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Mathematical Modeling of Marketing Research

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Abstract: ***As a result of the respondents' survey, statistical data were obtained in three areas of the Georgian consumer market: product prices, tuition fees in higher education, the number of people wishing to travel to the parts of Georgia. Using this marketing information, regressive and autoregressive models of variable values are constructed.***

Keywords: respondent, marketing, statistics, modeling

1. Introduction

In marketing research, in addition to marketing methods, probabilistic-statistical methods are essentially used. For example, regression analysis has been used in many marketing studies - see the literature cited in [1] and also [2], [3], [4] in the paper.

In addition to marketing methods, probabilistic-statistical methods are mainly used in marketing research. For example, regression analysis has been used in many marketing studies - see the literature cited in [1] and also [2], [3], [4] in the paper.

Please, note that the marketing information is obtained from the respondents of Tbilisi.

Built models have the following look:

Linear regression equation
$X(t)=a(t)+b$

The indicative equation
$X9t)=ba^t$

First-order autoregressive equation
$X(t)=aX(t-1)+b$

Second-order auto regressive equation
$X(t)=aX(t-1)+bX(t-2)+c$

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Table 3.1: Average prices acceptable for students

Time t	1	2	3	4	5	6	7	8	9	10	11	12
Price Y(t)	1000	900	1100	1200	1000	1000	1500	1000	1200	1000	1100	1000

Linear regression equation
$Y(t) = 5.5944t + 1047$ $R^2 = 0.0162$

First-order autoregressive equation
$Y(t)=-0.3846*Y(t-1)+1533$

The indicative equation
$X(t) = 1036.8e0.0054t$ $R^2 = 0.0209$

Second-order autoregressive equation
$Y(t)=0+0.363Y(t-1)+0.639Y(t-2)$

Georgian Technical University

Table 3.2: Average prices acceptable for students

Time t	1	2	3	4	5	6	7	8	9	10	11	12
Price Y(t)	1500	1200	1400	1000	1000	1200	1600	1500	1200	1100	1000	1200

Linear regression equation
$Y(t) = -15.035t + 1339.4$ $R^2 = 0.0661$

First-order autoregressive equation
$Y(t)=0.326*Y(t-1)+821.15$

The indicative equation
$Y(t)= 1323.2e-0.012t$ $R^2 = 0.0644$

Second-order autoregressive equation
$Y(t)=0+0.887Y(t-1)+0.092Y(t-2)$

Agricultural Univesity of Georgia

Table 3.3: Average prices acceptable for students

Time t	1	2	3	4	5	6	7	8	9	10	11	12
Price Y(t)	1600	1500	1600	1700	1800	1700	1800	1800	1600	1500	1400	1400

Linear regression equation
Y(t) = -14.685t + 1712.1 R^2 = 0.1303

The indicative equation
Y(t) = 1715.8e-0.01t R^2 = 0.1469

First-order autoregressive equation
Y(t)=0.8043*Y(t-1)+310.87

Second-order autoregressive equation
Y(t)=0+1.148Y(t-1)-0.15460Y(t-2)

Free University

Table 3.4: Average prices acceptable for students

Time t	1	2	3	4	5	6	7	8	9	10	11	12
Price Y(t)	3000	3200	4000	3500	3000	2900	3500	3300	3400	3000	3100	3000

Linear regression equation
Y(t) = -24.126t + 3398.5 R^2 = 0.075

The indicative equation
Y(t) = 3376.1e-0.007t R^2 = 0.07

First-order autoregressive equation
Y(t)=0.141*Y(t-1)+2804.85

Second-order autoregressive equation
Y(t)=0+0.866Y(t-1)+0.1216Y(t-2)

Adjara

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	22	16	20	18	24	20	21	18	25	20

Linear regression equation
Y(t) =0.2424t + 19.067 R^2 = 0.0709

The indicative equation
Y(t) = $18.916e^{0.0122t}$ R^2 = 0.0748

First-order autoregressive equation
Y(t)=-0.4235*Y(t-1)+28.879

Second-order autoregressive equation
Y(t)=0+0.218Y(t-1)+0.817Y(t-2)

Guria

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	16	18	16	20	22	24	15	14	18	16

Linear regression equation
Y(t)=0.2424t + 19.067 R^2 = 0.0173

The indicative equation
Y(t) = $18.526e^{-0.009t}$ R^2 = 0.0748

First-order autoregressive equation
Y(t)=0.246*X(t-1)+13.65

Second-order autoregressive equation
Y(t)=0+0.83Y(t-1)+0.138Y(t-2)

Imereti

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	15	12	16	20	22	14	15	14	18	16

Linear regression equation
Y(t)=0.2424t + 19.067 R^2 = 0.012

The indicative equation
Y(t)=$15.215e^{0.0087t}$ R^2 = 0.0214

First-order autoregressive equation
Y(t)=0.188*Y(t-1)+13.283

Second-order autoregressive equation
Y(t)=0.804Y(t-1)+0.204Y(t-2)

Kakheti

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	20	18	22	23	19	20	18	17	19	22

Linear regression equation
Y(t)=0.2424t + 19.067 R^2 = 0.0167

The indicative equation
Y(t) = $20.201e^{-0.004t}$ R^2 = 0.0184

First-order autoregressive equation
Y(t)=0.169*Y(t-1)+16.471

Second-order autoregressive equation
Y(t)=0.846Y(t-1)+0.1717Y(t-2)

Mtskheta Mtianeti

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	30	25	20	21	22	20	23	19	18	21

Linear regression equation
Y(t)=0.2424t + 19.067 R^2 = 0.4775

The indicative equation
Y(t) = $26.114e^{-0.034t}$ R^2 = 0.4815

First-order autoregressive equation
Y(t)=0.287*Y(t-1)+14.685

Second-order autoregressive equation
Y(t)=0.855Y(t-1)+0.102Y(t-2)

Racha

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	16	12	14	10	11	18	14	11	16	12

Linear regression equation
$Y(t) = 0.2424x + 19.067$ $R^2 = 0.0008$

The indicative equation
$Y(t) = 13.296e^{-0.002t}$ $R^2 = 0.0007$

First-order autoregressive equation
Y(t)=-0.29*Y(t-1)+17.06

Second-order autoregressive equation
Y(t)=0.516Y(t-1)+0.457Y(t-2)

Samegrelo

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	18	20	19	21	24	15	14	14	15	16

Linear regression equation
$Y(t) = 0.2424t + 19.067$ $R^2 = 0.03452$

The indicative equation
$Y(t) = 21.361^{e-0.038t}$ $R^2 = 0.03833$

First-order autoregressive equation
Y(t)=0.503*Y(t-1)+8.607

Second-order autoregressive equation
Y(t)=0.805Y(t-1)+0.148Y(t-2)

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	12	14	10	18	16	11	12	11	14	12

Linear regression equation
$Y(t) = 0.2424t + 19.067$ $R^2 = 0.0175$

The indicative equation
$Y(t) = 13.284e^{-0.007t}$ $R^2 = 0.0125$

First-order autoregressive equation
Y(t)=-0.165*Y(t-1)+15.29

Second-order autoregressive equation
Y(t)=0.498Y(t-1)+0.469Y(t-2)

Svaneti

Table 3.1: Number of Tourists

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	20	18	22	24	18	20	14	16	18	20

Linear regression equation
$Y(t) = 0.2424t + 19.067$ $R^2 = 0.01378$

The indicative equation
$Y(t) = 20.85e^{-0.019t}$ $R^2 = 0.01362$

First-order autoregressive equation
Y(t)=0.24*Y(t-1)+14.51

Second-order autoregressive equation
Y(t)=0.626Y(t-1)+0.369Y(t-2)

Kvemo Kartli

Time t	1	2	3	4	5	6	7	8	9	10
Number Y(t)	14	12	16	10	8	10	12	11	12	10

Linear regression equation
$Y(t) = 0.2424t + 19.067$ $R^2 = 0.1831$

The indicative equation
$Y(t) = 12.973e^{-0.025t}$ $R^2 = 0.151$

First-order autoregressive equation
Y(t)=0.129*Y(t-1)+9.72

Second-order autoregressive equation
Y(t)=0.599Y(t-1)+0.35Y(t-2)

References

[1] Malhotza N.K. (2008). Marketing Research: An Applied Orientation. New Jersey.
[2] Todua N. Maghlakelidze K. (2019).Marketing Research on Food Consumers' Behavior in Georgia's consumer market: British Journal of Marketing Studies (BJMS) Vol. 7, Issue 4, pp.76-82.
[3] Babilua P. Maghlakelidze K. (2019). On The Marketing Investigation Of The Behavior Of Higher Education Consumers In Georgia: British Journal of Marketing Studies (BJMS) Vol. 7, Issue 6, pp.32-34
[4] Babilua P., Maglakelidze K. (2019).Marketing Investigation of the Behavior of Tourists in Georgia: International Journal of Science and Research (IJSR) ISSN: 2319-7064