmentation. The premise is that people who were born and grew up within the same period experienced the same significant events. Thus, they share same socio-cultural experiences and are more likely to possess similar sets of values, attitudes, and behaviors (Kotler et al, 2021).

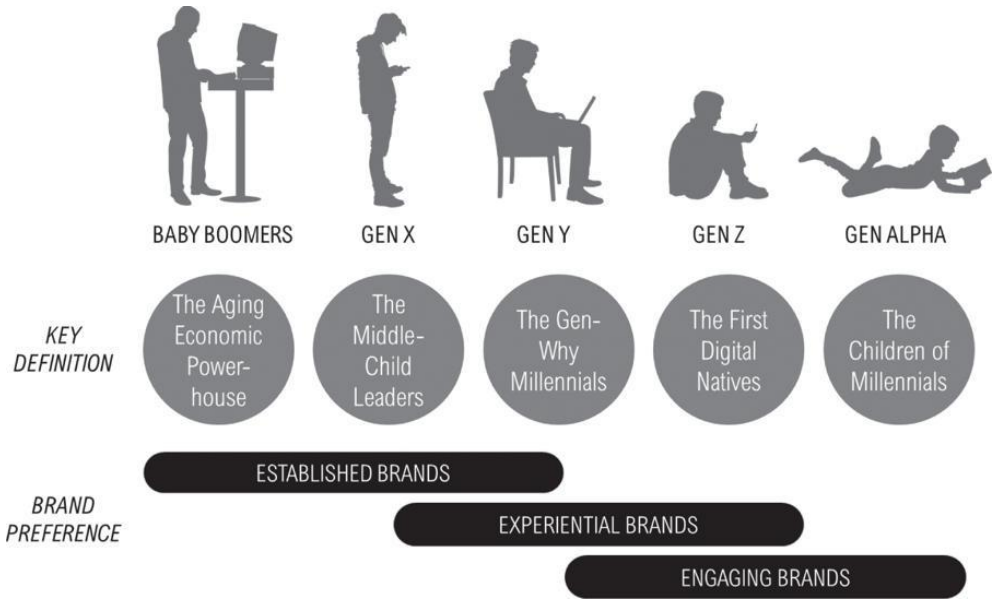

Figure 2. The Five Generations and Their Brand Preferences
Source: Kotler, Kartajaya & Setiawan, 2021, p. 45.

Each generation is familiar with certain devices, has certain preferences when it comes to brands, and needs a certain type of communication to receive the signal sent by the brand. This is one of the reasons why social media content must be responsive and adapted for all devices: laptops/computers, tablets, and phones. Also, implementing an effective strategy directed to consumer needs and preferences is essential in creating and nurturing long-term relationships (Stoica et al., 2015).

2. Communication Strategies with Social Media

Integrated communication strategies on social media must be adapted to the behavior of the digital consumer, who is active and interconnected. Brands must provide relevant content, answer questions and create authentic interaction experiences to build lasting relationships with consumers (Anderson & Williams, 2018). The role of integrated communication is to ensure that all communication efforts work together harmoniously to convey a coherent and unified message to the audience. It aims to create a consistent brand image, enhance brand awareness, build strong relationships with customers, and ultimately achieve marketing and business objectives.

2.1. Message

Brand messages on social media channels must be tailored to the preferences and needs of the target audience. Personalized and relevant communication creates a strong emotional connection and generates engagement from consumers (Davis & Williams, 2021). The messages must be formulated effectively so that they remain in the consumer's mind to make a direct connection between the message and the brand.

When it comes to the structure and content of the message within integrated communication on social media channels, there are a few key considerations to keep in mind. Brevity is essential due to the limited attention span of social media users. Messages should be clear and succinct. Including compelling visuals help such as images, videos, infographics, and emojis grab attention and convey information more effectively. Also, incorporating a call to action (CTA) is crucial to encourage audience engagement and drive desired actions. A well-crafted CTA can prompt users to like, comment, share, visit a website, make a purchase, or participate in a campaign or contest.

2.2. Content

The quality of social media content plays an important role in shaping users' perception and attitude towards brands. Well-structured, informative, and creative content is more likely to positively influence users' perception and purchase intentions (Li & Cheng, 2019). Also, the content must be adapted according to the target audience, the brand's communication strategy, and the communication channel. Thus, some platforms allow exclusively video content, others allow both video and image, while on other platforms it is advisable to communicate by text. Depending on the platform the content must be changed and adapted. Content marketing is also considered to be another form of brand journalism and brand publishing that creates deeper connections between brands and customers. (Kotler, Kartajaya & Setiawan, 2017).

2.3. Social Media Channels

At this moment there are a lot of social media platforms with tens, hundreds, and millions of users from all over the world. Also, the content on it differs depending on the capabilities of the platform. We have platforms with photo, video, and even text-only content. Each media has a distinct way of influencing perceptions and motivating behavior. Each source has a unique approach for delivering a brand message (Juska, 2018). Out of all the existing Social

Media platforms, five of them are the most used and popular among users: Instagram, Facebook, TikTok, Youtube, and Linkedin.

Instagram is a Social Platform in which video, photo, and audio content can be found when it is added to those mentioned before. When it comes to audience age group according to Datareportal.com most Instagram users are between the ages of "18 to 24 which means 32.0% of Instagram's total ad audience" and "25 to 34 - 29.6% of Instagram's total ad audience." Statistics show us that as the age range increases, the use of this platform decreases significantly.

Facebook is the social platform that appeared before Instagram and which is part of the same group, Meta Inc. Here we observe the fact that with the increase in age, there is relative maintenance of the number of users, they do not suddenly decrease as it happened on the previous platform. According to Orzan et al., (2021) Creating a Facebook Business Manager, companies could create complex marketing campaigns, being able to improve it all the time.

TikTok, the platform where the content is exclusively video, has fewer users than the other two platforms. Also, with increasing age, the number of users becomes smaller. Youtube, a video content platform has the most users in the age ranges between 18 years old and 44. Linkedin, is a totally different platform compared to the others mentioned above because it is directed towards the professional and business area. This is the reason why the professionally active age groups represent a high percentage and it decreases significantly with age.

Table 1. The percentage of total ad audience on each Social Media Platform based on the results found on datareportal.com related to the data reported in April 2023

AGE GROUP	13-17	18-24	25-34	35-44	45-54	55-64	65 AND ABOVE
The percentage represents % of total ad audience on each Social Media Platform							
Instagram	**8.1%** 131.1 million users	**32.0%** 517.7 million users	**29.6%** 488.7 million users	**15.3%** 246.3 million users	**8.2%** 132.2 million users	**4.2%** 68.2 million users	**2.6%** 41.5 million users
Facebook	**4.9%** 109.4 million users	**22.6%** 508.2 million users	**29.6%** 668.5 million users	**19.0%** 425.4 million users	**11.3%** 253.3 million users	**7.1%** 158.7 million users	**5.6%** 123.3 million users
TikTok	-	**38.5%** 419.9 million users	**32.5%** 354.8 million users	**15.6%** 170.0 million users	**8.0%** 87.3 million users	**5.5%** 60.1 million users	
Youtube	-	**15.0%** 379.7 million users	**20.7%** 522.5 million users	**16.7%** 422.0 million users	**12.0%** 303.0 million users	**8.8%** 222.2 million users	**9.0%** 227.7 million users
Linkedin	-	**21.1%** 200.0 million users	**55.8%** 520.0 million users	**20.1%** 170.0 million users		**2.9%** 23.0 million users	

Even if the presence on all social media platforms is important, new brands should take into account at least a few when they want to address a target audience according to age. As Fig. 2 shows us the type of preferred brand according to the generation to which the consumer belongs, Table 1 aims to reveal the audience of each Social Media platform mentioned according to age. These data could be a reference for new brands when choosing to address their target audience by choosing the right platforms to do that.

3. Methodology

The aim of the research entitled "The Role of integrated communication strategies with Social Media in Creating and nurturing relationships with new brands: A Consumer Behavior Perspective" is to explore and understand how integrated communication strategies that incorporate Social Media platforms can effectively contribute to the creation and nurturing of relationships between new brands and consumers. The research seeks to investigate the impact of such strategies on consumer behavior, including their attitudes, perceptions, and actions toward new brands. By adopting a consumer behavior perspective, the study aims to shed light on the mechanisms through which integrated communication strategies with social media influence consumer-brand relationships, brand awareness, and customer loyalty.

We carried out exploratory research in the first part of the study, which helped to establish a general framework for the problem investigated using primary data sources. After that, we made quantitative research by using the survey method: a questionnaire with a total number of 18 questions was created, which was administered through the Google Forms platform to a number of 100 respondents between 20 May and 29 May 2023.

The main objectives of this research are the following:

Objective 1: Determine what kind of content on Social Media platforms is more attractive to consumers when it comes to new brands.

Objective 2: Discover if a brand's active presence on Social Media platforms influences consumers' decision to be loyal and support that brand

Objective 3: Determine how important it is for the consumer to communicate with brands on Social Media platforms

Objective 4: Discover through what other methods offered by Social Media platforms consumers interact with brands.

Objective 5: Discover what attracts the consumer to a new brand

Objective 6: To determine whether consumers are making purchases following the discovery of a new brand on social media.

4. Findings

After centralizing the data, we can observe the preferences according to the age category of the respondents. For the question "What attracts you to a new brand?" the age group of 18-24, respectively the youngest of the respondents are most attracted to the type of product/service. The second preference is the brand message and communication, and then if a celebrity or famous person is the image of the brand. They are the least interested if the brand involves in social and environmental causes. According to the results obtained, for this age group, brands should direct their products or services to their needs, using a communication method that is as relevant as possible.

What attracts you to a new brand?	*Age*	COUNTA from Age
If a celebrity/famous person is the image of that brand	18-24	8
	25-34	1
	35-44	6
	45-54	1
Total pentru If a celebrity/famous person is the image of that brand		16
The brand message and communication	18-24	16
	25-34	11
	35-44	5
	45-54	3
Total pentru The brand message and communication		35
The involvement of the brand in social and environmental causes	18-24	2
	25-34	1
	35-44	2
	45-54	1
Total pentru The involvement of the brand in social and environmental causes		6
The type of product/service	18-24	29
	25-34	5
	35-44	5
	45-54	2
	55-64	2
Total pentru The type of product/service		43
Total general		**100**

Figure 3. What attracts consumers to new brands according to age.

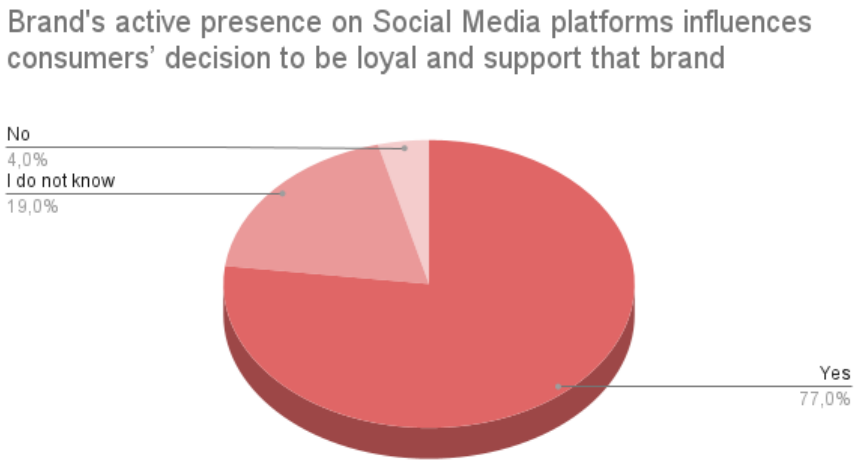

Figure 4. Brand presence on Social Media impact.

Based on the results, the most important for the 25-34 age group is the brand message and communication. After that, the type of product or service and they are equally the least interested in the involvement of the brand in social and environmental causes and if a celebrity is the image of the brand. The results provided by this group are similar to those of the previous group. Thus, brands could expand the age of their target audience and adapt to their demand.

The 35-44 age group prefers if a celebrity is the image of the brand. The following are equally important for them: the brand message and the type of product. Also, only 2 respondents from this category said that they are attracted to a new brand of involvement in social and environmental causes, which ranks this aspect last in preferences. Brands whose target audience is this age segment could choose a representative and famous person to be their image and a good way to communicate their message through it.

Even if this age group had a smaller number of respondents, the top of their preferences is the following: the brand message and communication, the type of product or service, and the least important for them are if a famous person is the image of the brand and the involvement

of the brand in environmental and social causes. According to the results, the preferences of this category are very much alike to those of 25-34. Brands could come up with a message similar to both categories.

For the majority of respondents (77.0%) the presence of the brand on Social Media platforms influences their decision to be loyal and support the brand. This may be because Social Media platforms are the environment in which brands can speak directly to consumers and take this aspect into account. The share of negative answers is very small and this may mean that brands should take into account their presence on Social Media channels in order to achieve their goals.

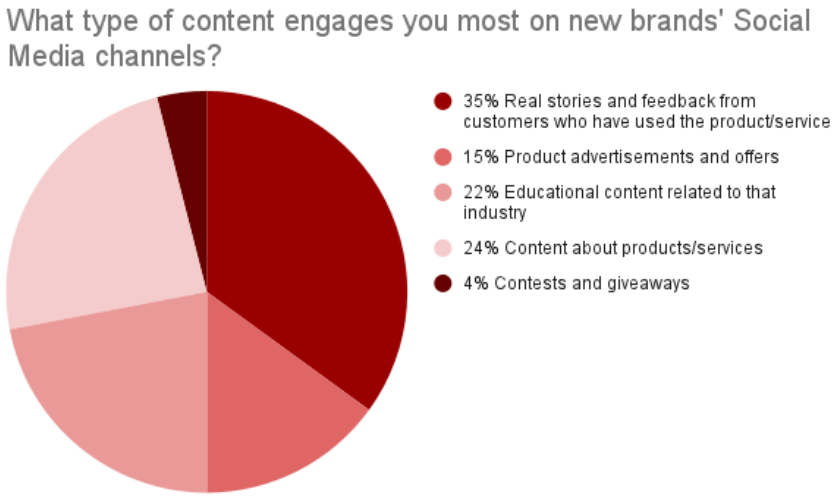

Figure 5. Type of content that engages new brands with consumers on Social Media.

In consideration of the findings, the most significant for respondents when it comes to the content that new brands should make is real stories and feedback from customers who have used the product or service. Brands could do this by introducing a series of video or photo testimonials on their Social Media channels or a feedback page on their company website. Brands could continue this activity with content about their products or services introducing in these testimonials many information about them. 22% of respondents consider that educational content related to that industry is essential to them. A smaller part of them, 15% of respondents consider that product advertisements and offers are the type of content that they engage the most with. Based on the small percentage of the respondents which is 4%, contests and giveaways are not of interest at all.

The analysis of the data reveals distinct preferences based on the age categories of the respondents. Across all age groups, the presence of brands on social media platforms has a significant impact on consumer loyalty and support. Furthermore, consumers highly value real stories and customer feedback as engaging content, suggesting that brands should incorporate testimonials and educational content to connect with their audience effectively, while contests and giveaways have limited appeal.

7. Conclusions, future directions and research limits

This research has successfully fulfilled its objectives through the analysis of data collected from the respondents by identifying and examining the effectiveness of integrated communication strategies incorporating social media platforms in fostering and maintaining connections between new brands and consumers.

The main limit of this research was that the sample size was not big enough so it was not satisfactory for statistical measurements. However, the findings aim to serve as a guide for businesses leveraging social media and integrating communication strategies to build and maintain strong relationships with their customers. The findings emphasize the significance of incorporating social media platforms into communication strategies to effectively connect with consumers.

Technological advancements have provided new brands with various tools and channels to overcome challenges faced by brands in the past. Understanding consumer preferences and effectively communicating with them through personalized messages and high-quality content is essential for building lasting relationships. Social media platforms play a crucial role in brand communication, with each platform requiring tailored strategies to engage the target audience effectively. Platforms such as Instagram, Facebook, TikTok, YouTube, and LinkedIn offer unique opportunities for brands to connect with different age groups, and understanding the user demographics of each platform can help brands choose the most suitable channels for their marketing efforts. Adapting strategies to different social media platforms is essential for brands to leverage the full potential of integrated communication strategies and maximize their impact on consumer behavior.

Social media has a significant influence on marketing decisions related to new brands, compelling companies to adjust their strategies and utilize these platforms for brand promotion and customer engagement. Moving forward, it is crucial for companies to prioritize areas such as data analytics provided by the Social Media platforms, customer segmentation, and staying updated on emerging trends. By doing so, they can strengthen their marketing policies and successfully meet evolving consumer expectations in the dynamic digital landscape.

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