



Undergraduate Fall Term: Marketing Research (MRK 400) Term Report

Study about a pharmaceutical company: Drivers and barriers regarding COVID-19 vaccination for Tunisian citizens

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I- Executive summary

During the COVID-19 pandemic, vaccination was a required strategy to overcome the most severe global health emergency declared by the World Health Organization.

As of 27 July 2021, COVID-19 has been confirmed in 194 million people, and it has caused 4 million deaths worldwide. Mass vaccination programs were suggested to considerably decrease the incidence of COVID-19 infections, hospitalizations, and deaths.

In fact, the COVID-19 vaccine was considered as the most widely awaited intervention to deal with pandemic. Many institutions have moved at unseen speed to create it. COVAX, the Gavi- led funding scheme to deliver COVID-19 vaccines to low- and middle-income countries, planned to provide 2 billion doses of vaccine by the end of 2021. COVAX aimed to guarantee sufficient doses of any vaccine to deliver protection to an initial 20% of the people in the signatory countries. This coverage level can help achieve the immediate goal of protecting people at high risk of COVID-19. However, the availability of the vaccine itself does not necessarily ensure that the population is sufficiently well vaccinated. Vaccine acceptance and request are complex in nature and specific to the context, changing according to place, time and the behavioral nature of the population.

In Tunisia, the Ministry of Health launched an awareness campaign in television spots and different social media platforms and started the vaccination campaign on March 13th, 2021 aiming to have vaccinated half of the Tunisian population by the end of 2021. However, as of July 31, 2021, only 1,104,286 people are completely vaccinated and only 4,020,572 are registered on the national vaccination platform “Evax”.

Vaccine hesitancy is complex and context-specific, varying across time, place, and vaccines. It is influenced by factors such as low perception of the disease risk, convenience meaning the availability, affordability, and delivery of vaccines in a comfortable context, and trust in vaccination safety and effectiveness.

We aimed in this study to determine the willingness to get the COVID-19 vaccine among citizens in Tunisia, and the factors associated with it.

II- Study Context

1. General Introduction

The report was written by a group of 5 marketing research students to investigate the drivers and barriers regarding COVID-19 vaccination for Tunisian citizens.

The purpose of the following report is to study the influence of demographic, psychographics, behavioral and geographic characteristics on the vaccination decision.

We intend to ascertain a measure of the impact on Tunisians' online purchasing of clothes, by understanding their attitude towards different aspects of the market, their tendencies with this market, and their general behavior.

The change in consumer behavior is difficult to quantify because Tunisian customers are still adjusting to the change, therefore the impact has yet to be seen. This isn't to say that we can't get a sense of the current impact in this industry.

2. The industry

The pharmaceutical industry is the economic sector that includes the activities of research, manufacturing, and marketing of drugs for human and veterinary medicine.

Tunisia implemented a pharmaceutical system since the beginning of independence in 1956, with the departure of pharmacists and representatives of foreign laboratories that ensured the import and distribution of drugs in Tunisia. As a result, it was necessary to define the new prerogatives of the Central Pharmacy of Tunisia (PCT). From then on, the PCT was responsible for opening drug depots called "pharmaceutical agencies" in cities and towns where there were no pharmacies and importing drugs. Thus, a law of 1961 defines the MDT as the monopoly of the importation of all the foreign pharmaceutical specialties, not represented in Tunisia, as well as the representation of the products which it could obtain thereafter.

In 2019, Tunisia had fifty-six (56) drug production units. Twenty-eight (28) of them produce drugs for human use, six (6) are producers of animal drugs, and Twenty-two (22) units produce medical equipment. The pharmaceutical industry in Tunisia mainly operates through joint ventures with international firms. These global companies invest significantly in local players to boost the Research and Development of pharmaceutical drug products.

3. The market

Tunisia's Pharmaceutical Market size was valued at US\$ 1.69 Bn in 2021 and the total revenue is expected to grow at 12.9 % from 2022 to 2029, reaching nearly US\$ 4.47 Bn. The pharmaceutical sector in Tunisia has grown significantly in the last two decades, as per the government. As of August 2021, this industry had received USD 105 million in investments. As a consequence of enhanced investment in the pharmaceutical industry, operational players interested in growing their company in the region will have attractive prospects. Pharmaceutical producers in the nation are also expanding their export reach to European and West African countries as a result of export growth. As a result, the firms are investing heavily to extend their industrial capacity.

4. The environmental context of the problem

Tunisia is among the African countries that can have a well-structured pharmaceutical industry. The development of this sector follows the implementation of privatization and incentive phases accompanied by a more adequate fiscal and regulatory framework in the early 1990s.

In recent years, the government has prioritized improving the regulatory framework for investment in the pharmaceutical sector. In fact, since 2014, the government has continuously pursued legislative reforms to progressively strengthen investor rights, create a more investor-friendly environment and narrow the policy gap between foreign and domestic investors. This attractive legislative and regulatory framework includes major benefits especially for regional development zones. For instance, Tunisia offers a tax exemption for profits from investments for five to ten years, investment grants and up to 30% coverage of employer contributions and infrastructure expenses in regional development zones. In addition to other benefits such as the possibility for the foreign investor to own up to 100% of the capital of implemented projects, preferential tax and customs regime for the acquisition of equipment and simplified customs declaration procedures.

Tunisia's healthcare system includes over 90% health insurance coverage, healthcare infrastructure at both primary and tertiary levels and a relatively strong local pharmaceutical industry, with biosimilar and generic production. The strong framework has led to a significant increase in the coverage of the pharmaceutical market's needs by local production, from 14% in 1990 to over 52% in 2019.

Tunisia is also characterized by conducive ecosystems. In fact, different research and development centers are implemented in Tunisia such as the biotechnology technopole of Sidi Thabet, the Pasteur Institute

of Tunis, and the Biotechnology Centre of Sfax. Besides, the availability of a pharmaceutical pact to improve the national ecosystem in terms of infrastructure, governance, training and investment. In addition, draft a charter of public-private partnership in the pharmaceutical industries by 2025 to increase the competitiveness of the sector's stakeholders. Finally, a National Quality Assurance System for Medicines that meets international standards.

The healthcare system of Tunisia is one of the most sophisticated in the Middle East and North Africa. Tunisia is an appealing market for pharmaceutical businesses, with a huge consumer base, growing healthcare expenditures, and expanding disposable incomes. Tunisia benefits from a key geographic proximity to European countries and has signed free trade agreements with the markets of Sub-Saharan Africa, the Middle East and the European Union. Therefore, Tunisia's pharmaceutical sector aspires to increase exports, notably to European and West African markets, in a bid to capitalize on its well-developed manufacturing base and obtain easy access to Europe and Africa.

In 2019, following the coronavirus disease (COVID-19) pandemic and its possible disruptions in the manufacturing and supply of health products, the Tunisian medicines regulatory authority was mobilized to guarantee patient safety. Remote work has become the ultimate way of service continuity. The planning was revised according to health priorities. Work procedures were set online. A minimum list of medicines known as medicines of health and strategic interest was established. The Directorate of Pharmacy and Medicines (DPM) has been working on updating medicines stock data. A provisional suspension of authorizations for medicines export for 1 mo was decided. A fast-track procedure allowing the validation of alternative sources of raw materials has been put in place. An appeal for a fast track manufacture of hydroalcoholic gel/solutions was launched. A Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) procedure has been adopted in order to dispense off-label prescriptions of hydroxychloroquine and azithromycin combination. Focus groups were organized in order to set up therapeutic trials exploring possible strategies of COVID-19 treatment, such as serotherapy and BCG vaccine. This proactive and anticipatory policy has made it possible to meet the health challenges dictated by this crisis.

III- Research problem

1. MRP: The Marketing Research Problem:

After thoroughly analyzing the Managerial Problem, we determined the MRP:

Determine the factors influencing the Tunisian citizens' decision to get a COVID-19 vaccination.

2. Objectives

- Determine the influence of demographic characteristics on the vaccination decision.
- Determine the influence of psychographics on the vaccination decision.
- Determine the influence of behavioral characteristics on the vaccination decision.

3. Hypotheses

We broke down the objectives into different hypotheses that will help us capture the factors influencing the Tunisian citizens' decision of getting vaccinated:

- The market could be segmented based on attitude towards health.
- There is a difference between age groups in terms of attitude.
- Attitude towards health and perception of vaccine types are determinants of willingness to get vaccinated.
- The perception of vaccine types depends on the insights about COVID-19 encountered.
- Lifestyle affects the vaccination decision.

4. Approach to the problem:

To gain a further understanding of the problem we conducted an exploratory research with the available resources we had. First, we read multiple studies published online with similar subjects or objectives as ours. Most of the studies found were conducted abroad in developed countries, but it helped us gain an idea about the possible drivers and obstacles for the Covid Vaccination. For instance, according to the study "Exploring enablers and barriers toward COVID-19 vaccine acceptance among Arabs: A qualitative study", published by The International Journal of Disaster Risk Reduction, the main influence on the vaccination decision is affected by the degree of trust in the medical system.

Another secondary data source was the statistics published by the Ministry of Health to estimate the possible influencers of the willingness to vaccinate.

Moreover, we tried to go beyond research and consult an industry expert to make sure we were on the right path. We interviewed Mr. Fares Ben Koussa, a pharmacist, to acquire better insights and collect more information about the problem given his direct relationship with the industry.

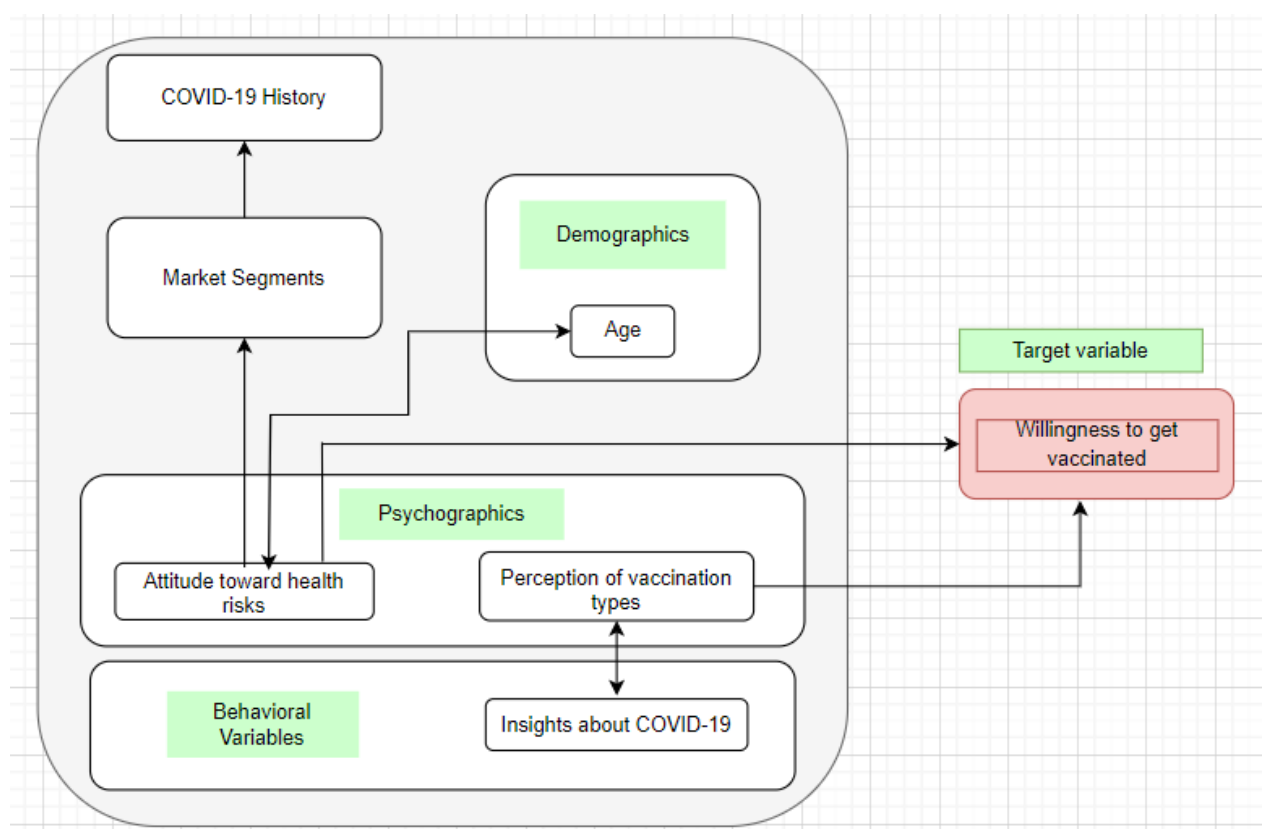
We asked him about the factors that he thinks can affect Tunisians' willingness to vaccinate, and presented him with the variables that we determined ourselves. His response was positive and he thought we captured all the possible major elements that may affect the vaccination decision. Thus, this confirmed the validity of our secondary research findings and we decided to move to the next step.

This is how we developed the approach based on objective and empirical evidence grounded in theory as far as it is appropriate.

5. Analytical framework:

The relevant variables and their interrelationships may be neatly summarized in an analytical model. The following is the final version of the analytical framework that captures the relationships between those variables. The framework derives the previously set objectives, study hypotheses, and relationships that will, later on, be studied and determined with precision.

Let's note that most variables evolve around the target variable, that is the willingness to get vaccinated, while other variables were set to help understand the profile and characteristics of the surveyed sample.



IV- Research design

1. Research design selection

Our marketing research problem is to determine the factors influencing the Tunisian citizens' decision to get a COVID-19 vaccination.

It was appropriate to begin with qualitative exploratory research to gain more background information about the health field in Tunisia during and after the pandemic, then conduct quantitative descriptive research to measure citizens' willingness to get vaccinated and infer the main factors influencing their decision. This will, eventually, allow us to gain reliable and specific information, and conclude, unlike the first exploratory research conducted to gain primary information.

2. Measurement and scaling

Measurement and scaling in marketing research involve the use of procedures to quantify the characteristics or attributes of a product, concept, or phenomenon. This allows researchers to compare the strength or intensity of different concepts, describe characteristics in a precise way, predict behaviors or outcomes, and control for certain variables in their studies.

Our variables are split into two main types; categorical variables represented by a nominal scale and continuous variables represented by an interval scale.

- **Nominal scale:** A scale whose numbers serve only as labels or tags for identifying and classifying objects, with a strict one-to-one correspondence between the numbers and the objects.
 - It gives us practical insights about participants that only need the description property.
- **Interval scale:** A scale in which the numbers are used to rank objects such that numerically equal distances on the scale represent equal distances in the characteristic being measured.
 - We are looking for attitudinal and perceptual data which is why we need the order and distance properties.

For all interval variables, we applied a 5-point Likert scale:

- "Definitely not" to "Definitely" to measure willingness to get vaccinated.
- "Strongly disagree" to "Strongly agree" to measure the perception of vaccination types.
- "Not important" to "Very important" to measure the attitude toward health risks.
- "Very unlikely" to "Very likely" to measure the likelihood of encountering Insights about COVID-19.

We will be using [2.5, 3.5] as a midpoint interval for more flexibility in the analysis.

Variable name	Question number in the survey	Number of questions to measure the variable	Scale used
Willingness to get vaccinated	1 - 4	4	5-point Likert scale
COVID-19 History	5 - 7	3	Nominal scale
Perception of vaccination types	8 - 11	4	5-point Likert scale
Health Status	12 - 13	2	Nominal scale
Attitude towards health	14 - 17	4	5-point Likert scale
Insights about COVID-19	18 - 20	3	5-point Likert scale
Lifestyle	21 - 26	6	Nominal scale
Age	27	1	Nominal scale
Gender	28	1	Nominal scale
Level of education	29	1	Nominal scale
Income	30	1	Nominal scale
Region	31	1	Nominal scale
Religion	32	1	Nominal scale

3. Sampling and sample design:

a. Population definition:

Our population consists of all Tunisian adults above the age of 18.

We chose age as the main criterion because of the nature of our MRP: only people above 18 can make their own decisions. Even though people between 12 and 17 are concerned with vaccination, we cannot survey them because they are minors who are legally protected by the law and are not fully equipped to make good decisions.

According to Digital 2022: Tunisia, Tunisia's total population was 11.99 million in January 2022. Thus, excluding minors, we get an estimated population of 8.6 million.

b. Sampling approach:

In this research study, our team was faced with time and budget constraints that limited our ability to use more traditional probability sampling methods, which involve randomly selecting a sample from the larger population in order to estimate the characteristics of that population. As a result, we opted to use a combination of non-probabilistic sampling techniques; convenience sampling and snowball sampling.

Convenience sampling involves selecting participants who are easily accessible or convenient to reach, that's why we shared the survey on social media with specific people in our network. This method is often used when time or resources are limited, but it can be subject to bias because the sample may not be representative of the larger population.

Snowball sampling involves starting with a small group of participants and asking them to share the survey with additional participants who meet the desired criteria. This method is also subject to bias because the sample may be composed of people who are more similar to each other than to the larger population.

Despite these potential biases, we attempted to diversify the age groups participating in the survey in order to mitigate some of the potential issues associated with these sampling methods. However, we acknowledge that there is a risk of both sampling and non-sampling errors in our study. Sampling errors refer to the differences between the sample and the population that are due to chance, while non-sampling errors refer to errors that are not due to sampling but may still impact the results of the study. For example, we may have issues with response errors, where some people who receive the survey do not respond or do not provide accurate responses. Additionally, there is the possibility of conformity issues, where the participants in the study may have many common characteristics, which could impact the generalizability of our results.

c. Sample size:

In order to ensure the reliability and validity of our results, we carefully calculated the sample size for our study. Based on our calculations, a sample size of 385 would be sufficient to achieve a confidence level of 95% and a precision level of 5%. Confidence level refers to the probability that the results of our study are representative of the larger population, while precision refers to the level of detail or resolution in our measurements. By selecting a sample size that is large enough to achieve a high confidence level and a high level of precision, we can be more confident that our results are accurate and can be generalized to the larger population.

d. The procedure of data collection

The procedure of data collection in this research study involved several steps. Before officially starting the data collection, we conducted a pre-test with 15 people from our families and friends who belonged to our target population. This is a common practice in marketing research projects to ensure that the survey is understandable and covers all the important variables. During the pre-test, the participants agreed that the survey was understandable and covered all the important variables. They did highlight a mistake in the French version of the survey and made some suggestions for improvement in the descriptions of the sections.

After making the necessary revisions based on the feedback from the pre-test, we were ready to begin the official data collection. Our survey was available in three different languages: English, French, and Arabic (Tunisian dialect). We chose to use Microsoft Forms as the platform for collecting our data because it is user-friendly and allows us to easily create a multilingual survey, invite others to respond to it using almost any web browser or mobile device, see real-time results as they are submitted, use built-in analytics to evaluate responses, and export the results to Excel.

The average completion time for the survey was 6 minutes and 54 seconds, and we received a total of 452 responses. This is a relatively large sample size, which should help to increase the reliability and validity of our results.

e. The procedure of data analysis

The data were analyzed on IBM SPSS Statistics 25 statistical software. The procedure is divided into two phases:

- Phase 1: Cleaning the dataset:

As all the questions are mandatory, we will not have any missing values. However, we will identify and eliminate any irrelevant or incoherent observations.

We will update and change variable and value labels in the final dataset.

We will run descriptive statistics.

We will also run reliability and factor analyses on all interval variables.

- If the scale is unreliable, we will proceed with the tests using the item that we see best describes the variable at hand.
- If the scale is reliable and valid, we move on to the analysis of the component at hand.
- If the scale is reliable and not valid, we treat components separately.

- Phase 2: Testing for our hypotheses:

- **The market could be segmented based on attitude towards health.**
 - Since this is a matter of segmentation we will use a two-step cluster analysis.
- **There is a difference between age groups in terms of attitude.**
 - Since age is a nominal variable and attitude is an interval variable, we will conduct a one-way ANOVA.
- **Attitude towards health and perception of vaccine types are determinants of willingness to get vaccinated.**
 - Since all variables here are intervals, we will conduct a bivariate analysis and a multi Regression.
- **The perception of vaccine types depends on the insights about COVID-19 encountered.**
 - Since the variables measured are both interval variables, we will conduct a bivariate analysis and a simple linear regression.
- **Lifestyle affects the vaccination decision.**
 - We will analyze the direct questions using descriptive statistics.

V- Results: data analysis and interpretation:

1. The general profile of the respondents:

We got 452 respondents in our survey. It took us 1 month and 18 days to gather these respondents, via the online survey, and here are some primary characteristics of the sample:

- We note that 60% of them are between 18 and 24 years old.
- 337 (around 75%) of them are females.
- 87% are college students.
- 369 out of the 452 respondents rely on social media to get COVID-19 information.
- The majority of the respondents' monthly income ranges between 0 and 500 Dinars.
- 142 reside in Bizerte and 111 in Tunis, that is more than 50% of the participants are based in the north.

With this, we can confirm that our sample is not representative especially in regards to gender (50.4% females and 49.6% males for the population) and age (18-24 y/o represent only 9.2% of the population).

Therefore, a typical respondent of our sample is classified as a female young adult student, with an income ranging from 0 to 500 TND and residing in North East Tunisia.

2. Descriptive results:

We will run descriptive statistics on each of the following variables to gain more insights into our sample respondents.

a. Age:

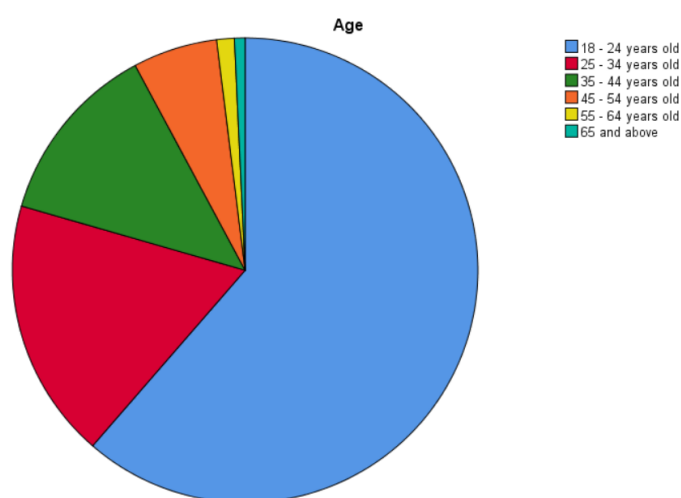
The following table shows the different age categories, their frequency, percentages, and cumulative percentages of the categories.

We note that the greatest percentage is that of the following age category: 18 - 24 years old, with 61.4%, then comes the 25 - 34 years old, with 18.1%. This means that nearly 80% of the respondents are classified as young adults.

We also note that in the adults and elderly categories, the percentages are notably low.

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 24 years old	251	61,4	61,4	61,4
	25 - 34 years old	74	18,1	18,1	79,5
	35 - 44 years old	52	12,7	12,7	92,2
	45 - 54 years old	24	5,9	5,9	98,0
	55 - 64 years old	5	1,2	1,2	99,3
	65 and above	3	,7	,7	100,0
	Total	409	100,0	100,0	

These results are visualized in the following pie chart:



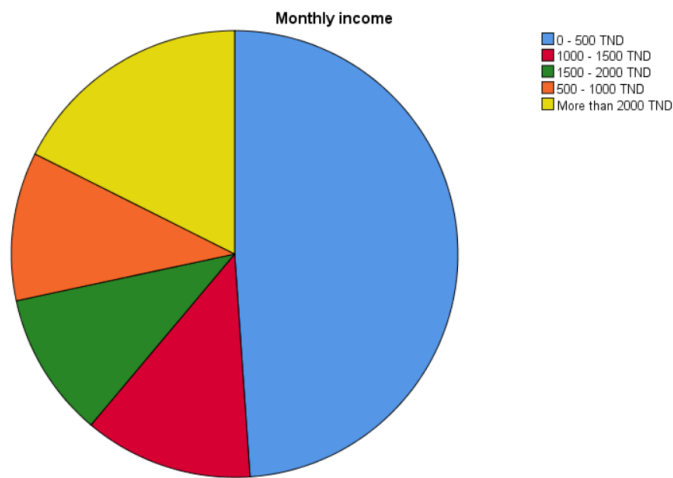
b. Income:

The following table shows the different income categories, their frequency, percentages, and cumulative percentages of the categories.

We note that the greatest percentage is that of the following age category: 0-500 TND, with 48.9%, then comes the 1000-1500 TND, with 12.2%. This means that nearly 50% of the respondents have an average monthly income ranging from 0 to 500 TND. These results make sense since the majority of the respondents are young adults, as discussed previously.

Monthly income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 500 TND	200	48,9	48,9	48,9
	1000 - 1500 TND	50	12,2	12,2	61,1
	1500 - 2000 TND	43	10,5	10,5	71,6
	500 - 1000 TND	44	10,8	10,8	82,4
	More than 2000 TND	72	17,6	17,6	100,0
	Total	409	100,0	100,0	

These results are visualized in the following pie chart:



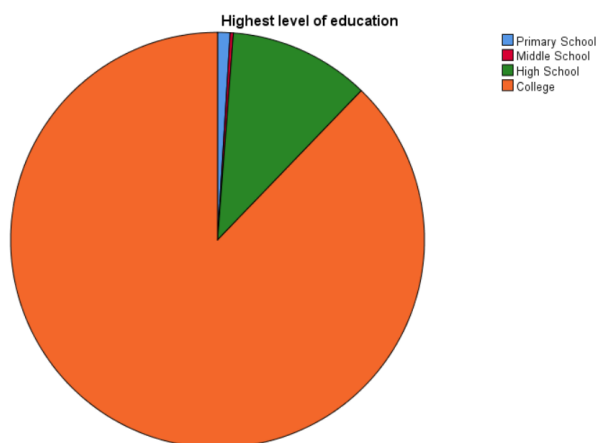
c. Education:

The following table shows the different levels of education, their frequency, percentages, and the cumulative percentages of the categories.

We note that the greatest percentage is that of college students, with 87.8%, then comes the high schoolers, with a notable difference in percentages of 76.8%. These results are explained by the sampling techniques we used since the majority of our acquaintances and network are college students.

Highest level of education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary School	4	1,0	1,0	1,0
	Middle School	1	,2	,2	1,2
	High School	45	11,0	11,0	12,2
	College	359	87,8	87,8	100,0
	Total	409	100,0	100,0	

These results are visualized in the following pie chart:



3. Main results:

a. Reliability and validity analysis:

As mentioned before, we will conduct these tests on all interval variables:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.845	.845	4

• Willingness to get vaccinated:

Cronbach's Alpha is higher than 0.7 thus we can conclude that the scale is reliable.

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Willingness1	5.5330	9.862	.746	.616	.776
Willingness2	4.7873	9.648	.757	.625	.770
Willingness3	4.9707	9.465	.747	.577	.773
Willingness4	5.4817	11.314	.491	.246	.881

We can notice that when we delete the 4th question the reliability of the scale will get higher to reach 0.881. However, we cannot disregard the question out of the scale without assessing the validity first.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.797
Bartlett's Test of Sphericity	Approx. Chi-Square	774.414
	df	6
	Sig.	.000

Kaiser-Meyer-Olkin Measure of Sampling Adequacy statistic is 0.797 and the P-value of Bartlett's Test of Sphericity is 0.000 (<0.05). Thus, we can conclude that a factor analysis of the Willingness scale is conclusive.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.759	68.971	68.971	2.759	68.971	68.971
2	.672	16.812	85.782			
3	.314	7.857	93.639			
4	.254	6.361	100.000			

Extraction Method: Principal Component Analysis.

We can see that Willingness has only one factor: component 1 with an eigenvalue higher than 1. Thus we are going to maintain all the variables and proceed to calculate the score variable.

- **Perception of vaccination types:**

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.645	.645	4

Cronbach's Alpha is lower than 0.7. Thus, the scale is not reliable.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Perception1	5.5257	6.127	.361	.133	.618
Perception2	5.0856	5.520	.390	.156	.603
Perception3	5.5990	5.344	.455	.222	.555
Perception4	4.9804	5.299	.498	.255	.524

We can notice that deleting either of the variables will not help increase Cronbach's Alpha. The scale is unreliable.

To be able to proceed with our statistical tests we will choose the variable that best describes the perception: Perception 4.

- **Attitude towards health:**

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.550	.562	4

Cronbach's Alpha is lower than 0.7. Thus, the scale is not reliable.

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Attitude1	7.1394	4.875	.291	.133	.529
Attitude2	8.0416	3.246	.477	.263	.345
Attitude3	9.5257	3.270	.363	.162	.458
Attitude4	7.6846	3.844	.264	.071	.543

We can notice that deleting either of the variables will not help increase Cronbach's Alpha. The scale is unreliable.

To be able to proceed with our statistical tests we will choose the variable that best describes the Attitude: Attitude 2.

- **Insights about COVID-19:**

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.663	.666	3

Cronbach's Alpha is lower than 0.7. Thus, the scale is not reliable.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Insights1	4.1051	3.202	.469	.227	.576
Insights2	4.8582	3.014	.507	.259	.526
Insights3	4.6553	2.815	.454	.207	.603

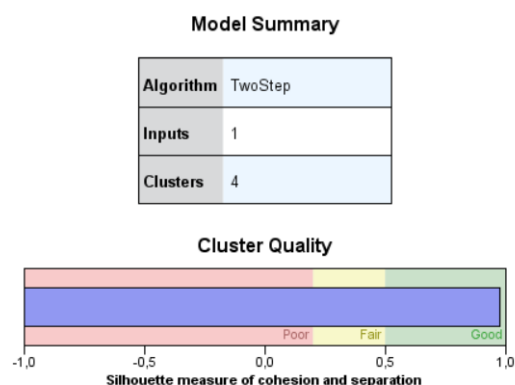
We can notice that deleting either of the variables will not help increase Cronbach's Alpha. The scale is unreliable.

To be able to proceed with our statistical tests we will choose the variable that best describes the Insights: Insights 2.

b. Test for the hypotheses:

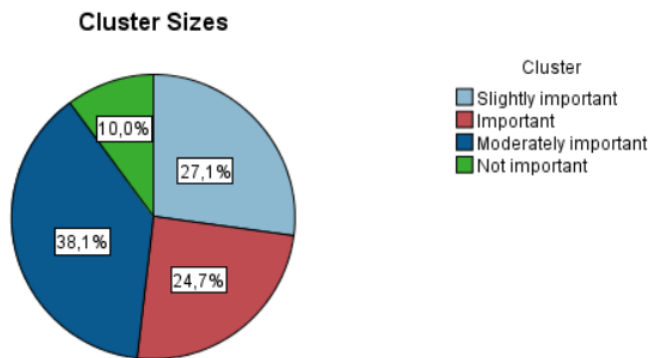
- **Hypothesis 1:** The market could be segmented based on attitude towards health.

We will be conducting a two-step cluster analysis on the variable attitude. Since attitude is non-reliable, we decided to work with the item “attitude 2” for the hypothesis testing.



With the cluster quality chart in the green area, we arrive at the conclusion that we have excellent cluster quality for the variable attitude 2. This means that we have good heterogeneity between clusters and good homogeneity within clusters.

The model summary table shows 4 clusters.



Size of Smallest Cluster	41 (10%)
Size of Largest Cluster	156 (38,1%)
Ratio of Sizes: Largest Cluster to Smallest Cluster	3,80

This pie chart reflects the percentages of respondents in each cluster. To be able to label those clusters, we need to take a look at the following clusters table:

Clusters

Input (Predictor) Importance

■ 1,0
 ■ 0,8
 ■ 0,6
 ■ 0,4
 ■ 0,2
 ■ 0,0

Cluster	3	1	2	4
Label	Moderately important	Slightly important	Important	Not important
Description				
Size	<div><div style="width: 38.1%;"></div></div> 38,1% (156)	<div><div style="width: 27.1%;"></div></div> 27,1% (111)	<div><div style="width: 24.7%;"></div></div> 24,7% (101)	<div><div style="width: 10.0%;"></div></div> 10,0% (41)
Inputs	Attitude2 3,00	Attitude2 2,00	Attitude2 4,00	Attitude2 0,80

We notice that cluster one, representing 38.1% of the data, has an average response of 3. By looking at the survey, we find that 3 refers to “Moderately Important”. Thus, we name the cluster “Moderately important”.

Cluster two, which is representing 27.1% of the data, has an average response of 2. By looking at the survey, we find that 3 refers to “Slightly important”. Thus, we name the cluster “Slightly important”.

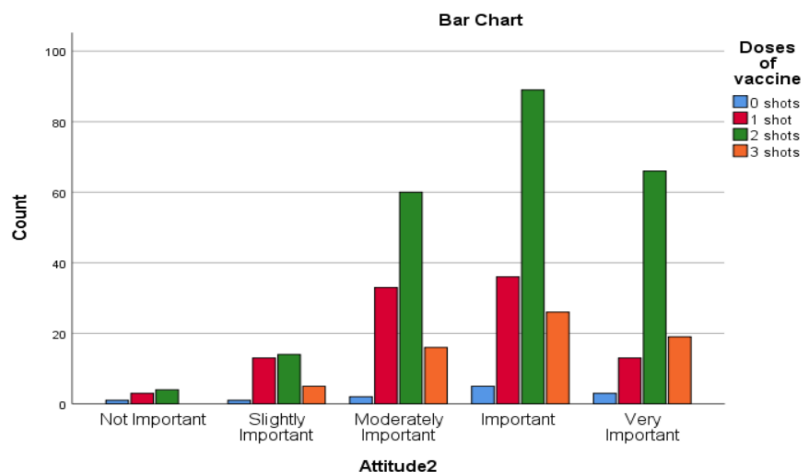
We follow the same logic for cluster 24.7%, “Important”, and for cluster 4, 10%, “Not important”.

Additionally, we want to test whether attitude toward health care is reflected in the shots of vaccine taken by each respondent, therefore, we run a cross-tabulation on both those variables and get the following results:

Attitude2 * Doses of vaccine Crosstabulation

			Doses of vaccine				
			0 shots	1 shot	2 shots	3 shots	Total
Attitude2	Not Important	Count	1	3	4	0	8
		% of Total	0,2%	0,7%	1,0%	0,0%	2,0%
	Slightly Important	Count	1	13	14	5	33
		% of Total	0,2%	3,2%	3,4%	1,2%	8,1%
	Moderately Important	Count	2	33	60	16	111
		% of Total	0,5%	8,1%	14,7%	3,9%	27,1%
	Important	Count	5	36	89	26	156
		% of Total	1,2%	8,8%	21,8%	6,4%	38,1%
	Very Important	Count	3	13	66	19	101
		% of Total	0,7%	3,2%	16,1%	4,6%	24,7%
Total	Count	12	98	233	66	409	
	% of Total	2,9%	24,0%	57,0%	16,1%	100,0%	

- **Hypothesis 2:** There is a difference between age groups in terms of attitude.



To test if there is a difference between age groups in terms of the item attitude2, we ran a one-way ANOVA and extracted the relationship between the 2 variables in a plot.

Descriptives

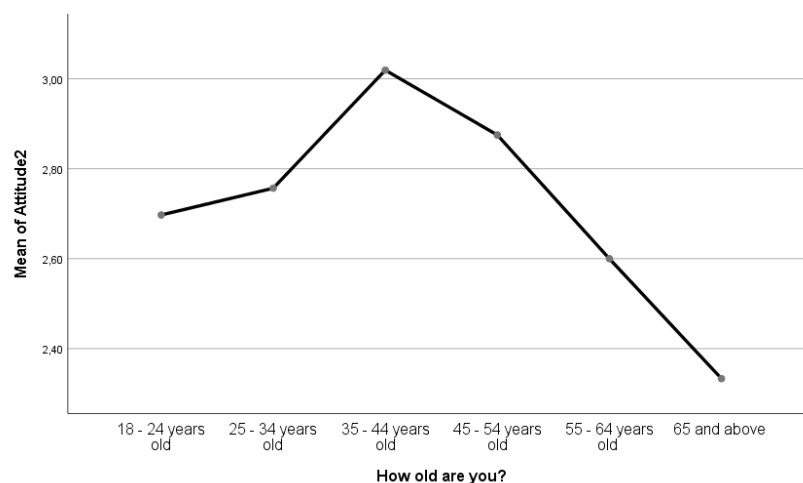
Attitude2

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
18 - 24 years old	251	2,6972	,98588	,06223	2,5747	2,8198	,00	4,00
25 - 34 years old	74	2,7568	1,01780	,11832	2,5210	2,9926	,00	4,00
35 - 44 years old	52	3,0192	,85154	,11809	2,7822	3,2563	1,00	4,00
45 - 54 years old	24	2,8750	1,11560	,22772	2,4039	3,3461	,00	4,00
55 - 64 years old	5	2,6000	,54772	,24495	1,9199	3,2801	2,00	3,00
65 and above	3	2,3333	,57735	,33333	,8991	3,7676	2,00	3,00
Total	409	2,7555	,97963	,04844	2,6603	2,8507	,00	4,00

ANOVA

Attitude2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5,468	5	1,094	1,142	,338
Within Groups	386,082	403	,958		
Total	391,550	408			



Sig.=0.338 > 0.05 => We accept H0: all means are equal so there is no difference between age groups in terms of attitude towards health.

- **Hypothesis 3:** The Tunisian population's perception of the vaccine has a notable effect on the willingness to get it. Attitude on the other hand does not significantly affect the decision to get vaccinated.

To test the relationships between Willingness, Perception and Attitude we ran a bivariate analysis.

		Correlations		
		Willingness	Perception4	Attitude2
Willingness	Pearson Correlation	1	.498**	.032
	Sig. (2-tailed)		.000	.522
	N	409	409	409
Perception4	Pearson Correlation	.498**	1	-.068
	Sig. (2-tailed)	.000		.172
	N	409	409	409
Attitude2	Pearson Correlation	.032	-.068	1
	Sig. (2-tailed)	.522	.172	
	N	409	409	409

** . Correlation is significant at the 0.01 level (2-tailed).

We can notice that there is a strong positive correlation between willingness and perception. However, the correlation between willingness and attitude is weak.

To further test the effect of attitude and perception on the willingness to get vaccinated we ran a linear regression.

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109.584	2	54.792	68.536	.000 ^b
	Residual	324.582	406	.799		
	Total	434.166	408			

a. Dependent Variable: Willingness

b. Predictors: (Constant), Perception4, Attitude2

Sig. = 0.000 < 0.05 thus the overall regression model is significant.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.502 ^a	.252	.249	.89413

a. Predictors: (Constant), Perception4, Attitude2

R Square = 0.252; thus, we can say that 25.2% of the variance in the willingness to get vaccinated is explained by the variance in the attitude and perception towards the vaccine.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.522	.163		3.203	.001
	Attitude2	.069	.045	.066	1.530	.127
	Perception4	.489	.042	.503	11.684	.000

a. Dependent Variable: Willingness

Equation: Willingness = 0.522 + 0.489 Perception + 0.069 Attitude

Perception: p-value is lower than 0.05; thus, perception is statistically significant. An increase of 1 point in the perception will increase the willingness by 0.489.

Attitude: p-value is higher than 0.05; thus, attitude is not statistically significant. An increase of 1 point in the attitude will only increase the willingness by 0.069.

- **Hypothesis 4:** There is a relationship between the perception of vaccine types and the insights about COVID-19

We first start with a bivariate analysis to see the relationship between perception and insights.

Correlations

Correlations

		Perception4	Insights2
Perception4	Pearson Correlation	1	.403**
	Sig. (2-tailed)		.000
	N	409	409
Insights2	Pearson Correlation	.403**	1
	Sig. (2-tailed)	.000	
	N	409	409

** . Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation coefficient = 0.403; there is a positive relationship between perception and insights. If the insights increase, the perception will also increase.

Second, we conducted a regression analysis to see the influence between perception and insights.

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	74,711	1	74,711	79,091	,000 ^b
	Residual	384,462	407	,945		
	Total	459,174	408			

a. Dependent Variable: Perception4

b. Predictors: (Constant), Insights2

Sig. = 0.000 < 0.05 thus the overall regression model is significant.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,403 ^a	,163	,161	,97192

a. Predictors: (Constant), Insights2

R Square = 0.403; thus, we can say that 40.3% of the variance in the perception towards the vaccine is explained by the variance in the insights of the vaccine.

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	1,253	,105		,000
	Insights2	,425	,048	,403	,000

a. Dependent Variable: Perception4

Equation: Perception = 1.253 + 0.425 Insights

The p-value is lower than 0.05: we reject H0: there is a dependency between insights and perception.

The variable insights are statistically significant. An increase of 1 point in the insights will increase the perception by 0.425.

The minimum level of perception towards the vaccine in our sample is 1.253.

- **Hypothesis 5: Lifestyle affects the vaccination decision.**

We mainly divided lifestyle into two main factors: Traveling and Work/Study.

We asked direct questions in our survey about the effect of traveling tendency and the nature of work or studies on the vaccination decision. The results are as shown in the following tables using cross-tabulations between these questions and the number of doses taken.

- **Traveling**

Travel Obligation * Doses of vaccine Crosstabulation

			Doses of vaccine				Total
			0 shots	1 shot	2 shots	3 shots	
Travel Obligation	I do not travel	Count	6	68	135	19	228
		% within Travel Obligation	2.6%	29.8%	59.2%	8.3%	100.0%
		% within Doses of vaccine	50.0%	69.4%	57.9%	28.8%	55.7%
		% of Total	1.5%	16.6%	33.0%	4.6%	55.7%
	Yes	Count	2	23	70	38	133
		% within Travel Obligation	1.5%	17.3%	52.6%	28.6%	100.0%
		% within Doses of vaccine	16.7%	23.5%	30.0%	57.6%	32.5%
		% of Total	0.5%	5.6%	17.1%	9.3%	32.5%
	No	Count	4	7	28	9	48
		% within Travel Obligation	8.3%	14.6%	58.3%	18.8%	100.0%
		% within Doses of vaccine	33.3%	7.1%	12.0%	13.6%	11.7%
		% of Total	1.0%	1.7%	6.8%	2.2%	11.7%
Total	Count		12	98	233	66	409
	% within Travel Obligation		2.9%	24.0%	57.0%	16.1%	100.0%
	% within Doses of vaccine		100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total		2.9%	24.0%	57.0%	16.1%	100.0%

- Work/Study

Work/study Obligation * Doses of vaccine Crosstabulation

			Doses of vaccine				Total
			0 shots	1 shot	2 shots	3 shots	
Work/study Obligation	I do not work nor study	Count	2	3	9	7	21
		% within Work/study Obligation	9.5%	14.3%	42.9%	33.3%	100.0%
		% within Doses of vaccine	16.7%	3.1%	3.9%	10.6%	5.1%
		% of Total	0.5%	0.7%	2.2%	1.7%	5.1%
	Yes	Count	0	65	157	36	258
		% within Work/study Obligation	0.0%	25.2%	60.9%	14.0%	100.0%
		% within Doses of vaccine	0.0%	66.3%	67.4%	54.5%	63.1%
		% of Total	0.0%	15.9%	38.4%	8.8%	63.1%
	No	Count	10	30	67	23	130
		% within Work/study Obligation	7.7%	23.1%	51.5%	17.7%	100.0%
		% within Doses of vaccine	83.3%	30.6%	28.8%	34.8%	31.8%
		% of Total	2.4%	7.3%	16.4%	5.6%	31.8%
Total	Count	12	98	233	66	409	
	% within Work/study Obligation	2.9%	24.0%	57.0%	16.1%	100.0%	
	% within Doses of vaccine	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	2.9%	24.0%	57.0%	16.1%	100.0%	

4. Discussion of the results:

- **Hypothesis 1:**

By looking at the clustering quality, we conclude that the Tunisian population can easily be segmented based on their attitude toward health risks.

38.1% of the respondents believe that visiting the doctor for check-ups is moderately important, 27.1% of them believe it's slightly important, and 24.7% believe it to be important. These close percentages mean that the majority of the sample believe this act to be relevant, and therefore, are considered to have a positive attitude toward health risks.

This leaves us with only 10% of respondents to think this act is not important, thus having a negative attitude toward health risks.

In addition, the cross-tabulations results show that people who voted “Slightly important” to “Important” have been vaccinated more than those who voted “Not important”.

This leaves us with the conclusion that respondents with a positive attitude toward health risks tend to get vaccinated more than those with a negative attitude.

- **Hypothesis 2:**

All age groups have the same attitude toward vaccination. Hence, no matter what the respondents' group age is they have the same perspective toward the vaccine. In case the company wants to improve the population's attitude toward the vaccine, the company has to target all age groups.

- **Hypothesis 3:**

The respondents' perception of the vaccine has a notable effect on their willingness to get it. Attitude on the other hand does not directly significantly affect the decision to get vaccinated. In case the company wants to improve the population's willingness to get vaccinated, it should work more on the perception of the vaccine types than the attitude.

- **Hypothesis 4:**

The respondents' insights on the vaccine have a notable effect on their perception of getting vaccinated. In case the company wants to boost the population perception, it needs to consider working on sharing more information and insights.

According to the findings, this information can be shared especially on social media since most respondents (80%) used to get COVID-19 updates from social media channels during the pandemic.

- **Hypothesis 5:**

57.6% of respondents who got 3 vaccine doses said that traveling obliged them to get vaccinated. However, 58.3% of the respondents who said that traveling did not oblige them to vaccinate received 2 shots of the vaccine which could be explained by other factors.

67.4% of the respondents who received 2 vaccine doses said that work or study obliged them to vaccinate. And 83.3 of respondents who never had any vaccine said that their work/study nature did not oblige them to.

VI- Recommendations:

The following recommendations are based on the previously extracted data, processed information, and developed insights to provide the pharmaceutical company with effective facts and insights about the drivers and barriers of the population's decision to get vaccinated.

Based on the findings, we recommend the following.

- To increase the willingness to get vaccinated, a campaign that targets altering their perception and mainly gaining their trust is highly recommended. We recommend the company use advertisements and marketing materials intended to convince the population of the importance of vaccines in an honest way.

For instance, the use of interviews with well-known people from all age groups (actors, politicians, artists) that communicate their experience with the vaccine.

Besides, filming the vaccination process with one person before, during, and after the vaccination involves storytelling.

- The attitude towards the vaccine is not a decisive factor in the decision to get vaccinated. Thus, we advise against wasting resources on trying to change it.
- Lifestyle, represented by traveling and work/study style, could be an important factor when targeting the profile defined. Thus, the company should work on approaching partnerships with schools, work environments, and travel agencies.

For instance, collaborate with travel agencies to offer special packages and discounts to visitors who have been vaccinated against COVID-19.

Besides, promote how trips with inoculation certificates and other measures lead to a better travel experience and expand exchanges between people.

- The insights shared about the vaccines will directly improve the perception, which has a highly positive relationship with the willingness to get vaccinated. In this case, working on sharing more information will indirectly improve willingness. Thus, we recommend the company to share more valuable content which will build strong confidence in COVID-19 vaccines within communities.

For instance, the use of social media to raise awareness on trusting well-sourced insights. We recommend always mentioning the source of information shared and using only trusted sources such as the World Health Organization (WHO).

Besides, the company can make a weekly section where it shares short videos discussing false information shared on social media, provide counter arguments with professionals and deliver the corrected insight. This also can be done in Live stream where the professional discusses in real time and stimulates critical thinking by asking and answering questions. This will encourage the population to not trust everything found on the internet or social media impulsively.

- The market can be segmented into 4 segments based on their attitude toward health risks. According to the clustering, respondents who consider their health important to them tend to take more vaccine shots. Thus, the company should work on:

First, target people who consider their health “Not Important” to raise awareness of health issues and stimulate them to seek information and services.

For instance, conducting a free health campaign in different regions. Thus, people can over time take more care of their health, which will affect their willingness to get vaccinated.

Second, target people who consider their health “Slightly important” to listen to their points of view and encourage them to care more about their health.

This can be done by encouraging and promoting motivational interviewing from Healthcare professionals to patients. In fact, the healthcare staff is considered a trusted source of health information and healing. The approach to conversations with patients and families who are hesitant about receiving COVID-19 vaccines can influence their willingness to consider vaccination.

- The age groups have the same attitude towards the vaccine. Although we don’t highly advise the company to work on the attitude since it slightly affects the willingness, we recommend using communication channels that target all age groups in case it wants to proceed with it.

For instance, the company can commercialize short videos on social media, especially Tiktok, Instagram, and Facebook to target young adults. Also, it can consider Youtube Ads as a first step to connect with people in case the company doesn’t have a large audience base on social media.

Besides, work on TV advertisements to target adults. This can be done by creating effective and compelling broadcasts, commercials, and campaigns.

And finally, work on radio advertisements to target the elderly. This can be done using radio intervention and health quizzes with audience participation.

VII- Conclusion & limitations:

At the end of this study, we concluded that some of the key drivers that we identified include perception of vaccine types and the information encountered about the COVID-19 vaccine, as well as citizens' lifestyles. On the other hand, some of the key barriers may include misinformation, lack of trust in the vaccine source, and the respondent's COVID-19 history.

However, due to time and budget constraints, we were obliged to use specific non-probabilistic sampling techniques. Thus, this generated a sample that is based on our surroundings, falling in the age group of [18 – 24], surveyed using online platforms. As a result, the sample was not representative and it cannot be generalized for the whole population, and it is limited to our sample only.

Added to that, we encountered other limitations during this study and came across two types of error: The first is a sampling error of measurement, as the survey may have not accurately captured the participants' attitudes and behaviors.

The second one is a non-sampling error which is response bias, as participants may have not answered the survey truthfully and accurately.

VIII- References:

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- [The challenges of conducting surveys of youth](#)
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- [Tunisia Pharmaceutical Market – Industry Analysis and Forecast \(2022-2029\)](#)
- [Tunisia Pharmaceutical Market Size Report, 2021-2028](#)
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- [Exploring enablers and barriers toward COVID-19 vaccine acceptance among Arabs: A qualitative study](#)
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- [Regulatory Challenges in the COVID-19 Era: The Case of Tunisia](#)