

Evaluation of Problems While Marketing Clothing on Instagram with the Pythagorean Fuzzy AHP Method

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Abstract

Due to the fierce international competition in today's clothing market, businesses have started to pay more attention to marketing activities. One of the most popular of these marketing activities is Instagram marketing. For this reason, the aim of this study was to identify the problems faced by clothing businesses that perform garment marketing on Instagram, to rank them in order of importance and to develop solutions to the most important problems. Within the scope of the research, firstly, the problems encountered by businesses while marketing clothing on Instagram were determined through data obtained from 14 businesses through a designed questionnaire. The problems identified are technical problems, cargo-related problems, difficulty in increasing the number of followers, and various other issues. Secondly, all the problems identified in the research were ranked by the Pythagorean Fuzzy AHP Method according to the degree of importance; increasing the number of followers, technical problems, lack of trust and others. In the last stage of the research, expert opinion from Instagram marketing experts of 14 businesses was used to develop solutions to the three most important problems previously identified. The solution suggestions developed are as follows: to increase the number of followers of businesses, to increase the number and variety of advertisements and to make advertising campaigns continuous; for technical problems - to share purchase links to customers, to keep the programs used constantly updated, to get professional support and to focus more on story ads instead of post ads; and for the problem of lack of trust - honesty, phenomenon support, product photo shoots within the business.

Keywords

Clothing, marketing problems, Instagram, Pythagorean Fuzzy AHP Method, solution development.

1. Introduction

Increasing competition in the international clothing industry [1] has started to be felt in every field from raw material supply, product design and production, to sales channels, sales tools and sales location selection, areas among others [2]. In order to overcome this intense competition, one of the activities that clothing businesses focus on is marketing [3]. In the field of marketing, the popularity of social media marketing tends to increase. In this case, it is of great importance that businesses have the opportunity to listen to consumers, respond to them and review them in real time with social media. In addition, the content created by both businesses and consumers and the ability to share this content on social media platforms have enabled marketing to reach a different level [4]. In short, social media offers businesses the opportunity to connect directly with customers, strengthen communication and provide offers [5].

Instagram, as a type of social media, is a mobile-based application that offers users

simple features like taking and sharing photos through a user-friendly interface [6]. As of January 2023, it has surpassed two billion active users and continues to grow in popularity [7]. Due to its broad user base, captivating visual content, and strong influence on consumer behavior, Instagram has become an effective platform for marketing [8]. Businesses view Instagram as an important platform to interact with their existing and potential customers, understand their customers, reach the market with a low budget [9], offer niche products and services, conduct market research [10], tell brand stories, showcase products, and build brand identity [11]. Additionally, Instagram provides businesses with powerful advertising options that allow them to collaborate with popular users (influencers), encourage users to create and share content about their brands and products, target ads based on demographics, interests and behaviors, and more. It enables businesses to measure the effectiveness of their marketing efforts, track engagement, and gain insights into their target audience, thus helping them optimize their marketing

strategies and make informed decisions to achieve marketing goals [6, 12-13]. In conclusion, Instagram has become a powerful platform for businesses to promote their products and services, connect with their target audience, and achieve business outcomes [14].

Despite the many opportunities Instagram provides businesses, there is not enough research in the literature on the issues that companies face when using Instagram for marketing. For this reason, the general purpose of this research was to determine the problems faced by garment businesses that perform garment marketing on Instagram. In addition, there are also specific objectives such as ranking the problems identified in the research in order of importance and developing solutions to the most important problems.

2. Literature Review

Instagram marketing is a relatively new but rapidly evolving field. Therefore, there are very few studies in the literature that focus on the problems encountered

in Instagram marketing. Some of these studies include the following:

Ayres examined the problems faced by four vintage sellers with over 2,500 followers who conducted sales on Instagram. The study identified that responding to direct messages and communicating with customers, time spent, resource finding, research, capturing compelling photographs for social media, pricing, and keeping up with fashion were the most significant challenges [15].

In a social media marketing trends survey, Ascend2 found that the inability to measure the return on investment of Instagram and other social media tools, the difficulty in measuring success criteria due to their abstract nature, insufficient social media expertise within businesses, inadequate allocation of resources to the marketing department, and the inability to create engaging content for the target audience were the most significant problems in social media marketing [16].

Additionally, Nummila examined successful marketing accounts on Instagram, such as Nike, H&M, and Mango, to define successful marketing on the platform. The study concluded that understanding the platform well is crucial for success on Instagram. Creating content that resonates with the target audience plays a vital role in achieving success [17].

Putri and Windasari found that the social media sales of DMC, a women's fashion business, were low in proportion to the number of Instagram followers. When they investigated the reason for this problem, they concluded that DMC did not have an attractive and accurate content strategy that would facilitate the target audience to order clothes on social media [32].

Laakso, in order to analyse and improve the existing social media platforms of a Finnish clothing brand, analysed the Facebook and Instagram accounts of the business and compared them with its competitors. As a result, they found that the company lacked information, could

not use the platforms efficiently and did not have a comprehensive social media plan [33].

In conclusion, based on the literature, some of the problems faced in Instagram marketing include difficulties in responding to direct messages, time-consuming communication with customers, pricing issues [15], inability to measure ROI, lack of social media expertise [16], difficulty in creating engaging content [15-17], lack of an attractive and accurate content strategy [32], and lack of a social media plan [33].

When the literature is examined, it is seen that the studies generally focus on social media marketing. This study differs from the others in that it is the only study in the field that provides important information to the clothing industry by presenting many studies such as problem identification, ranking problems according to their importance and developing solutions to the identified problems at the same time.

3. Methodology

The aim of this study was to identify the problems faced by clothing businesses on Instagram, a platform they increasingly turn to for marketing purposes, and to rank those problems according to their level of importance. The study also aimed to develop solution recommendations for the most significant problems. The research plan consisted of three stages to achieve the objective.

In the first stage, a question form was created to determine the problems encountered by clothing businesses when marketing clothing on Instagram. The question form consisted of a single question: "Could you please list the problems your business encounters when marketing clothing on Instagram?". In order to apply the relevant question form, Marmara University students were asked about the clothing businesses they prefer on Instagram in order to determine the clothing businesses' marketing on Instagram. As a result of these interviews, 20 different businesses' marketing on

Instagram were identified. A question form was sent to the Instagram marketing department in those businesses. The relevant questionnaire was completed by 14 businesses. Frequency analysis was applied to the data obtained from the businesses. The primary problems encountered by clothing businesses in marketing on Instagram, as identified through frequency analysis, are presented in Table 2.

In the second stage, the aim was to rank the problems faced by clothing businesses in Instagram marketing according to their level of importance. Determining the importance levels of the problems identified and ranking them was highly subjective. Evaluating those problems without incorporating the evaluators' own emotions and subjective views was not possible. Therefore, the use of fuzzy sets, which can model uncertainties in problems involving subjective evaluations, and fuzzy multi-criteria decision-making methods that involve these sets, would be beneficial. Fuzzy theory has been developed by various researchers for solving such problems [18].

Fuzzy sets are a mathematical framework developed by Lotfi Zadeh in the 1960s as an extension of classical set theory [30]. While classical sets are based on clear-cut boundaries, indicating whether an element belongs to a set or not, fuzzy sets introduce the concept of partial membership and allow elements to have different degrees of membership in a set. In a fuzzy set, each element is assigned a membership value between 0 and 1, indicating the degree to which the element belongs to the set. A membership value of 1 represents full membership, while 0 indicates no membership. Values between 0 and 1 represent partial membership degrees [19]. Fuzzy sets are particularly useful for modeling and dealing with uncertain, vague, or imprecise information. They provide a flexible and intuitive way to represent and reason about fuzzy concepts and boundaries that are commonly encountered in many real-world scenarios. Moreover, they have found applications in various fields, including artificial intelligence,

decision-making, control systems, pattern recognition, expert systems, and others. By allowing more robust and flexible modeling in complex domains, they provide a powerful framework for overcoming uncertainty and vagueness [20].

Pythagorean fuzzy sets (PFS) were introduced due to the inability of classical fuzzy sets to fully express uncertainty [21]. PFS are an extension of traditional fuzzy sets and provide a more flexible and meaningful way to handle uncertainty and vagueness in decision-making and modeling complex systems. In PFS, each element is associated with a triple value: membership degree, non-membership degree, and hesitation degree. The membership degree represents the degree to which an element belongs to the set, while the non-membership degree represents the degree to which the element does not belong. The hesitation degree measures the level of uncertainty or hesitation in assigning membership and non-membership degrees. Compared to traditional fuzzy sets, PFS provide additional information through the hesitation degree. This allows for a more nuanced representation of uncertainty and vagueness, enabling decision-makers to express their hesitations more explicitly, which is particularly useful when dealing with subjective or imprecise information [22]. PFS have been applied in various fields due to their ability to express and handle uncertainty in uncertain environments [23]. In these sets, the sum of membership and non-membership degrees can be greater than 1, but the sum of their squares cannot exceed 1. As a result, PFS have a better application in multi-criteria decision-making (MCDM) problems due to their ability to handle embedded uncertainties in decision-making [24]. Below are some important definitions related to PFS [25].

Definition 1: A Pythagorean fuzzy set is an object expressed as P

$$\{ \langle x, P(\mu_p(x), \nu_p(x)) \mid x \in X \} \quad (1)$$

Where $\mu_p(x):x \mapsto [0,1]$ ve $\nu_p(x):x \mapsto [0,1]$ $x \in X$ refers to the degree of membership and non-membership of the

set P, respectively, and the sum of their squares does not exceed 1, as shown in Equation 2.

$$0 \leq \mu_p^2(x) + \nu_p^2(x) \leq 1 \quad |x \in X \quad (2)$$

The degree of hesitation is calculated using Equation 3.

$$\mu_p(x) = \sqrt{1 - \mu_p^2(x) - \nu_p^2(x)} \quad (3)$$

The basic operations in PFS are listed below.

Definition 2: $\beta_1 = P(\mu_{\beta_1}, \nu_{\beta_1})$ ve $\beta_2 = P(\mu_{\beta_2}, \nu_{\beta_2})$ the operations, with two Pythagorean fuzzy numbers, are as follows:

$$\beta_1 \oplus \beta_2 = P\left(\sqrt{\mu_{\beta_1}^2 + \mu_{\beta_2}^2 - \mu_{\beta_1}^2 \mu_{\beta_2}^2}, \nu_{\beta_1}, \nu_{\beta_2}\right) \quad (4)$$

$$\beta_1 \otimes \beta_2 = P\left(\mu_{\beta_1}, \nu_{\beta_1} \nu_{\beta_2} \sqrt{\nu_{\beta_1}^2 + \nu_{\beta_2}^2 - \nu_{\beta_1}^2 \nu_{\beta_2}^2}\right) \quad (5)$$

$$\lambda \beta_1 = P\left(\sqrt{1 - (1 - \mu_{\beta_1}^2)^\lambda}, \nu_{\beta_1}^\lambda\right) \quad (6)$$

$$\beta_1^\lambda = P\left(\mu_{\beta_1}^\lambda, \sqrt{1 - (1 - \nu_{\beta_1}^2)^\lambda}\right) \quad (7)$$

Definition 3: The distance between two PFS is found by equation 8 below.

$$d(\beta_1, \beta_2) = \frac{1}{2} (|\mu_{\beta_1}^2 - \mu_{\beta_2}^2| + |\nu_{\beta_1}^2 - \nu_{\beta_2}^2| + |\pi_{\beta_1}^2 - \pi_{\beta_2}^2|) \quad (8)$$

Definition 4: If more than one DM evaluates the criteria, the ranged PF numbers are summed using the ranged PF weighted geometric operator.

$\beta_i = P([\mu_i^L, \mu_i^U], [\nu_i^L, \nu_i^U])$ this is a PF number.

With $w_j = (w_1, w_2, w_3, \dots, w_n)^T, \beta_i = (1, 2, 3, \dots, n)$ nin $\sum_{i=1}^n w_i = 1$ as the weight vector, an IVPFWG operator is represented as the 9th equation below. Here, n represents the number of decision makers (DMs).

$$IVPFWG(\beta_1, \beta_2, \beta_3, \dots, \beta_n) = \left(\left[\prod_{j=1}^n \mu_{\alpha_j}^L w_j, \prod_{j=1}^n \mu_{\alpha_j}^U w_j \right], \left[\prod_{j=1}^n \nu_{\alpha_j}^L w_j, \prod_{j=1}^n \nu_{\alpha_j}^U w_j \right] \right) \quad (9)$$

In PFS, the sum of membership and non-membership degrees can be greater than 1, but the sum of their squares cannot. This means that for every point (x, y) with both intuitive membership grades and Pythagorean membership grades, all points below the line $x + y \leq 1$ represent intuitive membership grades, while all points satisfying $x^2 + y^2 \leq 1$ represent Pythagorean membership grades. Therefore, the set of Pythagorean membership grades is larger than the set of intuitive membership grades. Thus, PFS provide decision-makers with more freedom to express their opinions about the uncertainty and vagueness of the problem. [26] The Pythagorean fuzzy AHP (PF-AHP), which utilizes these sets, is an extension of the traditional AHP method that incorporates the concept of PFS. PFS allow for a more flexible representation of uncertainty and vagueness by assigning a membership value to each element in the set. [27] In the AHP method, decision-making involves creating a hierarchical structure of criteria and alternatives and then evaluating pairwise comparisons between them to determine their relative importance. PF-AHP takes into account the uncertainty in these pairwise comparisons by using Pythagorean fuzzy numbers instead of precise numbers [28]. PF-AHP provides a more comprehensive approach to decision-making when there is uncertainty and vagueness in the evaluation process. It enables decision-makers to express their preferences more flexibly and realistically by considering multiple criteria and alternatives simultaneously. PF-AHP offers a more comprehensive and flexible framework for decision-making, especially when dealing with imprecise or uncertain information. It allows decision-makers to express and handle uncertainties more effectively through Pythagorean fuzzy numbers, leading to more realistic and nuanced decision outcomes. [29]

Linguistic Variables	Pythagorean Fuzzy Numbers			
	The lower value of the membership degree (μ_L)	The upper value of the membership degree (μ_U)	The lower value of the non-membership degree (ν_L)	The upper value of the non-membership degree (ν_U)
Certainly Low Importance (CLI)	0	0	0.9	1
Very Low Importance (VLI)	0.1	0.2	0.8	0.9
Low Importance (LI)	0.2	0.35	0.65	0.8
Below Average Importance (BAI)	0.35	0.45	0.55	0.65
Average Importance (AI)	0.45	0.55	0.45	0.55
Above Average Importance (AAI)	0.55	0.65	0.35	0.45
High Importance (HI)	0.65	0.8	0.2	0.35
Very High Importance (VHI)	0.8	0.9	0.1	0.2
Certainly High Importance (CHI)	0.9	1	0	0
Exactly Equal (EE)	0.1965	0.1965	0.1965	0.1965

Table 1. Linguistic variables and pythagorean fuzzy numbers [26]

The Pythagorean Fuzzy AHP method provides the ability to deal with uncertainty through the integration of fuzzy logic into traditional AHP. This method can model real-world situations more effectively, increasing flexibility and tolerance in the decision-making process. It allows participants to express their preferences in authentic language, which can help make more personalized and meaningful decisions by taking individual terms into account. Pythagorean Fuzzy AHP successfully models ambiguous and fuzzy relationships, which can lead to realistic and applicable results. Finally, this method reflects human judgmental abilities, making the decision-making process more human-like. Due to these characteristics, the PF-AHP method is employed in this study. The scale shown in Table 1 is used for decision-makers to evaluate alternatives and criteria in Pythagorean fuzzy numbers.

The steps of the PF-AHP method are as follows [26]:

Step 1: According to the scale given in Table 3, the decision makers compare the criteria or alternatives in pairs and accordingly create the pairwise comparison matrix.

Step 2: Calculation of the difference matrix between the lower and upper points of the membership and non-membership functions with the help of equations (10) and (11)

$$d_{ik_l} = \mu_{ik_l}^2 - \nu_{ik_u}^2 \quad (10)$$

$$d_{ik_u} = \mu_{ik_u}^2 - \nu_{ik_l}^2 \quad (11)$$

Step 3: Calculation of the multiplicative matrix using equations (12) and (13)

$$s_{ik_l} = \sqrt{1000^{d_l}} \quad (12)$$

$$s_{ik_u} = \sqrt{1000^{d_u}} \quad (13)$$

Step 4: Calculation the degrees of determinacy for each criterion with the help of equation (14)

$$\tau_{ik} = 1 - (\mu_{ik_u}^2 - \mu_{ik_l}^2) - (\nu_{ik_u}^2 - \nu_{ik_l}^2) \quad (14)$$

Step 5: Determining the before normalization weights using both the degrees of determinacy and the multiplication matrix with the help of equation (15).

$$t_{ik} = \left(\frac{s_{ik_l} + s_{ik_u}}{2} \right) \tau_{ik} \quad (15)$$

Step 6: Calculation of weights of importance (w_i)

$$w_i = \frac{\sum_{k=1}^m t_{ik}}{\sum_{i=1}^m \sum_{k=1}^m t_{ik}} \quad (16)$$

4. Analysis of research method's results

Data resulting from the frequency analysis of the survey results is presented in Table 2.

According to Table 2, clothing businesses face nine main problems when marketing on Instagram. The problems with the highest frequency are Instagram-related technical issues, shipping-related problems, and customer-related problems on Instagram. The prioritization of the problems encountered when marketing clothing on Instagram using the PF-AHP Method was carried out according to the steps described above.

Step 1: The problems listed in Table 2 were evaluated according to the common opinions of three experts in three clothing marketing companies in the online meeting, according to the scale given in Table 1, to obtain the pairwise comparison matrix presented in Table 3.

Step 2: The difference matrix between the lower and upper points of the membership and non-membership functions is calculated with the help of equations (10) and (11) and given in Tables 4-5.

Step 3: Multiplicative matrix is calculated using equation (12) and (13) and is given in Table 6-7.

	Problems	F
P1	Instagram-related technical issues (disconnection, frequent freezing of the page, difficulties in reaching customer support, posts not appearing on everyone's feed, inability to make direct sales, limitations on payments, visibility, etc.)	8
P2	Instagram users generally demand retail products.	1
P3	Shipping-related issues (speed, loss, high prices, etc.)	7
P4	Lack of trust among users in Instagram marketing (due to the abundance of amateur pages, etc.)	4
P5	Challenges in creating engaging content on Instagram	3
P6	Challenges in increasing follower count on Instagram	6
P7	The high cost of Instagram marketing (due to expenses such as advertising, promotion, commissions, shipping, CPM, etc.)	6
P8	Customer-related problems on Instagram (such as incorrect size selection, requests for unavailable sizes, exchange requests, discount demands, Instagram algorithm, excessive inquiries, etc.)	6
P9	Shortage of Instagram marketing specialists (lack of foreign language proficiency, addressing customer feedback, etc.)	2
	Total	43

Table 2. Distribution of problems encountered when selling clothes on Instagram

Problems	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	EE	VHI	HI	VHI	HI	VHI	HI	VHI	HI
P2	VLI	EE	VLI	CLI	VLI	CLI	VLI	CLI	VLI
P3	LI	VHI	EE	AI	AAI	AI	AAI	AI	AAI
P4	VLI	CHI	AI	EE	HI	AAI	HI	AAI	HI
P5	LI	VHI	BAI	LI	EE	VLI	LI	VLI	LI
P6	VLI	CHI	AI	BAI	VHI	EE	CHI	CHI	CHI
P7	LI	VHI	BAI	LI	HI	CLI	EE	AAI	HI
P8	VLI	CHI	AI	BAI	VHI	CLI	BAI	EE	AI
P9	LI	VHI	BAI	LI	HI	CLI	LI	AI	EE

Table 3. Pairwise comparison of problems when marketing clothes on Instagram with respect to experts' judgments

Problems	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	0,0	0,6	0,3	0,6	0,3	0,6	0,3	0,6	0,3
P2	-0,8	0,0	-0,8	-1,0	-0,8	-1,0	-0,8	-1,0	-0,8
P3	-0,6	0,6	0,0	-0,1	0,1	-0,1	0,1	-0,1	0,1
P4	-0,8	0,8	-0,1	0,0	0,3	0,1	0,3	0,1	0,3
P5	-0,6	0,6	-0,3	-0,6	0,0	-0,8	-0,6	-0,8	-0,6
P6	-0,8	0,8	-0,1	-0,3	0,6	0,0	0,8	0,8	0,8
P7	-0,6	0,6	-0,3	-0,6	0,3	-1,0	0,0	0,1	0,3
P8	-0,8	0,8	-0,1	-0,3	0,6	-1,0	-0,3	0,0	-0,1
P9	-0,6	0,6	-0,3	-0,6	0,3	-1,0	-0,6	-0,1	0,0

Table 4. Difference matrix between lower points of membership and non-membership functions

Step 4: In Table 8 the degrees of determinacy are given for each criterion calculated with the help of equation (14).

Step 5: Before normalization importance weights are calculated with the help of equation (15) and given in Table 9.

Step 6: The importance weights of each criterion are calculated using equation (16) and given in Table 10.

When Table 10 is examined, it is seen that the “Challenges to increase Instagram follower count (account promotion, reaching customers, building a permanent customer base, etc.)” problem is the most important among those encountered while marketing clothing on Instagram, with an importance weight value of 0.319. “Problems originating from Instagram (not being able to make direct sales, posts not reaching everyone,

frequent closing, and freezing of pages, Instagram algorithm, disconnection, data not updating as required, problems originating from Meta Business, etc.)” is the second and “Lack of customer trust in Instagram marketing (due to the abundance of amateur pages, etc.)” is the third important criterion. “Customers on Instagram often request retail products” was determined as the last problem.

Afterward, a sensitivity analysis was performed in dependence on the scenarios given in Table 10 to determine whether the ranking of problems would be different according to different problem weights. In this analysis, the weights of a problem are given the lowest importance weight, while the importance weights of the other problems are kept constant, and this process is applied to all problems in order. The same process is done by giving the highest importance weight to each problem. The results are given in Figure 8.

The sensitivity analysis results show that P6 is the most important problem in all scenarios, except for Scenario 7, where the weight of problem P6 was changed. This result indicates that the PF-AHP Method results are sensitive and that problem P6 is the most important one.

In the third stage, solutions to the three most important problems encountered by clothing businesses while marketing on Instagram were developed with expert opinion. Expert opinion is the information

Problems Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	0,00	0,80	0,60	0,80	0,60	0,80	0,60	0,80	0,60
P2	-0,60	0,00	-0,60	-0,81	-0,60	-0,81	-0,60	-0,81	-0,60
P3	-0,30	0,80	0,00	0,10	0,30	0,10	0,30	0,10	0,30
P4	-0,60	1,00	0,10	0,00	0,60	0,30	0,60	0,30	0,60
P5	-0,30	0,80	-0,10	-0,30	0,00	-0,60	-0,30	-0,60	-0,30
P6	-0,60	1,00	0,10	-0,10	0,80	0,00	1,00	1,00	1,00
P7	-0,30	0,80	-0,10	-0,30	0,60	-0,81	0,00	0,30	0,60
P8	-0,60	1,00	0,10	-0,10	0,80	-0,81	-0,10	0,00	0,10
P9	-0,30	0,80	-0,10	-0,30	0,60	-0,81	-0,30	0,10	0,00

Table 5. Difference matrix between upper points of membership and non-membership functions

Problems Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	1,00	7,94	2,82	7,94	2,82	7,94	2,82	7,94	2,82
P2	0,06	1,00	0,06	0,03	0,06	0,03	0,06	0,03	0,06
P3	0,13	7,94	1,00	0,71	1,41	0,71	1,41	0,71	1,41
P4	0,06	16,41	0,71	1,00	2,82	1,41	2,82	1,41	2,82
P5	0,13	7,94	0,35	0,13	1,00	0,06	0,13	0,06	0,13
P6	0,06	16,41	0,71	0,35	7,94	1,00	16,41	16,41	16,41
P7	0,13	7,94	0,35	0,13	2,82	0,03	1,00	1,41	2,82
P8	0,06	16,41	0,71	0,35	7,94	0,03	0,35	1,00	0,71
P9	0,13	7,94	0,35	0,13	2,82	0,03	0,13	0,71	1,00

Table 6. Multiplicative matrix of the lower points

Problems Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	1,00	15,85	7,94	15,85	7,94	15,85	7,94	15,85	7,94
P2	0,13	1,00	0,13	0,06	0,13	0,06	0,13	0,06	0,13
P3	0,35	15,85	1,00	1,41	2,82	1,41	2,82	1,41	2,82
P4	0,13	31,62	1,41	1,00	7,94	2,82	7,94	2,82	7,94
P5	0,35	15,85	0,71	0,35	1,00	0,13	0,35	0,13	0,35
P6	0,13	31,62	1,41	0,71	15,85	1,00	31,62	31,62	31,62
P7	0,35	15,85	0,71	0,35	7,94	0,06	1,00	2,82	7,94
P8	0,13	31,62	1,41	0,71	15,85	0,06	0,71	1,00	1,41
P9	0,35	15,85	0,71	0,35	7,94	0,06	0,35	1,41	1,00

Table 7. Multiplicative matrix of upper points

Problems Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	1,00	0,80	0,70	0,80	0,70	0,80	0,70	0,80	0,70
P2	0,80	1,00	0,80	0,81	0,80	0,81	0,80	0,81	0,80
P3	0,70	0,80	1,00	0,80	0,80	0,80	0,80	0,80	0,80
P4	0,80	0,81	0,80	1,00	0,70	0,80	0,70	0,80	0,70
P5	0,70	0,80	0,80	0,70	1,00	0,80	0,70	0,80	0,70
P6	0,80	0,81	0,80	0,80	0,80	1,00	0,81	0,81	0,81
P7	0,70	0,80	0,80	0,70	0,70	0,81	1,00	0,80	0,70
P8	0,80	0,81	0,80	0,80	0,80	0,81	0,80	1,00	0,80
P9	0,70	0,80	0,80	0,70	0,70	0,81	0,70	0,80	1,00

Table 8. Determinacy degrees of the criteria

given to solve a technical problem by a person who has a background in a particular subject and is seen as competent to answer questions by his colleagues. Experts can be a person or a group [31]. Within the scope of this study, the problems identified were presented to Instagram marketing experts in 14 ready-to-wear garment companies through a questionnaire form and their solution suggestions were received. The solution proposals developed based on the responses provided by the experts are as follows:

4.1. Solution proposals developed by experts for increasing follower count

- Sustaining advertising campaigns: Businesses can continuously run advertising campaigns to reach a wider audience and attract new followers.
- Increasing the number and diversity of advertisements: Businesses can increase the quantity and variety of advertisements. For example, they can collaborate with well-known individuals to promote their products, invest in sponsored ads, and encourage customers to share product photos in their social circles, thereby expanding the product's reach.

4.2. Solution proposals developed by experts for Instagram-related technical problems

- Sharing direct purchase links with customers
- Keeping data in the e-commerce panel under control
- Keeping software and applications up to date
- Seeking professional support
- Prioritizing story ads over feed ads

4.3. Solution proposals developed by experts for the trust deficit in Instagram marketing

- Being an honest seller
- Collaborating with influencers
- Conducting product shoots in-house
- Being patient

Problems Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	1,00	9,52	3,77	9,52	3,77	9,52	3,77	9,52	3,77
P2	0,08	1,00	0,08	0,04	0,08	0,04	0,08	0,04	0,08
P3	0,17	9,52	1,00	0,85	1,69	0,85	1,69	0,85	1,69
P4	0,08	19,45	0,85	1,00	3,77	1,69	3,77	1,69	3,77
P5	0,17	9,52	0,43	0,17	1,00	0,08	0,17	0,08	0,17
P6	0,08	19,45	0,85	0,43	9,52	1,00	19,45	19,45	19,45
P7	0,17	9,52	0,43	0,17	3,77	0,04	1,00	1,69	3,77
P8	0,08	19,45	0,85	0,43	9,52	0,04	0,43	1,00	0,85
P9	0,17	9,52	0,43	0,17	3,77	0,04	0,17	0,85	1,00

Table 9. Matrix of weights before normalization

Problems	Before normalization importance weights	Normalized importance weights	Ranking
P1	54,13	0,193	2
P2	1,49	0,005	9
P3	18,31	0,065	6
P4	36,06	0,128	3
P5	11,77	0,042	8
P6	89,67	0,319	1
P7	20,54	0,073	5
P8	32,63	0,116	4
P9	16,10	0,057	7

Table 10. Importance weight and ranking of criteria

Scenarios	Combinations
Scenario 1	Current
Scenario 2	P1 CLI, The Rest current
Scenario 3	P2 CLI, The Rest current
Scenario 4	P3 CLI, The Rest current
Scenario 5	P4 CLI, The Rest current
Scenario 6	P5 CLI, The Rest current
Scenario 7	P6 CLI, The Rest current
Scenario 8	P7 CLI, The Rest current
Scenario 9	P8 CLI, The Rest current
Scenario 10	P9 CLI, The Rest current
Scenario 11	P1 VHI, The Rest current
Scenario 12	P2 VHI, The Rest current
Scenario 13	P3 VHI, The Rest current
Scenario 14	P4 VHI, The Rest current
Scenario 15	P5 VHI, The Rest current
Scenario 16	P6 VHI, The Rest current
Scenario 17	P7 VHI, The Rest current
Scenario 18	P8 VHI, The Rest current
Scenario 19	P9 VHI, The Rest current

Table 11. Combinations of scenarios with different problems' weights

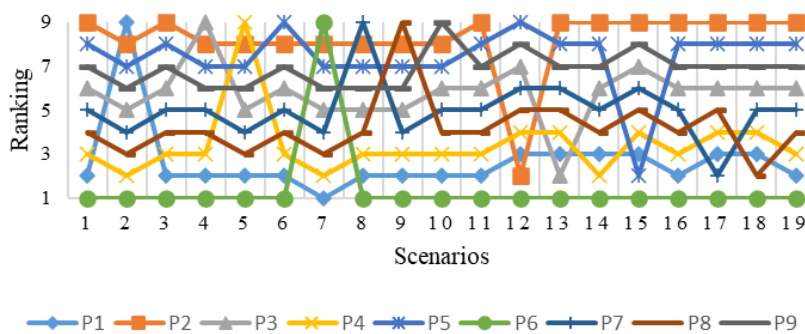


Fig. 1. Changes in sensitivity analysis results

5. Conclusion

Excessive competition in the clothing market forces businesses to diversify their marketing activities. For this reason, businesses try to reach customers with many different marketing activities at the same time. Since Instagram marketing is one of the most popular marketing activities today, it was chosen as the subject of this research. As a result of this research, it was determined that businesses marketing ready-to-wear garments on Instagram face nine main problems and many sub-problems related to these problems. The highest frequency of these problems are as follows:

- Instagram-related technical issues are disconnection, frequent freezing of the page, difficulties in reaching customer support, posts not appearing on everyone's feed, inability to make direct sales, limitations on payments, visibility, etc.
- Shipping-related issues are speed, loss, high prices, etc.
- Challenges in increasing follower count
- Customer-related problems on Instagram are incorrect size selection, requests for unavailable sizes, exchange requests, discount demands, Instagram algorithm, excessive inquiries, etc.

Within the scope of the research, 9 main problems faced by ready-to-wear businesses on Instagram were analysed by the PF-AHP method in order of importance; with the most important being difficulties in increasing the number of followers on Instagram, technical problems arising from Instagram and lack of trust of users in Instagram marketing.

In order to develop solutions to these 3 most important problems identified within the scope of the research, the solution suggestions formed by making use of expert opinion are as follows: the primary problem for clothing businesses in marketing on Instagram is increasing their number of followers. The most important solution developed by businesses to address this problem is to maintain continuous advertising campaigns and increase the number and variety of ads. Additionally, the second

most significant problem identified in the research is Instagram-related technical issues. The solutions developed by businesses for these problems include sharing purchase links with customers, keeping the software used updated, seeking professional support, and placing more emphasis on story ads rather than regular posts. As for the problem of trust deficiency in Instagram marketing, the solutions developed by businesses include honesty, leveraging support from influencers, conducting product photo shoots in-house, and waiting for the customer's decision.

It is important to conduct more studies on the problems encountered in clothing marketing on Instagram as it will help to make the use of Instagram for marketing purposes more efficient.

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