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## **Strategic Analysis of Turkish Over-The-Counter Drugs (OTC) and Non-Pharmaceutical Products Market**

### **Türkiye Tezgah Üstü İlaç ve İlaç Dışı Ürün Pazarının Stratejik Analizi**

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#### **Öz**

**GİRİŞ ve AMAÇ:** Global olarak Tezgâh Üstü İlaç pazarı önemli ölçüde büyümektedir. Bu bağlamda çalışmamızda, reçetesiz ilaçların yanı sıra, bitkisel ürünler, gıda takviyeleri ve diğer sağlık ürünleri gibi ilaç dışı ürünler de stratejik olarak değerlendirilmiştir. Bu çalışmanın amacı, genişletilmiş OTC endüstrisinin mevcut problemlerine olası stratejik çözümler sunmak için analizini yapmaktır.

**YÖNTEM ve GEREÇLER:** Bu çalışmada entegre SWOT ve Bulanık Analitik Ağ Prosesi (FANP) analizlerinin yanı sıra sektör profesyonellerinin bakış açılarını kapsayan nicel analizler yapılmıştır.

**BULGULAR:** Çalışmadan elde ettiğimiz bulgular en uygun pazar stratejilerinin WO2 (Sosyal medya ve mobil uygulamalar dahil bilişim ve dijital teknolojileri pazarlama maliyetlerini düşürmek için kullanmak), SO2 (OTC pazarının büyümesi için self-medikasyon / kişisel bakımı teşvik etmek ve bu amaçla bilgi ve iletişim teknolojilerine yatırım yapmak), ST2 (Sağlık okuryazarlığını geliştirmek için internet ve sosyal medya gibi alternatif kanallar aracılığıyla doğru ve anlaşılır bilgilere erişimi arttırmak) olduğunu göstermiştir. Bu kilit stratejiler dijital teknolojilerin kullanımı ile yakından ilgilidir. Ayrıca bu çalışmada SO1 (OTC ürünleri daha yüksek karlılık taşıdığı için eczacıyı danışmanlık yapmaya teşvik etmek), ST1 (Üretimde kaliteyi sağlamak ve toplum sağlığını iyileştirmeye yönelik güvenli ilaç kullanımını tanıtmak için, paydaşlara eğitim programları düzenlemek) gibi diğer stratejiler ayrıntılı olarak incelenmiş ve sonuçları yorumlanmıştır.

**TARTIŞMA ve SONUÇ:** Dijital dönüşümün etkisi düşünüldüğünde, aynı stratejiler gelişmekte olan diğer pazarlar için de uygulanabilir. Bu çalışma, Tezgâh Üstü İlaç sektörünün toplum sağlığını geliştiren ve buna bağlı olarak sağlık maliyetini azaltan paydaşlardan biri olarak önemini vurgulamıştır.

**Anahtar Kelimeler:** Tezgah Üstü İlaçlar, Reçetesiz İlaçlar, İlaç Dışı Ürünler, SWOT Analizi, Bulanık Analitik Ağ Prosesi

## ABSTRACT

**INTRODUCTION:** Globally, the Over the Counter (OTC) market is growing significantly. Within this context, our study reviews OTCs (non-prescription drugs), together with non-pharmaceutical products such as herbal products, dietary supplements, and other healthcare products strategically. The aim of this study is to analyse the expanded OTC industry to offer possible strategic solutions for existing problems.

**METHODS:** Within this study, we utilized integrated SWOT and Fuzzy Analytic Network Process (FANP) analysis along with quantitative analysis covering industry professionals' perspectives.

**RESULTS:** Our findings from this study showed that the most suitable market strategies are WO2 (To use IT and digital technologies, including mobile applications and social media, in reduction of marketing costs), SO2 (To promote self-medication / self-care for the growth of the OTC market and to invest in information and communication technologies for this purpose), ST2 (To improve health literacy, increase access to accurate and understandable information via alternative channels like internet and social media). These key strategies are closely related to utilization of digital technologies. In addition, other strategies like SO1 (To encourage pharmacist to provide consulting as OTC products carry a higher profitability), ST1 (To undertake stakeholder training programs in order to ensure production quality and introduce safe use to improve community health) were examined in detail and their outcomes were interpreted in this study.

**DISCUSSION AND CONCLUSION:** Given the impact of digital transformation, the same strategies can also be implemented for other emerging OTC markets. This study underlines the importance of the OTC sector as one of the main drivers improving community health and reducing health cost accordingly.

**Keywords:** Over-the-counter drugs (OTC), Non-prescription drugs, Non-pharmaceutical products, SWOT analysis, Fuzzy analytic network process (FANP)

## INTRODUCTION

OTC drugs are sold directly to the consumer without a prescription. The main reason for this is that they are known as safe and effective due to long-term clinical use. But OTC drugs have possible adverse effects just like prescription drugs and they can be misused and abused because of their certain active substances<sup>1-4</sup>.

Non-pharmaceutical products include a range of different products such as; vitamins, herbal products, dietary supplements, biocidal products licensed by the Ministry of Health (MoH), certain medical devices in pharmaceutical form, medical infant formulas, cosmetic and dermo-cosmetics, baby food. These are used in self-care / self-medication and complementary therapy but are not evaluated as prescription drugs due to their active metabolites.

Regulations applied by the MoH on non-prescription drugs are cumbersome.

Comparatively, for non-pharmaceutical products, licensed by the Ministry of Agriculture and Forestry, pricing matters are simplified and easier to process, thus an advantage to non-pharmaceutical product manufacturers.

In Turkey, registration files must be submitted according to Common Technical Documents (“CTD”) similar to EU regulations. Some products are licensed from the MoH, and others from the Ministry of Agriculture and Forestry. Each process is different from each other in terms of duration time and other registration processes<sup>5</sup>. In 2018, the Turkish pharmaceutical market size increased by 26.1% to 30.94 billion TL compared to 2017. Reasons for this growth were price escalation, sales distribution, volume, and new products respectively. The Pharmaceutical Manufacturers Association of Turkey (IEIS) reported that non-pharmaceutical products which were mentioned as medicinal products in their report, scored approximately 31.5 % growth in 2018 and reached a value of 2.4 billion TL<sup>6</sup>. The mentioned medicinal products were also examined in our study.

However, this data doesn't cover certain products such as sports nutrition, homeopathic medicinal products, and some herbal products. Therefore, one of the biggest problems for all stakeholders including manufacturing companies is data quality and thus difficult to understand and interpret the OTC market dynamics of Turkey<sup>7-8</sup>.

The aim of this study is to analyze the expanded OTC industry to offer possible strategic solutions for existing problems such as data quality, lack of regulation. In this context, related market has been evaluated and the necessary strategies for the growth of the market have been put forward.

## **MATERIALS AND METHODS**

### **Data Collection**

The data collection consists of literature research and quantitative field research. There are a limited number of studies about OTC / non-pharmaceutical products / self-medication in Turkey (Table 1). None of them includes strategic market analysis via SWOT-ANP/AHP. The studies directly related are only our previous integrated SWOT and PESTEL analysis<sup>7</sup> and qualitative analysis about Turkish OTC market<sup>8</sup>. Our previous qualitative analysis was performed using in-depth, semi-structured interviews of marketing professionals representing OTC and non-pharmaceutical products manufacturers as well as OTC consultants in Turkey<sup>8</sup>.

In addition to the literature review (Table 1), data were collected from several reports and resources such as Turkish Statistical Institute (TUIK), IEIS, and IMS Health. The collected data (related literatures, reports, quantitative field research) were used in the preparation of the SWOT matrix. All data from literatures except field research are shown in the SWOT matrix as L. The findings obtained from the online survey are shown as S (Table 3).

### **Table 1** Results of literature searching

### **Quantitative Survey Data**

This study received ethical approval (No. 2019/26-13) from the Biruni University Ethics Board. Current quantitative assessment includes an online survey. IEIS, AIFD, TISD and other related institutes were informed about our study, but only IEIS agreed to participate. For this reason, this survey was initially tested on a group of IEIS experts before it was conducted on a group of OTC professionals. Data collection took place between March - June 2019. Main data were collected from a purposive sample. The targeted audience was functional managers and senior executives of the OTC industry. The designed questionnaire, including a SWOT segment, was sent to 55 members – who are mostly manufacturers, through IEIS. The online questionnaire was also sent to 40 OTC professionals with similar qualifications via

LinkedIn. Totally, 42 participants responded to the questionnaire. 6 were excluded because of their missing answer. 36 valid questionnaires of the participants who completed all the questions were included in the sample. This number of participants are acceptable as these were specially selected as purposive sampling. The results were evaluated utilizing advanced statistical tools.

The latter incorporated use of AHP/ANP/FANP methods, which do not require a large number of samples to be statistically significant<sup>21-23</sup>. As participants of the survey were experts who have deep knowledge and experience about the related topic, we believe all 36 responders are appropriate and enough to provide the required information for the study.

#### SWOT - FANP

SWOT as a decision-making tool, enables subjective examination of companies, industries, and even countries. However, SWOT has some disadvantages such as no weighting factors and ambiguity. Besides SWOT, we have also utilized the Fuzzy Analytic Network Process (FANP) in this study.

The Analytic Hierarchy Process (AHP) introduced by Thomas Saaty, as it is a flexible and effective mechanism to deal with complex decision making, and thus can aid the decision maker to set priorities and take the best decision<sup>24</sup>. As a follow-up, the Analytic Network Process (ANP) which is a generalization of AHP, enables analyzing the interactions of decision criteria. Its basic structures are networks, which undergo interactions and feedbacks within and between the clusters to solve more sophisticated decision problems.

Both methods (ANP and AHP) are used for multicriteria decision making. However, the Analytic Network Process (ANP) is the most appropriate for solving complicated problems allows you to capture the complex structures of real interconnections and makes prediction much more accurate. Saaty suggested the use of ANP to solve the problem of dependence among alternatives or criteria<sup>25-26</sup>.

ANP method is feasible for fuzzy decision-making problems due to relatively fewer limitations (FANP). It is nearly impossible to determine the weights and effects of alternative strategic criteria quantitatively using only SWOT. Therefore, ANP/FANP should be combined with SWOT to improve insufficient SWOT data<sup>27</sup>. For this reason, FANP was preferred as a research method in our study.

FANP consists of eight steps.

**Step 1.** Identify SWOT factors and sub-factors. Determine the alternative strategies according to SWOT sub-factors

**Step 2.** Develop matrix using all the factors, sub-factors and formed with a fuzzy scale of 1–9 ( $W_1$ , i.e. matrix calculation)

**Step 3.** Determine, with a fuzzy 1—9 scale, the inner dependence matrix of each SWOT factor with respect to the other factors by using the schematic representation of inner dependence among the SWOT factors ( $W_2$ , i.e. matrix calculation)

**Step 4.** Determine the interdependent priorities of the SWOT ( $W$  SWOT factors =  $W_1 \times W_2$ )

**Step 5.** Determine local importance degrees of the SWOT sub-factors with a fuzzy 1—9 scale ( $W$  SWOT sub-factors, local)

**Step 6.** Determine the global importance degrees of the SWOT sub-factors ( $W_3$  global sub-factors of SWOT =  $W$  factors  $\times$   $W$  relative sub-factors of SWOT)

**Step 7.** Determine the importance degrees of strategy options with respect to each SWOT sub-factor with a fuzzy 1—9 scale ( $W_4$ )

**Step 8.** Determine the overall priorities of the strategic options, with consideration to internal relations among SWOT factors ( $W_{alternatives} = W_4 \times W_3$  global sub-factors) Saaty reported that the acceptable limit of the consistency ratio (CR) is 0.10 or less. Accordingly, the consistency ratio of the matrix was checked<sup>28</sup>. The AHP template which was developed by SCB Associates Ltd was used for statistical analysis. The schematic structure of SWOT analysis is established. Accordingly, the related SWOT criteria and sub-criteria were shown in Fig.1. The prioritization of the strategies was realized on the basis of the FANP approach.

**Fig. 1.** FANP model for the selection of the best strategies

## RESULTS

The demographics of the participants were summarized in Table 2. The respondents comprised of 66.7% males and 33.3% females. Of 36 respondents, 69.5% are in the age range of 31-50 years, 22.2% are in the age range of 51-60, and 8.3% are in the age range of 26-30. Regarding the years of experience were mainly ranges in two major groups: 6-10 years (33.4 %) and 21 < years (27.8%). In terms of the working area, majority of the participants work in the marketing and sales department of the OTC industry (47.2%) and others work in the regulatory affairs department (25%). The sample also included executives (16.7%) and managers from the medical department (11.1%) from OTC sector. All participants were functional managers or senior executives. Unlike our previous study<sup>8</sup>, not only marketing professionals, but also managers who specialize in other departments of the companies participated in our study.

**Table 2** Demographic characteristics of participants

Findings from the survey and other sources are consolidated as SWOT matrix and are shown in Table 3.

**Table 3** SWOT matrix for Turkish OTC Industry (survey findings are shown as S, literature findings as L)

The consistency check of each swot elements was performed. Accordingly, the consistency ratio (CR) was calculated as less than 0.1 (10 %) which is acceptable range<sup>28</sup>. There was no need reexamination due to passing the consistency theory. Fuzzy linguistic variables are shown in Table 4.

**Table 4** Linguistic variables

**Table 5** Pairwise comparison of SWOT groups without interdependences

The weighting factor on FANP is essential for the strategic choice. Regarding relative-importance weights, the impact of each group was analyzed on all other factors by using pair-wise comparisons. To do this, some required questions such as "How important is a strength when it is compared with a weakness?", "How important is an opportunity when it is compared with a threat?" were used.

**Table 6** The importance of the criteria and sub-criteria of the SWOT analysis

In this study, all possible criteria and interactions are considered. The following table summarizes the strategies for the Turkish OTC industry, which are individually examined.

**Table 7** Strategies for Turkish OTC Industry

**Table 8** Elements of the fuzzy matrix  $W \sim 4$

SO1: The profitability level of these products will increase the consultation capacity of the pharmacist. For this purpose, companies may need to involve pharmacists in their marketing strategies. In order for this strategy to be effective, it will be important to reduce the prejudice of pharmacists against OTC drugs and non-pharmaceutical products and to increase their knowledge about these products. Therefore, it will be necessary to improve the quality of the implemented training and to support the training with digital technologies.

SO2: Self-medication and self-care are increasing rapidly in the world<sup>29</sup>. Paralleling these developments, promotion of self-medication/self-care will grow the OTC market in Turkey. The expansion of health and wellness trends will also grow the market. It will be important that the government supports such products because these products do not require reimbursement. Therefore, it would be a good strategy to support self-medication. However, it is critical to increasing the health literacy of the society, otherwise, serious adverse reactions may occur.

ST1: Among the threats, poor quality products of some non-pharmaceuticals known to exist. Education and training are vital in the eco-system. As one will increase the qualified people in the OTC industry, production quality will increase via the application of GMP standards. These will inevitably lead to safe use of these products.

ST2: Assuming that companies provide correct information, access to information, and diversifying the channel sources like that of the internet can increase health literacy. In addition, the increase in advertising and use of information technologies will also promote self-medication.

WO1: Poor quality production can be overcome by investing in innovation. Companies should prioritize innovation and manage to spend more on R&D. As active metabolites of non-prescription drugs are well-known, innovations are bounded. Main innovation practices of OTCs are combination products, different dosage forms, and line extension.

On the other hand, differentiation from the competitors is the essential factor of building a successful brand and increasing market share. According to our survey findings, innovation is best when using advanced technology and creative communications strategies (72.2 %). Sector participants in our survey also emphasized that efficacy, quality, and corporate reputation (42.9 %) as the key factors in building a strong brand.

WO2: In times of economic volatility, all pharma companies and consumers, try to survive. External factors like economic crisis, exchange rate fluctuation increases the costs for the companies. As companies cannot directly intervene in macro factors like economic crisis, they can develop counterstrategies for the crisis by introducing cost saving measures. Examples may include switching from traditional to digital media – thus increase use of social media. At this point, effective content management will gain importance for OTC companies.

WT1: Advertising restrictions may be effective in the improvement of the negative perspective of physician and pharmacist. Advertising control is rather important for patient safety, especially when literacy and/or educational levels vary among the public. In our study, the participants agreed that environmental, economic and social sustainability which also cover the safety of non-pharmaceutical products (86.1%) should be among the priorities of the company (88.8%).

Yet we must remember that direct to consumer advertising for prescription and non-prescription drugs are banned in Turkey<sup>30</sup> whereas the same are free for non-pharmaceutical products. However, there is no specific regulation regarding the use of social media by companies. The lack of direct to consumer advertising can turn into an advantage for public health, especially where health literacy is not high. As studies show, this represents a strong point for Turkey, since nearly half of the population has limited health literacy in Turkey<sup>31</sup>. Companies should prioritize the disclosure of the right information to the targeted customer groups. In Turkey, there is a need for new regulation that also includes a classification for OTCs. Accordingly, OTC ads should also be organized in this context.

**Table 9** The priorities of the alternative strategies

According to Table 9, after prioritizing defined strategies, we conclude that WO2 is the best strategy with the highest weight of 0.163. Other strategies ranked include SO2 in second place with 0.161 and ST2 in third place with 0.160. The first three strategies, in weight terms, are very close to each other.

## DISCUSSION

In the context of the survey, the strengths of the OTC industry were found to be many and varied in type. Among these, especially the increasing consumer awareness and self-medication tendency is noteworthy. Self-medication / self-care has some advantages such as reducing government spending<sup>29</sup>. However, this is also a threat for this market. OTC drugs have potential risks such as misdiagnosis, drug misuse and abuse, and polypharmacy induced drug-drug interaction especially elderly patients.

Pharmacovigilance regulation as drug safety has been published since 2005 for prescription drugs. But what about others? For example, healthcare professionals can only report hepatotoxicity and nephrotoxicity to the MoH for herbal medicines. Pharmacovigilance concept should cover all kind of products in Turkey. Similarly, in our study, 86.1% of the participants agreed that the vigilance system should be extended to non-pharmaceutical products.

As with pharmacovigilance, we don't exactly know the environmental impacts of these products. Although some global companies attach importance to sustainability, the government should promote campaigns about the ecological footprint, climate change awareness, and eco-pharmacovigilance. According to our survey, 88.8% of participants confirmed that environmental, economic and social sustainability should be among the priorities of companies.

In this study, we have also highlighted the significant role assigned to the pharmacist. Pharmacists are the most accessible healthcare professionals and can improve medication adherence and decrease self-medication risk and cost<sup>29,32-33</sup>. In order to build consumer awareness, pharmaceutical companies should liaise with pharmacists to develop marketing strategies which would result in safe and ethically correct results.

The pharmaceutical industry has high-quality production capabilities, but it is not easy to say that all non-pharmaceutical products are manufactured with high-quality standards. In the study conducted by Kotecki, it was found that medical forces such as the active ingredients of the products, clinical studies, and information obtained from scientific references were more effective in pharmacists' OTC product decisions. Therefore, it is highly important that companies focus on manufacturing quality and

evidence-based information to take responsibility for community health and also to make a good impression on healthcare professionals<sup>34</sup>.

When compared with previous SWOT analyzes for the OTC market, Dzeperoski et al. were underlined qualified people as a strength factor, and market growth as an opportunity<sup>35</sup>. These results were similar to our findings. In another study about SWOT analyzes of Traditional Chinese Medicine, they reported government policy support<sup>36</sup>, similar to our results.

In our research, the first three strategies were related to the advantages of utilizing digital technologies. Technology is crucial for innovation and differentiation in this competitive environment<sup>37</sup>. In this context, companies should adopt rapid development of information and communication technologies to educate all stakeholders. While the internet can be the most effective channel to reach the consumer and thus increase their awareness, one must be aware of the dangers of information pollution. Accordingly, companies should conduct full diligence to protect the public from information pollution.

At this point, we would like to underline that Turkish legislation prohibits the sale of prescription and non-prescription drugs via the internet or any other electronic media<sup>38</sup>. Companies should utilize digital communication options by complying with relevant laws and regulations.

### **STUDY LIMITATIONS**

OTC, as a term, is ambiguous in Turkey due to two main reasons; lack of regulation, slow progress in the diversification of sales channels. For this reason, our study refers to all products (non-prescription drugs and non-pharmaceutical products) sold in pharmacies excluding prescription drugs as OTC<sup>7-8</sup>.

The limitation of our study is lack of large sample size for quantitative study. The questionnaire was sent to IEIS members and some experts who have similar qualifications via LinkedIn. Only 36 participants completed all the questions. The AHP/ANP/FANP methods used in our study do not require a large number of samples to be statistically significant<sup>21-23</sup>. Additionally, as participants of the survey were experts who have deep knowledge and experience about OTC and Pharma Industry. In this context, all 36 responders were appropriate to provide the required information for this study.

### **CONCLUSIONS**

Our study is among the first detailed strategic study conducted on Turkish OTC market – that uses integrated SWOT and FANP.

In conclusion for this study, we would like to underline the transformation of the OTC industry can contribute to the health of society. Companies must allocate a budget for training as part of the marketing activities. The training program should be directed to all stakeholders such as company professionals, physician, pharmacist, and consumers.

For non-pharmaceutical products, companies should increase production quality. They should expand their portfolio with innovative products. On the other hand, they should avoid aggressive and misleading advertising due to the level of health literacy. Main result of our research is that the utilization of digital technologies is within the scope of priority strategies. Our studies reveal, as detailed in Table 9, that in all of the strategies (WO2, SO2, ST2), the importance of investing in digital technologies is paramount. It is clearly seen that development and management of social media, website and microsite and in particular related content management are



indispensable for utilizing the right strategy. Widespread utilization of digital technologies in many areas starting from R&D, supply chain and production to marketing and corporate communication, will accelerate the development of OTC companies. At the same time, the effective use of digital platforms will undoubtedly contribute to increasing health literacy in the communities and raise awareness about OTC consumption and self-medication among consumers.

#### **Declaration of Interest**

There are no conflicts of interest.

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#### **Ethical approval**

This study received ethical approval (No. 2019/26-13) from the Biruni University Ethics Board.

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**Table 1** Results of literature searching

References	Related Part
(Özcelikay et al. 1999) <sup>9</sup>	OTC, Pharmacists and patients' perspectives
(Yüksel 2001) <sup>10</sup>	OTC, Pharmacists' perspectives
(Gül et al. 2007) <sup>11</sup>	The role of pharmacists, OTC purchases
(Kirgiz 2014) <sup>12</sup>	Regulations, Advertising, Self-medication
(Sencan and Uyar 2014) <sup>13</sup>	Advertising, Pharmacist and industry perspectives
(Lionis et al. 2014) <sup>14</sup>	OTC prescribing, Rational drug use
(Gülpinar and Özcelikay 2015) <sup>5</sup>	Regulations, Pharmacist and industry perspectives
(Atikeler and Özçelikay 2016) <sup>15</sup>	Regulations, Pricing
(Oztora et al. 2017) <sup>16</sup>	Self-medication
(Okçay and Erdoğan 2017) <sup>17</sup>	Self-medication
(Oral and Özçelikay 2017) <sup>18</sup>	Policies, regulations, Ethics

(Memisoglu 2017) <sup>8</sup>	OTC marketing
(Memisoglu 2018) <sup>7</sup>	OTC SWOT-PESTEL
(Cavaco et al. 2018) <sup>19</sup>	Self-medication
(Gülpınar et al. 2019) <sup>20</sup>	Pharmacists' perspectives about non-pharmaceutical products

**Table 2** Demographic characteristics of participants

		Percentage %	Frequency n
<b>Gender</b>	Female	33.3	12
	Male	66.7	24
<b>Age</b>	26-30	8.3	3
	31-40	30.6	11
	41-50	38.9	14
	51-60	22.2	8
	6-10	33.4	12
<b>Years of experience</b>	11-15	19.4	7
	16-20	19.4	7
	21 <	27.8	10
	Regulatory affairs / Market access	25	9
<b>Department</b>	Marketing	33.3	12
	Sales	13.9	5
	Medical	11.1	4
	Executives	16.7	6

**Table 3** SWOT matrix for Turkish OTC Industry (survey findings are shown as S and literature findings as L in the table)

<b>Strengths (S)</b>	<b>Weaknesses (W)</b>
S1 Increasing self-medication / Self-care (L)	W1 Healthcare Professionals' negative perception to herbal products and dietary supplements (L)
S2 Aging population (L)	W2 Information pollution caused by companies (S)
S3 Increasing government support for minimizing reimbursement (L)	W3 Lack of education of related stakeholders (S)
S4 Absolute population growth and increased migrants (S)	W4 Lack of OTC regulations and certain classifications (L)
S5 Increasing consumer awareness (S)	W5 Non-regular market; difficult obtaining clear data (L)
S6 Pharmacies as distribution channel (L)	W6 Rising costs (S)
S7 Qualified people in OTC industry (S)	W7 Lack of the direct to consumer advertising for non-prescription drugs (S)
S8 Possible synergistic effects of non-pharmaceutical products (S)	W8 Absence of pharmacist's role as a consultant (L)

S9 More profitable in comparison with prescription drugs for the pharmacist (S)	W9 Unwillingness of healthcare professionals to recommend and subscribe prescriptions (S)
<b>Opportunities (O)</b>	<b>Threats (T)</b>
O1 Rapid market growth (S)	T1 Economic crisis, exchange rate fluctuation (L)
O2 Rapid development of information and communication technologies (S)	T2 Poor quality production for some non-pharmaceutical products (L)
O3 R &D and Innovation (S)	T3 Poor health literacy (L)
O4 Direct to consumer advertising (L)	T4 Media disinformation (S)
O5 Pharmacists as consultant/salespersons (L)	T5 Lack of direct to consumer advertising for non-prescription drugs (S)
O6 Mergers and acquisitions by companies (L)	T6 Difficult market penetration, very competitive environment (S)

**Table 4** Linguistic variables

	Saaty's scale	Triangular fuzzy number (TFN)	Definition of TFN		
			Bottom	Medium	Top
Equally preferred	1	1	1	1	1
Equally to moderately preferred	2	2	1	3/2	3/2
Moderately preferred	3	3	1	2	2
Moderately to strongly preferred	4	4	3	7/2	4
Strongly preferred	5	5	3	4	9/2
Strongly to very strongly preferred	6	6	3	9/2	5
Very strongly preferred	7	7	5	11/2	6
Very strongly to extremely preferred	8	8	5	6	7
Extremely preferred	9	9	5	7	9

**Table 5** Pairwise comparison of SWOT groups without interdependences

	S	W	O	T	TFN importance of SWOT factors		
					Bottom	Medium	Top
Strengths (S)	1,000	3,000	2,000	2,000	0,250	0,352	0,352
Weaknesses (W)		1,000	0,500	0,500	0,250	0,166	0,166
Opportunities (O)			1,000	1,000	0,250	0,241	0,241
Threats (T)				1	0,250	0,241	0,241

**Table 6** The importance of the criteria and sub-criteria of the SWOT analysis

SWOT groups - criteria	Importance of the SWOT criteria	SWOT sub-criteria	Local importance of SWOT sub-criterion	The overall importance of SWOT sub-criterion
Strengths (S)	0,250-0,352-0,352	12S1	0,26-0,284-0,308	0,065-0,1-0,108
		S2	0,087-0,125-0,118	0,022-0,044-0,042
		S3	0,134-0,095-0,09	0,034-0,033-0,032
		S4	0,148-0,161-0,164	0,037-0,057-0,058
		S5	0,085-0,099-0,096	0,021-0,035-0,034
		S6	0,08-0,08-0,076	0,02-0,028-0,027
		S7	0,069-0,054-0,051	0,017-0,019-0,018
		S8	0,071-0,051-0,048	0,018-0,018-0,017
		S9	0,066-0,051-0,048	0,017-0,018-0,017
		Weaknesses (W)	0,250-0,166-0,166	14W1
W2	0,103-0,137-0,132			0,026-0,023-0,022
W3	0,103-0,09-0,087			0,026-0,015-0,014
W4	0,237-0,235-0,258			0,059-0,039-0,043
W5	0,089-0,1-0,093			0,022-0,017-0,015
W6	0,133-0,131-0,132			0,033-0,022-0,022
W7	0,078-0,064-0,062			0,02-0,011-0,01
W8	0,078-0,057-0,054			0,02-0,009-0,009
W9	0,078-0,057-0,054			0,02-0,009-0,009
Opportunities (O)	0,250-0,241-0,241	28O1	0,281-0,416-0,44	0,07-0,1-0,106
		O2	0,18-0,205-0,202	0,045-0,049-0,049
		O3	0,159-0,149-0,144	0,04-0,036-0,035
		O4	0,14-0,094-0,088	0,035-0,023-0,021
		O5	0,114-0,065-0,059	0,029-0,016-0,014
		O6	0,127-0,071-0,066	0,032-0,017-0,016
Threats (T)	0,250-0,241-0,241	29T1	0,549-0,492-0,516	0,137-0,119-0,124

		T2	0,093-0,105-0,1	0,023-0,025-0,024
		T3	0,093-0,105-0,1	0,023-0,025-0,024
		T4	0,088-0,099-0,095	0,022-0,024-0,023
		T5	0,088-0,099-0,095	0,022-0,024-0,023
		T6	0,088-0,099-0,095	0,022-0,024-0,023

**Table 7** Strategies for Turkish OTC Industry

<b>SO Strategies</b>	<b>WO Strategies</b>
<p><b>SO1</b> To encourage pharmacist to provide consulting as OTC products carry a higher profitability.</p> <p><b>SO2</b> To promote self-medication / self-care for the growth of the OTC market and to invest in information and communication technologies for this purpose</p>	<p><b>WO1</b> To invest in R&amp;D and innovation to overcome poor quality manufacturing and at the same time, to increase variety of medical treatments.</p> <p><b>WO2</b> To use IT and digital technologies (including social media and mobile applications) in reduction of marketing costs</p>
<b>ST Strategies</b>	<b>WT Strategies</b>
<p><b>ST1</b> To undertake stakeholder training programs in order to ensure production quality and introduce safe use to improve community health.</p> <p><b>ST2</b> To improve health literacy, increase access to accurate and understandable information via alternative channels like internet and social media.</p>	<p><b>WT1</b> To limit direct to consumer advertising for non-pharmaceutical products may help in improving the negative view of both the physician and the pharmacist. This possible limitation may turn into an advantage for the community where health literacy is not high.</p>

**Table 8** Elements of the fuzzy matrix  $W \sim 4$

B values	S1	S2	S3	S4	S5	S6	S7	S8	S9	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	O 1	O 2	O 3	O 4	O 5	O 6	T 1	T2	T3	T4	T5	T6	
	SO1	0,14	0,10	0,39	0,098	0,392	0,143	0,095	0,143	0,033	0,14	0,10	0,14	0,11	0,354	0,076	0,11	0,13	0,189	0,11	0,07	0,09	0,11	0,26	0,14	0,11	0,13	0,13	0,43	0,19	0,13
SO2	0,14	0,10	0,297	0,105	0,105	0,143	0,413	0,143	0,1010	0,14	0,10	0,14	0,13	0,106	0,076	0,11	0,13	0,26	0,33	0,07	0,09	0,13	0,11	0,14	0,11	0,13	0,13	0,43	0,37	0,97	
WO 1	0,14	0,13	0,13	0,098	0,098	0,143	0,095	0,143	0,0808	0,14	0,10	0,14	0,11	0,11	0,13	0,13	0,03	0,11	0,07	0,43	0,11	0,11	0,14	0,11	0,14	0,11	0,97	0,13	0,43	0,19	0,13
WO 2	0,14	0,13	0,13	0,095	0,098	0,143	0,095	0,143	0,0808	0,14	0,1	0,14	0,11	0,176	0,11	0,39	0,03	0,11	0,36	0,10	0,11	0,11	0,14	0,33	0,13	0,13	0,43	0,37	0,39		
ST1	0,14	0,32	0,13	0,105	0,105	0,143	0,103	0,143	0,1010	0,14	0,10	0,14	0,13	0,106	0,129	0,13	0,154	0,11	0,07	0,09	0,11	0,13	0,14	0,11	0,39	0,39	0,43	0,18	0,13		
ST2	0,14	0,10	0,13	0,392	0,098	0,143	0,103	0,143	0,0808	0,14	0,1	0,14	0,26	0,176	0,11	0,97	0,37	0,11	0,25	0,09	0,13	0,11	0,14	0,11	0,13	0,2	0,43	0,37	0,13		
WT 1	0,14	0,10	0,13	0,098	0,105	0,143	0,095	0,143	0,2020	0,14	0,37	0,14	0,11	0,35	0,76	0,11	0,13	0,89	0,11	0,07	0,09	0,26	0,13	0,14	0,11	0,13	0,43	0,33	0,13		
M values	S1	S2	S3	S4	S5	S6	S7	S8	S9	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	O 1	O 2	O 3	O 4	O 5	O 6	T 1	T2	T3	T4	T5	T6	
SO1	0,12	0,07	0,17	0,077	0,426	0,155	0,072	0,1717	0,038	0,16	0,10	0,14	0,09	0,00	0,67	0,09	0,92	0,21	0,33	0,06	0,07	0,07	0,32	0,12	0,10	0,91	0,91	0,00	0,91	0,00	
SO2	0,19	0,09	0,37	0,123	0,104	0,118	0,440	0,236	0,0909	0,18	0,08	0,11	0,10	0,82	0,67	0,09	0,92	0,15	0,98	0,06	0,07	0,12	0,08	0,18	0,10	0,91	0,91	0,47	0,47	0,36	
WO 1	0,10	0,16	0,83	0,074	0,065	0,114	0,072	0,105	0,0606	0,11	0,10	0,11	0,09	0,78	0,29	0,19	0,92	0,69	0,94	0,06	0,45	0,08	0,08	0,12	0,10	0,53	0,91	0,00	0,91	0,00	

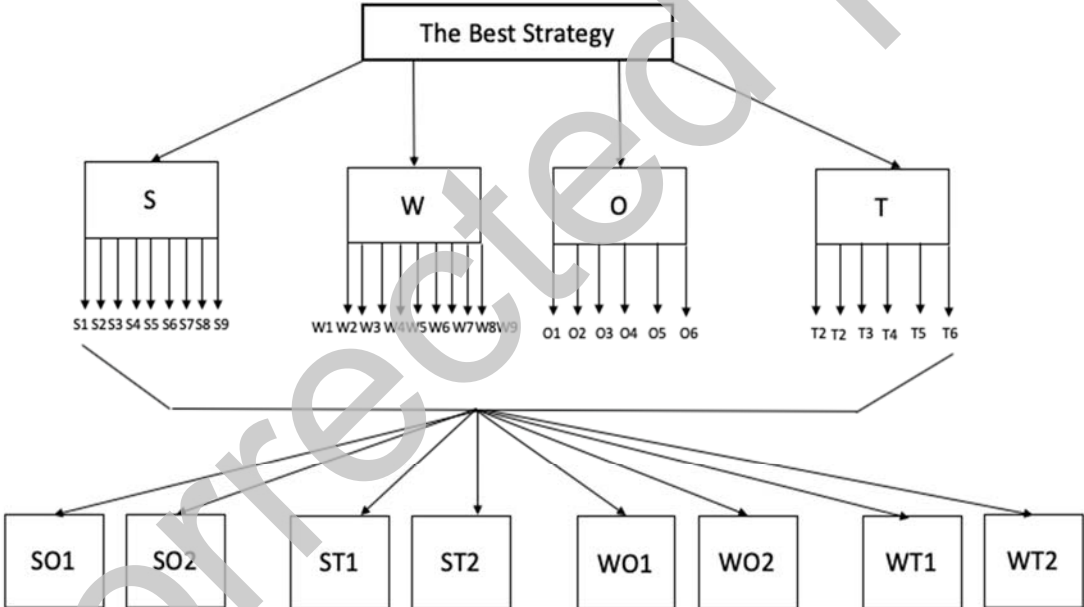


WO 2	0,13	0,11	0,093	0,137	0,065	0,239	0,078	0,105	0,006	0,017	0,008	0,016	0,009	0,079	0,067	0,009	0,154	0,069	0,094	0,038	0,015	0,010	0,008	0,012	0,040	0,104	0,091	0,147	0,147	0,122
ST1	0,12	0,037	0,093	0,084	0,133	0,125	0,125	0,154	0,110	0,111	0,112	0,111	0,117	0,133	0,136	0,135	0,102	0,148	0,194	0,006	0,007	0,010	0,013	0,018	0,010	0,177	0,182	0,147	0,191	0,114
ST2	0,19	0,10	0,185	0,429	0,079	0,125	0,140	0,177	0,007	0,111	0,008	0,111	0,333	0,75	0,67	0,09	0,366	0,110	0,94	0,27	0,07	0,17	0,08	0,12	0,10	0,91	0,64	0,13	0,47	0,114
WT 1	0,12	0,07	0,093	0,077	0,127	0,125	0,072	0,106	0,22	0,11	0,42	0,23	0,09	0,53	0,67	0,09	0,102	0,268	0,094	0,06	0,07	0,33	0,18	0,12	0,10	0,91	0,91	0,47	0,86	0,114
<b>T values</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6</b>	<b>S7</b>	<b>S8</b>	<b>S9</b>	<b>W 1</b>	<b>W 2</b>	<b>W 3</b>	<b>W 4</b>	<b>W 5</b>	<b>W 6</b>	<b>W 7</b>	<b>W 8</b>	<b>W 9</b>	<b>O 1</b>	<b>O 2</b>	<b>O 3</b>	<b>O 4</b>	<b>O 5</b>	<b>O 6</b>	<b>O 1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>
SO1	0,12	0,07	0,115	0,074	0,451	0,155	0,069	0,117	0,39	0,16	0,10	0,14	0,09	0,19	0,62	0,08	0,88	0,28	0,27	0,06	0,07	0,07	0,34	0,12	0,09	0,88	0,87	0,00	0,88	0,97
SO2	0,19	0,08	0,355	0,117	0,099	0,118	0,465	0,236	0,09	0,18	0,07	0,11	0,10	0,79	0,62	0,08	0,88	0,14	0,26	0,06	0,07	0,11	0,08	0,18	0,09	0,88	0,87	0,47	0,45	0,58
WO 1	0,10	0,16	0,080	0,071	0,062	0,114	0,069	0,105	0,05	0,11	0,09	0,11	0,09	0,75	0,43	0,18	0,88	0,67	0,89	0,06	0,48	0,08	0,08	0,12	0,09	0,75	0,87	0,00	0,88	0,97
WO 2	0,13	0,10	0,090	0,130	0,062	0,239	0,075	0,105	0,05	0,17	0,07	0,20	0,09	0,77	0,62	0,08	0,51	0,67	0,89	0,39	0,14	0,10	0,08	0,12	0,42	0,01	0,87	0,47	0,45	0,59
ST1	0,12	0,037	0,090	0,080	0,127	0,125	0,120	0,154	0,109	0,111	0,111	0,117	0,128	0,144	0,137	0,199	0,147	0,189	0,06	0,07	0,10	0,13	0,18	0,09	0,73	0,78	0,47	0,88	0,97	
ST2	0,19	0,13	0,176	0,455	0,076	0,125	0,133	0,177	0,007	0,111	0,007	0,111	0,353	0,73	0,62	0,08	0,89	0,09	0,89	0,28	0,07	0,16	0,08	0,12	0,09	0,88	0,86	0,13	0,45	0,97
WT 1	0,12	0,06	0,094	0,073	0,122	0,125	0,069	0,106	0,23	0,11	0,44	0,19	0,09	0,50	0,62	0,08	0,99	0,66	0,89	0,06	0,07	0,35	0,18	0,12	0,09	0,88	0,87	0,47	0,99	0,97

Uncorrected proof

**Table 9** The priorities of the alternative strategies

Strategy	Weight	Ranking / Priority
SO1	0,131	4
<b>SO2</b>	<b>0,161</b>	<b>2</b>
WO1	0,130	6
<b>WO2</b>	<b>0,163</b>	<b>1</b>
ST1	0,131	5
<b>ST2</b>	<b>0,160</b>	<b>3</b>
WT1	0,126	7



**Fig. 1.** FANP model for the selection of the best strategies