The Quantitative and Descriptive Approach in Calculating Expected Market Share

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The current research aims to study the impact of leaders' thinking styles in strategic momentum, in an oversample of 72 administrative leaders at the University of Karbala. The information related to the practical aspect was collected by a survey designed according to Grigorenko & Sternberg, 1997 matrix to measure thinking styles, while Peters et al, 2018 matrix was leveraged to measure Strategic Momentum. The information on the forms was subjected to several statistical methods and leveraged with SPSS, V23. One of the most important conclusions that the University of Karbala leaders adapt several thinking styles with different scores, as Hierarchic Style is the most influential in strategic momentum.

Key words: *Leaders, Thinking Styles, Strategic Momentum, University leaders.*

Introduction

The banking system is considered to be the beating heart of the body of the economic system, as it is not possible to imagine economic development or economic and administrative activity for any country without the presence of this important device. Banks have become different, whether private or government, competing with each other for the marketing of banking services and the acquisition of market shares from customers through the search for a competitive advantage in this activity that includes the superiority over the rest of the banks (governmental or private), so many banks have turned towards the search for scientific methods (quantitative or descriptive) in calculating the expected market shares from customers. The quantitative and descriptive indicators that are obtained support decision-making processes related to supporting various banking activities and in a manner that supports raising the level of achieved profits and the continuity of banks in the market. Such problems are addressed through this research, on the basis of four chapters. The first chapter

is devoted to the scientific method. The conceptual framework of the study is addressed in the second chapter. As for the third chapter, it includes the applied side of the study, as it went towards quantitative and descriptive analysis, based on the available data. Then, the fourth chapter is devoted to conclusions and recommendations. At the end of the study, the Arab and foreign sources are used and the most important annexes are presented at the end.

Study Problem: Our study problem can be presented through the following four questions:

First: How to calculate the expected market shares by adopting one of the quantitative methods?

Second: What are the descriptive methods that support the process of calculating market shares from customers?

Third: How do banks (private or government) benefit from the process of indicators achieved from the quantitative and descriptive approach in supporting future activities, programs and plans?

Fourth: Do the quantitative and descriptive approaches in competition and struggle benefit to obtain the largest possible market share from customers?

Study Hypotheses: Our study is based on the following assumptions:

1- Assume that the calculation of market shares from customers can be done using one of the quantitative methods, which is the Markov Chain method.
2- Assume that there is a possibility to support the process of calculating market shares by polling the two sides of the marketing equation (the customer and the salesman)
3- Assume that both private and government banks can benefit from the quantitative and descriptive indicators achieved to support future activities, programs and plans.
4- Assume that the quantitative and descriptive approach methods used in competition and conflict drive private and government banks to acquire the largest possible market share. From it we conclude the following sub-hypothesis:

There is a statistically significant relationship between the use of quantitative and descriptive methods in order to control or obtain the largest possible market share from customers.

Objectives of the Study

First: Calculating future market shares from customers for one or more seasons using quantitative method such as the Markova Chain or the decision theory method.

Second: Supporting the quantitative accounts above by seeking the opinion of both parties of the marketing equation (customer-salesman) in order to find out all the behavioral indicators in customer acquisition, maintain the current market share and increase it in the future.

Third: Supporting future plans in the field of expanding the provision of banking services, withdrawing them or changing them.

Fourth: Providing the necessary indicators to increase the market share and improve the competitive advantage.

The Importance of the Study

Our study derives its importance through the following points:

1- Such a study places among the decision-maker a package of quantitative and qualitative methods in order to guide future decisions
2- Workers in commercial banks were able to tackle competition problems related to hegemony and control the largest possible market share from customers while paying attention to the competitive advantage that supports that.

The Quantitative Methodology of the Study and the Methods Used

It is one of the basic approaches to managing business organisations, and is closely related to the use of mathematical models and quantitative methods. The beginning of the emergence of this approach in the first attempts of Frederick Taylor (F. Taylor) at the beginning of the twentieth century, and this approach developed after the Second World War due to the successes achieved by the operations research team, to address many problems in practice.
It is understood from the methods of the quantitative approach as a set of tools or methods that are used by the decision maker to address a specific problem or to rationalise a specific administrative decision, in which case it is assumed that there is sufficient amount of data that should reflect the limited resources and the multiplicity of alternatives. In this regard, there are many methods, for example:

1. Linear Programming
2. Decision Theory
3. Markov Chain Method
4. Probability Theory

Markov Chain

The Markov chains method is based on an important assumption, which is that any system is dealt with in a preliminary and basic condition in preparation for the transition to another situation, where, if there are a group of productive organisations sharing the market among them, this method helps decision-makers in predicting the shares of each of them. It is calculated according to certain possibilities based on what is known as the Matrix of Transition Probabilities. Below is a table that represents the general framework for the transitional matrix of the five banks.

Table 1: the general framework of the transitional possibilities matrix focusing on the five banks

	1	2	3	4	5	…………	n
1	0	P12	P13	P14	P15	…………	P1n
2	P21	0	P23	P24	P25	…………	P2n
3	P31	P32	0	P34	P35	…………	P3n
4	P41	P42	P43	0	P45	…………	P4n
5	P51	P52	P53	P54	0	…………	…………
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
m	Pm1	Pm2	Pm3	Pm4	.	…………	Pmn

Whereas, the sum of the probabilities is calculated as follows:

$$p = \sum_{j=1}^{n} p_j(x_j) = 1$$

$$p = p_1(x_1) + p_2(x_2) + \cdots + p_n(x_n) = 1$$

P = total probability (sum of probabilities) Pj = probability of the phenomenon (xj) with the number (j)

Xj = phenomenon with values (j)

On the basis of the above, the adoption of the law of probabilities in obtaining market shares for the five banks, which can be divided into private banks (T) or government banks (H), this matter will complicate the issue before the decision-maker.

The square will prevail in the market only for government banks H, and thus the distribution of the five banks to the governorates is: (H_1 , H_2 , H_3 , H_4 , H_5)

This is evident from the figure (4) in which the probability number is 1/32 and the matter may be exactly the opposite as it is in the last probability that carries the number (32) as follows: (T_1 , T_2 , T_3 , T_4 , T_5)

And between the first possibility above and this last possibility, there are (30) various possibilities for banking activity of the study sample

Descriptive Method of Study

The descriptive approach means adopting methods that are based on the skills and capabilities of the decision maker, and not relying on numbers or mathematical models. Where it is known that the decision-making process is based on two types of skills and capabilities, which are as follows:

Figure 5. overlap between inherited and acquired qualifications
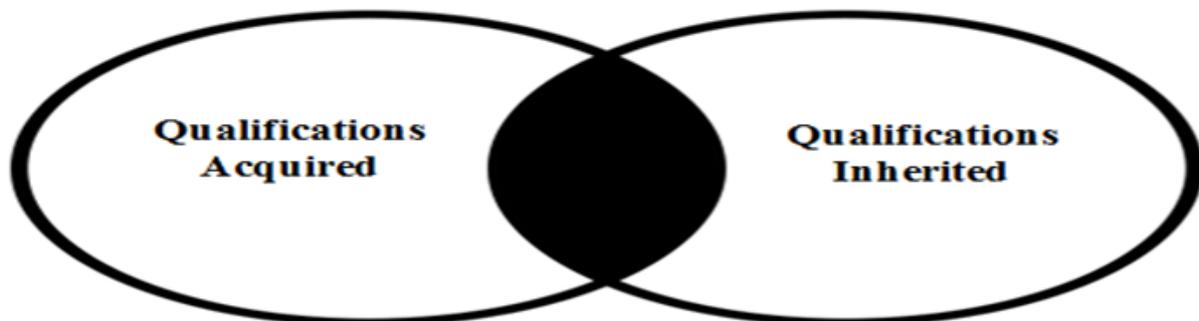
Source: Prepared by researchers

As the descriptive approach is supposed to be integrated with the previous quantitative approach in order to come out with the ways that would support the process of determining market shares.

Professor Simon Herbert went to the same opinion adopted by the writer Mik Wiesniewski regarding the integration between the methods of the quantitative and descriptive approach in making various decisions, including what is related to determining the market share of customers in the banks of the study sample, and one of the most important trends, identified by Prof. Simon Herbert, is the lack of Absolute Rationality.

First: collective methods, the most common ones are the following:

1- Scenarios Method
2- Method Brain Storming
3- Delphi Method

Second: collective and individual methods (that is, they are used by groups or individuals), the most important of which are:

1. Force Field Analysis
2. Fishbone Or (Ishikawa Chart(
3. Helicopter Or Mixed Scanning method

Chapter Three: The Applied Aspect of the Study

Quantitative data on the current state of banking activity

The following data relates to the number of customers from the four governorates, the study sample was approved:

Bank name	No. Of Costumer
Bank no.1 (T/H)	4400
Bank no.2 (T/H)	4400
Bank no.3 (T/H)	5200
Bank no.4 (T/H)	5000
Bank no.5 (T/H)	4500
total summation	23500

- A known calculator program was used as WIN. Q.S.B which includes a set of quantitative methods as follows: Linear and Integer Programming
- Transportation Model
- Network
- Inventory Control
- Markov Chain

The (Markov Chain) program is required in this case, and the necessary data for this program was created and is as follows:

First: Profit Matrix

	Bank No.1 (T\H)	Bank No.2 (T\H)	Bank No.3 (T\H)	Bank No.4 (T\H)	Bank No.5 (T\H)
Bank No.1 (T\H)	0	200	400	300	250
Bank No.2 (T\H)	400	0	100	250	300
Bank No.3 (T\H)	600	500	0	300	400
Bank No.4 (T\H)	500	250	300	0	100
Bank No.5 (T\H)	250	300	250	400	0

	B1	B2	B3	B4	B5
B1	0	200	400	300	250
B2	400	0	100	250	300
B3	600	500	0	300	400
B4	500	250	300	0	100
B5	250	300	250	400	0

← Profit matrix

The loss matrix is calculated as the inverse of the profit matrix:

	B1	B2	B3	B4	B5
B1	0	400	600	500	250
B2	200	0	500	250	300
B3	400	100	0	300	250
B4	300	250	300	0	400
B5	250	300	400	100	0

← Loss matrix

	Profit	loss
(T\H) Bank No.1	1150	1750
(T\H) Bank No.2	1050	1250
(T\H) Bank No.3	1800	1050
(T\H) Bank No.4	1150	1250
(T\H) Bank No.5	1200	1050
	6350	6350

On the Basis of the Foregoing, the Transition Probability Matrix is Calculated, According To The Following Steps:

The First Step

The retention power of each bank, whether private (T) or government (H), is calculated by its customers who represent their market share and working to increase this market share as much as possible, and this is done through the following mathematical relationship: $M = \frac{V-K}{V}$ wherein:

M = the strength of the bank (T or H) to retain its customers
K = the number of clients lost during the period
V = the number of customers at the beginning of the time period

On the basis of the above, applying this relationship to the available data, we obtain the following:

Bank No.1 (T\H) $= \frac{4400-1750}{4400} = \mathbf{0.61}$

Bank No.2 (T\H) $= \frac{4400-1250}{4400} = \mathbf{0.72}$

Bank No.3 (T\H) $= \frac{5200-1050}{5200} = \mathbf{0.80}$

Bank No.4 (T\H) $= \frac{5000-1250}{4400} = \mathbf{0.75}$

Bank No.5 (T\H) $= \frac{4500-1050}{4500} = \mathbf{0.77}$

The Second Step

Calculating the probabilities of customer loss or market share, based on the calculation of each bank's loss. The sample of the study is the number of customers who go to the other bank, and this is done according to the following mathematical relationship:

$$P = \frac{W}{V}$$

wherein:
P = Probability Symbol (PROBABILETY)
W = the number of clients that were lost from any bank and who went to any other bank
V = the number of customers (the amount of market share) at the beginning of the time period

The following calculations are performed:

1- The probability of losing the first bank, B1, is calculated for its customers compared to other banks, according to the following form and mathematical relationships:
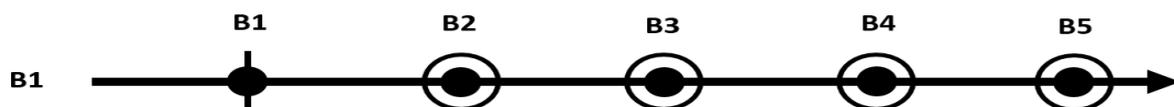
$$P_{B_1} = \frac{B_5 B_4 B_3 B_2 \text{ to me } B_1 Possibility\ loss}{V}$$

The mathematical relationship above is divided into sub-mathematical relationships, as follows:

$$P_{B_1} = \frac{B_2 \text{ to me } B_1\ Possibility\ of\ loss}{V} = \frac{400}{4400} = 0.09$$

In order to simplify the solving processes, the symbols were reduced as follows: (1)

BANK NO.1	B1	BANK NO.3	B3
BANK NO.2	B2	BANK NO.4	B4
		BANK NO.5	B5

$$P_{B_1} = \frac{B_3 \text{ to me } B_1\ Possibility\ of\ loss}{V} = \frac{600}{4400} = 0.13$$

$$P_{B_1} = \frac{B_4 \text{ to me } B_1 Possibility\ of\ loss}{V} = \frac{500}{4400} = 0.11$$

$$P_{B_1} = \frac{B_5 \text{ to me } B_1 Possibility\ of\ loss}{V} = \frac{250}{4400} = 0.05$$

2- Calculating the probability of losing the second bank, B2, to its customers compared to other banks, according to the following form and mathematical relationships:
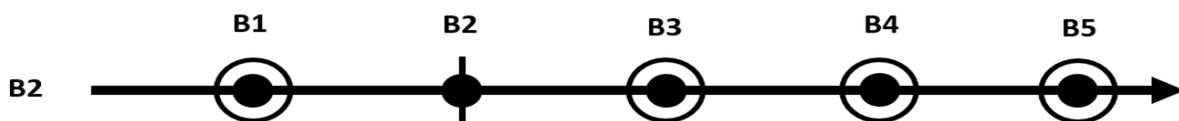
$$P_{B_2} = \frac{B_5 B_4 B_3 B_1 \text{ to me } B_2\ Possibility\ of\ loss}{V}$$

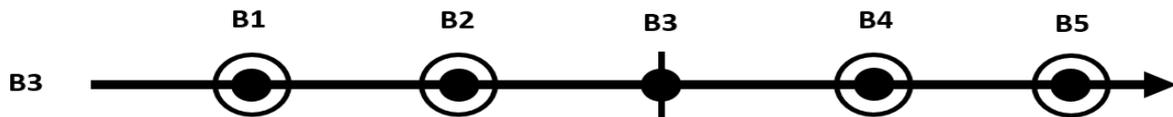The mathematical relationship above is divided into sub-mathematical relationships, as follows:

$$P_{B_2} = \frac{B_1 \text{ to me } B_2 Possibility\ of\ loss}{V} = \frac{200}{4400} = 0.04$$

$$P_{B_2} = \frac{B_3 \text{to me } B_2 Possibility\ of\ loss}{V} = \frac{500}{4400} = 0.11$$

$$P_{B_2} = \frac{B_4 \text{to me } B_2 Possibility\ of\ loss}{V} = \frac{250}{4400} = 0.05$$

$$P_{B_2} = \frac{B_5 \text{ to me } B_2 Possibility\ of\ loss}{V} = \frac{300}{4400} = 0.06$$

3- Calculating the probability of losing the third bank, B3, to its customers compared to other banks, according to the following form and mathematical relationships:

$$P_{B_3} = \frac{B_5 B_4 B_2 B_1 \text{to me } B_3 Possibility\ of\ loss}{V}$$

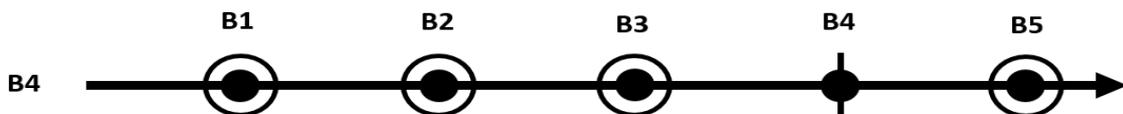The mathematical relationship above is divided into sub-mathematical relationships, as follows:

$$P_{B_3} = \frac{B_1 \text{to me } B_3 Possibility\ of\ loss}{V} = \frac{400}{5200} = 0.07$$

$$P_{B_3} = \frac{B_2 \text{to me } B_3 Possibility\ of\ loss}{V} = \frac{100}{5200} = 0.19$$

$$P_{B_3} = \frac{B_4 \text{to me } B_3 Possibility\ of\ loss}{V} = \frac{300}{5200} = 0.05$$

$$P_{B_3} = \frac{B_5 \text{to me } B_3 Possibility\ of\ loss}{V} = \frac{250}{5200} = 0.04$$

4. Calculating the probability of losing the fourth bank, B4, to its customers compared to other banks, according to the following form and mathematical relationships:

.5

$$P_{B_4} = \frac{B_5 B_3 B_2 B_1 \text{to me } B_4 Possibility\ of\ loss}{V}$$

The mathematical relationship above is divided into sub-mathematical relationships, as follows:

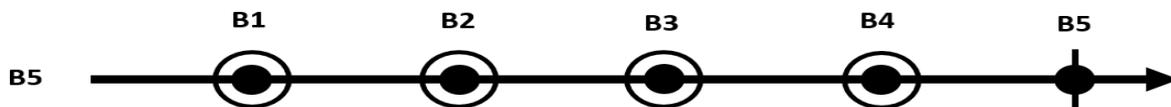$$P_{B_4} = \frac{B_1 \, to \, me \, B_4 Possibility \, of \, loss}{V} = \frac{300}{5000} = 0.06$$

$$P_{B_4} = \frac{B_2 \, to \, me \, B_4 Possibility \, of \, loss}{V} = \frac{250}{5000} = 0.05$$

$$P_{B_4} = \frac{B_3 \, to \, me \, B_4 Possibility \, of \, loss}{V} = \frac{300}{5000} = 0.06$$

$$P_{B_4} = \frac{B_5 \, to \, me \, B_4 Possibility \, of \, loss}{V} = \frac{400}{5000} = 0.08$$

5- Calculating the probability of losing the fifth bank, B5, to its customers compared to other banks, according to the following form and mathematical relationships:

$$P_{B_5} = \frac{B_4 B_3 B_2 B_1 \, to \, me \, B_5 \, Possibility \, loss}{V}$$

The mathematical relationship above is divided into sub-mathematical relationships, as follows:

$$P_{B_5} = \frac{B_1 \, to \, me \, B_5 \, Possibility \, of \, loss}{V} = \frac{250}{4500} = 0.05$$

$$P_{B_5} = \frac{B_1 \, to \, me \, B_5 \, Possibility \, of \, loss}{V} = \frac{300}{4500} = 0.06$$

$$P_{B_5} = \frac{B_1 \, to \, me \, B_5 \, Possibility \, of \, loss}{V} = \frac{400}{4500} = 0.08$$

$$P_{B_5} = \frac{B_1 \, to \, me \, B_5 Possibility \, of \, loss}{V} = \frac{100}{4500} = 0.02$$

The next step:

On the basis of the above results and calculations, what is known as the TRANSITION PROBABILITIES MATRIX is calculated based on what has been obtained from the percentages that express the percentages of customer loss within the market share of each bank, as follows:
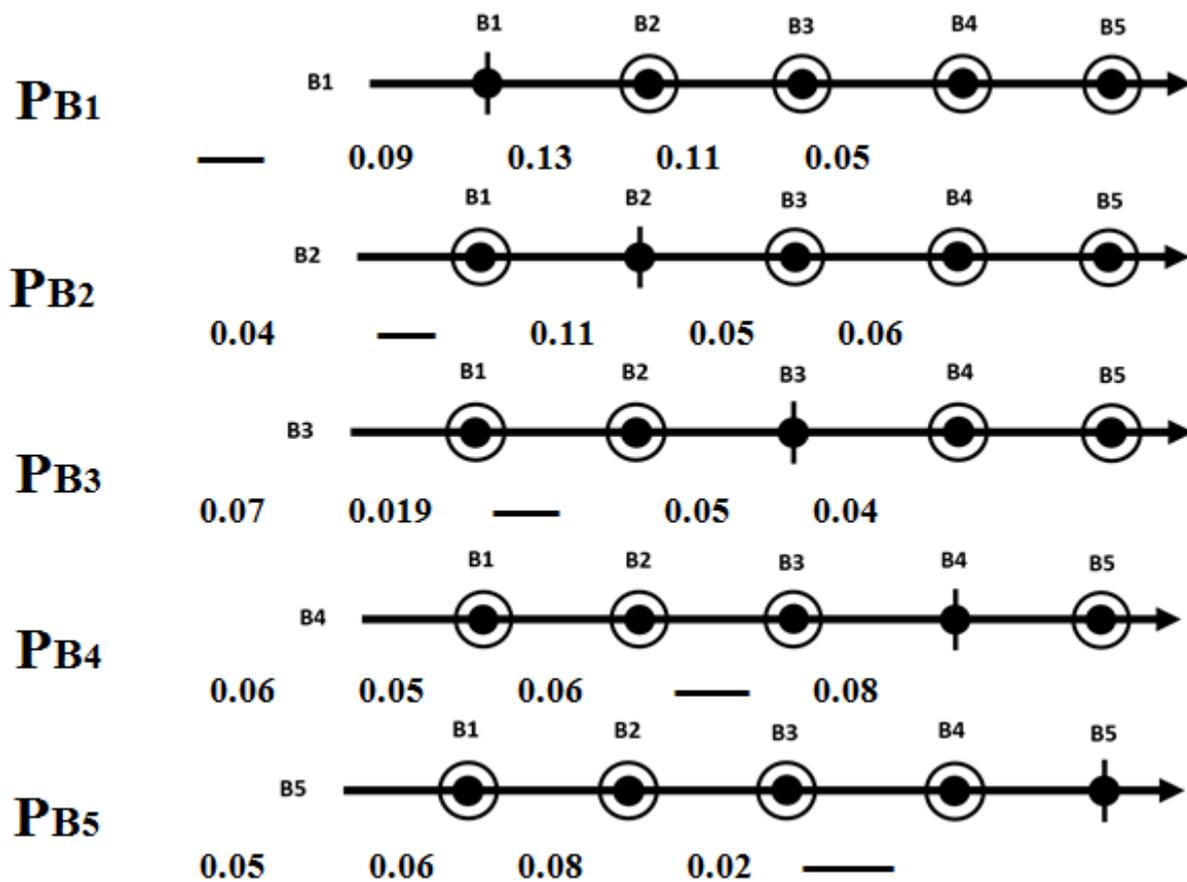
The construction of the transitional probability matrix is based on the above percentages, where it is placed within the matrix as follows:

$$
\begin{array}{c}
B1 \\
B2 \\
B3 \\
B4 \\
B5
\end{array}
\begin{bmatrix}
\text{——} & 0.09 & 0.13 & 0.11 & 0.05 \\
0.04 & \text{——} & 0.11 & 0.05 & 0.06 \\
0.07 & 0.019 & \text{——} & 0.05 & 0.04 \\
0.06 & 0.05 & 0.06 & \text{——} & 0.08 \\
0.05 & 0.06 & 0.08 & 0.02 & \text{——}
\end{bmatrix}
$$

The ratios of the retention force probabilities are added to the loss probability ratios. The probability total, which is equal to 1, is obtained from each of the five banks of the study sample. Therefore, the sum of the percentages of each bank is: 0.61 + 0.09 + 0.13 + 0.11 + 0.05 = 1

And so on for the rest, then we get the automated matrix:

$$
\begin{array}{c}
 & \begin{array}{ccccc} B1 & B2 & B3 & B4 & B5 \end{array} \\
\begin{array}{c} B1 \\ B2 \\ B3 \\ B4 \\ B5 \end{array}
&
\left[
\begin{array}{ccccc}
0.61 & 0.09 & 0.13 & 0.11 & 0.05 \\
0.04 & 0.72 & 0.11 & 0.05 & 0.06 \\
0.07 & 0.019 & 0.80 & 0.05 & 0.04 \\
0.06 & 0.05 & 0.06 & 0.75 & 0.08 \\
0.05 & 0.06 & 0.08 & 0.02 & 0.77
\end{array}
\right]
\end{array}
$$

Market for the month of January at the beginning of the new year 1/1/2020, given that no change occurred when moving from 12/31/2019 to 1/1/2020, therefore, what is required here is the application of Markov chains and specifically the transitional possibilities matrix to predict the market share for these five banks, the study sample (whether private or governmental) is for the next quarter, which is from 1/1/2020 to 3/31/2020. Accordingly, the year 2020 is the target in this problem, and on this basis, the first bank is BANK No.1 per month. Who is the first of the year 2020, earning its share in the month of January of this year is calculated as follows:

$$B_1 = \frac{4400}{23500} = 0.19$$

$$B_2 = \frac{4400}{23500} = 0.19$$

$$B_3 = \frac{5200}{23500} = 0.22$$

$$B_4 = \frac{5000}{23500} = 0.21$$

$$B_5 = \frac{4500}{23500} = 0.19$$

The total number of shares for the first month (January 2020) is 0.19 + 0.19 + 0.22 + 0.21 + 0.19 = 1

These shares can be placed in a horizontal vector frame, as follows:

B1	B2	B3	B4	B5
0.19	0.19	0.22	0.21	0.19

In order to calculate the shares of these five banks in February 2020, based on the WIN Q.S.B program, it is as follows:

$$\begin{bmatrix} 0.61 & 0.09 & 0.13 & 0.11 & 0.05 \\ 0.04 & 0.72 & 0.11 & 0.05 & 0.06 \\ 0.07 & 0.019 & 0.80 & 0.05 & 0.04 \\ 0.06 & 0.05 & 0.06 & 0.75 & 0.08 \\ 0.05 & 0.06 & 0.08 & 0.02 & 0.77 \end{bmatrix}$$

The calculation process is done according to the calculator program as follows:

1- Calculation the share of BANK NO.1 stake in February 2020 according to the WIN Q.S.B program as follows:

$= [(0.19)(0.61) + (0.19)(0.04) + (0.22)(0.07) + (0.21)(0.6) + (0.19)(0.05)]$
$= (0.116) + (0.008) + (0.015) + (0.013) + (0.10) = 0.267$

2- Calculating the share of BANK NO.2 stake in February 2020 according to the WIN Q.S.B program as follows:

$= [(0.19)(0.09) + (0.19)(0.72) + (0.22)(0.019) + (0.21)(0.05) + (0.19)(0.06)]$
$= (0.17) + (0.137) + (0.004) + (0.011) + (0.012) = 0.334$

3- Calculating the share of BANK NO.3 stake in February 2020 according to the WIN Q.S.B program as follows:

$= [(0.19)(0.13) + (0.19)(0.11) + (0.22)(0.80) + (0.21)(0.06) + (0.19)(0.08)]$
$= (0.025) + (0.021) + (0.176) + (0.013) + (0.015) = 0.250$

4- Calculating the share of BANK NO.4 stake in February 2020 according to the WIN Q.S.B program as follows:

$= [(0.19)(0.11) + (0.19)(0.05) + (0.22)(0.05) + (0.21)(0.75) + (0.19)(0.20)]$
$= (0.021) + (0.010) + (0.011) + (0.16) + (0.038) = 0.240$

5- Calculation the share of BANK's No.5 stake in February 2020 according to the WIN Q.S.B program as follows:

$= [(0.19)(0.05) + (0.19)(0.06) + (0.22)(0.04) + (0.21)(0.08) + (0.19)(0.77)]$
$= (0.010) + (0.012) + (0.01) + (0.01) + (0.15) = 0.192$

In the same way, market shares are obtained from customers for the month of March 2020, as follows:

Bank No.1 =0.280
Bank No.2 =0.276
Bank No.3 =0.250
Bank No.4 =0.278
Bank No.5 =0.198

On this basis, the matrix expressing market shares for the first quarter of the year is as follows:

	B1	B2	B3	B4	B5
January	0.190	0.190	0.220	0.210	0.190
February	0.267	0.334	0.250	0.240	0.192
March	0.280	0.276	0.250	0.278	0.198
April					
March	Same as previous way The shares of the five banks: the study sample				
June					
July					
Father					
September					
October 1					
October 2					
December					
		End of the year 2020			

It is clear from the above that the group of competing banks, whether governmental or private, can know the size of the expected market share for one season or more, or perhaps even until the end of the year 2020.

Conclusions and Recommendations

Conclusions

First: Quantitative methods support the process of rationalising decisions related to calculating market shares from customers.

Second: The quantitative approach can be integrated with the descriptive approach in calculating market shares from customers.

Third: The number and amount of market share from customers is calculated for the first semester of the year 2020, after which market share from customers is calculated for the second semester, and on this the other market shares are calculated.

Fourth: Calculating the market shares for the late third or fourth semesters of the year are less reliable than the first and second semester, and the reason is due to the indicators of the internal and external environment.

Fifth: Building scenarios according to the descriptive approach requires the skill and competence of workers in building and formulating these scenarios in order to express realistically the future market shares in complement with the methods of the quantitative approach.

Recommendations

1- The necessity of adopting the methods of the quantitative and descriptive approach in supporting integrated assessment and calculation of market shares from customers.
2- Paying attention to the process of building scenarios in order to properly express the reality of the situation and to ensure that market shares are calculated correctly.
3- The researchers recommend that it is necessary to accurately calculate the transitions probability matrix, as it is the basis for calculating future market shares.
4- The need to pay attention to external and internal indicators in the process of estimating market shares and taking them into consideration.
5- The necessity of knowledge communication with all scientific institutions in order to be acquainted with the latest methods, especially with regard to the implementation of the WINQ.S.B program.

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