**MACHAKOS UNIVERSITY**

**SCHOOL OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF ECONOMICS AND STATISTICS**

**EES 404**

**GROUP RESEARCH PROJECT**

**ASSIGNMENT 2**

**TOPIC OF THE RESEARCH**

Factors Influencing Performance of Businesses ran by Machakos University Students

**Purpose of the Study**

To examine factors that influence performance of businesses that are ran by the Mksu Students in and off-campus

**Part 1 Model Specification and Data Collection (20 marks)**

1. Identify five most common businesses ran by students

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Please indicate the types of your business** | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Cyber | 9 | 10.3 | 18.0 | 18.0 |
| Sale of shoes | 2 | 2.3 | 4.0 | 22.0 |
| Sale of clothes | 6 | 6.9 | 12.0 | 34.0 |
| Fast foods | 8 | 9.2 | 16.0 | 50.0 |
| Nail parlour | 5 | 5.7 | 10.0 | 60.0 |
| Boda Boda | 3 | 3.4 | 6.0 | 66.0 |
| Shop | 4 | 4.6 | 8.0 | 74.0 |
| Salon/Barber fruits | 2 | 2.3 | 4.0 | 78.0 |
| Restaurant and bar | 4 | 4.6 | 8.0 | 86.0 |
| Others | 7 | 8.0 | 14.0 | 100.0 |
| Total | 50 | 57.5 | 100.0 |  |
| Missing | System | 37 | 42.5 |  |  |
| Total | | 87 | 100.0 |  |  |

Cyber, Fast foods, Others, sale of clothes and Nail parlour with frequencies of 9,8,7,6, and 5 respectively are the five preferred common business by the students.

1. Develop a model for factors that influence performance of these businesses. State the dependent and independent variables. Explain the economic theory on which your model is based.

3. Collect data from at least 50 businesses being operated in and around Machakos University by the Students using the questionnaire attached.

4. Code the data appropriately and enter it on SPSS/STATA for analysis.

**Part 2 Data Analysis (40 marks)**

Using the data collected from the survey perform the following tasks.

1. Give summary statistics of the continuous variables (2 marks)

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| --- | --- | --- | --- | --- | --- |
| **Descriptive Statistics** | | | | | |
|  | N | Minimum | Maximum | Mean | Std. Deviation |
| Kindly indicate the average number of customers per day | 50 | 2 | 100 | 28.82 | 28.174 |
| Kindly indicate the average monthly revenue/sales of your product...(ksh) | 50 | 2000 | 200000 | 39554.00 | 38987.341 |
| Kindly indicate the daily expenses incurred in the business....(ksh) | 50 | 50 | 20000 | 2387.50 | 4178.939 |
| Kindly indicate for how long you have been running the business...(Months | 50 | 1 | 60 | 11.38 | 11.144 |
| Valid N (listwise) | 50 |  |  |  |  |

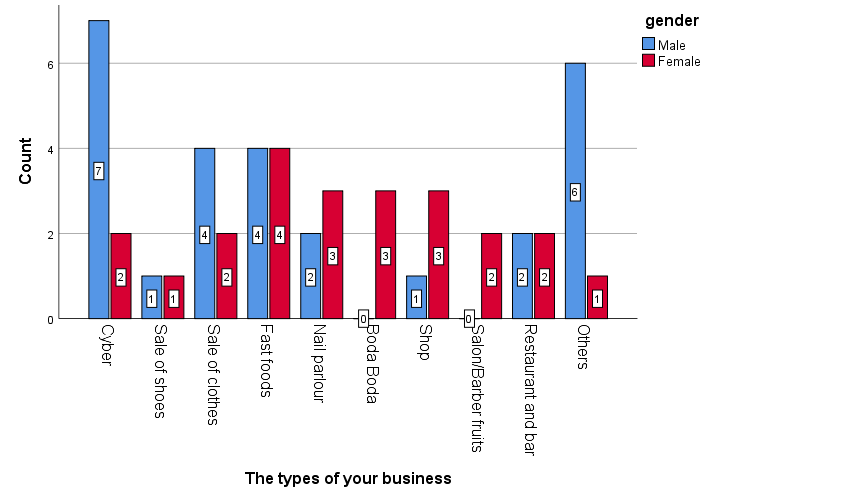
The minimum number of customers per day was 2, and the maximum was 100.

The minimum monthly revenue of the business was 2000, and the maximum was 200000, with a mean of 39554 and standard deviation of 38987.341.

The minimum daily expenses of the business was 50, and the maximum was 20000, with a mean of 2387.50 and standard deviation of 4178.939.

The minimum period of running the business was 1 month, and the maximum was 60 months, with a mean of 11.38 and standard deviation of 11.144.

1. Draw a bar chart of the top 4 most frequent types of businesses across the gender. Label the bar chart appropriately.



For male: Cyber, others, fast foods and sell of clothes were the most preferred type of business, with frequencies of 7, 6, 4 and 4 respectively.  
For female: Fast food, Nail parlour, Shop and Boda-boda were the most preferred type of business with frequencies of 4, 3, 3 and 3 respectively

1. Conduct the appropriate test to evaluate the following
2. The significance of the relationship between nature/type of business and gender of the business of the owner/manager

Ho: There is a significant relationship between gender and the type of business

Hi: There is no significant relationship between gender and the type of business

|  |  |  |  |
| --- | --- | --- | --- |
| **Chi-Square Tests** | | | |
|  | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 12.979a | 9 | .164 |
| Likelihood Ratio | 15.443 | 9 | .079 |
| Linear-by-Linear Association | .327 | 1 | .567 |
| N of Valid Cases | 50 |  |  |
| a. 20 cells (100.0%) have expected count less than 5. The minimum expected count is .92. | | | |

The p-value is 0.164 which is greater than 0.05, we accept Ho and conclude that there is a significant relationship between gender and the type of business

1. The significance of the relationship between the location of the business and the type of the business

Ho: There is a significant relationship between the location of the business and the type of business

Hi: There is no significant relationship between the location of the business and the type of business

|  |  |  |  |
| --- | --- | --- | --- |
| **Chi-Square Tests** | | | |
|  | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 61.948a | 36 | .005 |
| Likelihood Ratio | 67.172 | 36 | .001 |
| Linear-by-Linear Association | .000 | 1 | .998 |
| N of Valid Cases | 50 |  |  |
| a. 50 cells (100.0%) have expected count less than 5. The minimum expected count is .24. | | | |

The p-value is 0.05, which is equal to 0.05; we accept Ho and conclude that there is a significant relationship between the location of the business and the type of business

1. Whether the mean daily sales are statistically significantly different across the various types of businesses

Ho, Means daily sales is not equal for all types of businesses.

Hi, Means daily sales is equal for all types of businesses.

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| --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | |
| The types of your business | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 132.497 | 24 | 5.521 | .410 | .984 |
| Within Groups | 336.783 | 25 | 13.471 |  |  |
| Total | 469.280 | 49 |  |  |  |

The p-value is 0.984, which is greater than 0.05, we accept Ho and conclude that means daily sales is not equal for all types of businesses.

d) Whether data on performance of business (No 13), factors influencing performance of business (No. 11), and daily expenses of business (No 12) are normally distributed.

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| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | df | Sig. | Statistic | df | Sig. |
| The cost of living has generally increased | .318 | 50 | .000 | .766 | 50 | .000 |
| The performance of the business has improved | .264 | 50 | .000 | .845 | 50 | .000 |
| The profits have been high | .291 | 50 | .000 | .827 | 50 | .000 |
| The number of customers have been high | .351 | 50 | .000 | .807 | 50 | .000 |
| The sales have been high | .290 | 50 | .000 | .816 | 50 | .000 |
| Price of the product | .357 | 50 | .000 | .800 | 50 | .000 |
| Prices of related products (substitute or complementary) | .287 | 50 | .000 | .841 | 50 | .000 |
| Type of the business | .380 | 50 | .000 | .720 | 50 | .000 |
| Location of the business | .304 | 50 | .000 | .824 | 50 | .000 |
| Number of competitors | .250 | 50 | .000 | .876 | 50 | .000 |
| Population density of the area | .269 | 50 | .000 | .850 | 50 | .000 |
| The cost of running the business has increased | .301 | 50 | .000 | .797 | 50 | .000 |
| The prices of raw materials has increased | .282 | 50 | .000 | .780 | 50 | .000 |
| a. Lilliefors Significance Correction | | | | | | |

From the above observations on performance of business (No 13), factors influencing performance of business (No. 11) and daily expenses of business (No 12) the p-value is less than 0.05 suggesting the data is not normally distributed.

1. Conduct the appropriate regression analysis to estimate the following models
2. Sales/revenue model as a function of monthly expenses, number of customers per day, and age of business. Interpret the estimated revenue model

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| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .402a | .162 | .107 | 36846.120 |
| a. Predictors: (Constant), Kindly indicate for how long you have been running the business...(Months, Kindly indicate the average number of customers per day, The daily expenses incurred in the business | | | | |

R-squared is 0.162; this means that the independent variables explains 16.2% of the change in the dependent variable (average monthly revenue/sales).

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| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 12029342464.888 | 3 | 4009780821.629 | 2.954 | .042b |
| Residual | 62451281735.112 | 46 | 1357636559.459 |  |  |
| Total | 74480624200.000 | 49 |  |  |  |
| a. Dependent Variable: Kindly indicate the average monthly revenue/sales of your product...(ksh) | | | | | | |
| b. Predictors: (Constant), Kindly indicate for how long you have been running the business...(Months, Kindly indicate the average number of customers per day, The daily expenses incurred in the business | | | | | | |

The level of significance is 0.042 this is less than 0.05, this means that the variables are jointly significant.

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| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 22468.303 | 9412.643 |  | 2.387 | .021 |
| The daily expenses incurred in the business | 3.095 | 1.317 | .332 | 2.349 | .023 |
| Kindly indicate the average number of customers per day | 201.887 | 187.077 | .146 | 1.079 | .286 |
| Kindly indicate for how long you have been running the business...(Months | 340.866 | 493.980 | .097 | .690 | .494 |
| a. Dependent Variable: Kindly indicate the average monthly revenue/sales of your product...(ksh) | | | | | | |

When holding all factors constant the average monthly revenue/ sales is 22468.303.

For each unit increase in the daily expenses incurred in the business, the average monthly revenue /sales increases by 3.095

For each unit increase in the average number of customers, the average monthly revenue /sales increases by 201.887

For each unit increase in the months running the business, the average monthly revenue /sales increases by 340.866

The daily expenses incurred in the business is statistically significant at 5% level of significance, this implies that it is crucial in determining the average monthly revenue /sales.

1. Performance of business (No 13) as a function of factors influencing business (No. 11) and cost of business (No 12).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter Estimates** | | | | | | | | |
|  | | Estimate | Std. Error | Wald | df | Sig. | 95% Confidence Interval | |
| Lower Bound | Upper Bound |
| Threshold | [Performanceofbusiness = 1.00] | -1.963 | 1.274 | 2.371 | 1 | .124 | -4.460 | .535 |
| [Performanceofbusiness = 1.25] | -.875 | 1.196 | .534 | 1 | .465 | -3.219 | 1.470 |
| [Performanceofbusiness = 1.50] | -.603 | 1.189 | .257 | 1 | .612 | -2.933 | 1.727 |
| [Performanceofbusiness = 1.75] | -.369 | 1.184 | .097 | 1 | .755 | -2.690 | 1.952 |
| [Performanceofbusiness = 2.00] | .291 | 1.182 | .060 | 1 | .806 | -2.026 | 2.607 |
| [Performanceofbusiness = 2.25] | .780 | 1.186 | .433 | 1 | .511 | -1.545 | 3.105 |
| [Performanceofbusiness = 2.50] | 1.110 | 1.191 | .867 | 1 | .352 | -1.226 | 3.445 |
| [Performanceofbusiness = 2.75] | 1.281 | 1.195 | 1.150 | 1 | .284 | -1.061 | 3.623 |
| [Performanceofbusiness = 3.00] | 2.075 | 1.216 | 2.912 | 1 | .088 | -.308 | 4.459 |
| [Performanceofbusiness = 3.25] | 2.198 | 1.221 | 3.242 | 1 | .072 | -.195 | 4.590 |
| [Performanceofbusiness = 3.75] | 2.330 | 1.226 | 3.612 | 1 | .057 | -.073 | 4.732 |
| [Performanceofbusiness = 4.00] | 3.265 | 1.284 | 6.462 | 1 | .011 | .748 | 5.783 |
| [Performanceofbusiness = 4.25] | 3.577 | 1.317 | 7.375 | 1 | .007 | .995 | 6.158 |
| [Performanceofbusiness = 4.50] | 4.007 | 1.379 | 8.436 | 1 | .004 | 1.303 | 6.710 |
| Location | factorsinfluencingbusiness | .095 | .275 | .119 | 1 | .730 | -.444 | .634 |
| costofbusiness | .127 | .220 | .335 | 1 | .563 | -.304 | .559 |
| Link function: Logit. | | | | | | | | |

For every one-unit increase on factors, influencing business there is a predicted increase of 0.095 in the log odds of falling at a higher level on the performance of the business.

For every one unit increase on the cost of business there is a predicted increase of 0.127 in the log odds of falling at a higher level on the performance of the business

The cost of business and factors influencing business are statistically insignificance in determining the performance of the business

1. Generate the dummy variables for the five most frequent types of businesses. Conduct the appropriate regression analysis to estimate the monthly revenue model as a function of daily number of customers, period of existence of the business, daily expenses and the dummy variables of the 5 most frequent types of businesses. Interpret your estimated model.

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| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .591a | .349 | .240 | 33981.524 |
| a. Predictors: (Constant), Sale of clothes, Kindly indicate the average number of customers per day, Kindly indicate for how long you have been running the business...(Months, Others, Cyber, The daily expenses incurred in the business, Fast foods | | | | |

R-squared is 0.349; this means that the independent variables explains 34.9% of the change in the dependent variable (average monthly revenue).

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| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 25981376145.710 | 7 | 3711625163.673 | 3.214 | .008b |
| Residual | 48499248054.290 | 42 | 1154744001.293 |  |  |
| Total | 74480624200.000 | 49 |  |  |  |
| a. Dependent Variable: Kindly indicate the average monthly revenue/sales of your product...(ksh) | | | | | | |
| b. Predictors: (Constant), Sale of clothes, Kindly indicate the average number of customers per day, Kindly indicate for how long you have been running the business...(Months, Others, Cyber, The daily expenses incurred in the business, Fast foods | | | | | | |

The level of significance is 0.008 this is less than 0.05, this means that the variables are jointly significant

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 48023.844 | 11727.892 |  | 4.095 | .000 |
| Kindly indicate the average number of customers per day | 246.509 | 179.646 | .178 | 1.372 | .177 |
| Kindly indicate for how long you have been running the business...(Months | -187.415 | 486.063 | -.054 | -.386 | .702 |
| The daily expenses incurred in the business | 3.196 | 1.290 | .343 | 2.477 | .017 |
| Cyber | -27976.310 | 14244.004 | -.278 | -1.964 | .056 |
| Fast foods | -40150.812 | 15175.303 | -.381 | -2.646 | .011 |
| Others | -33487.936 | 15361.815 | -.301 | -2.180 | .035 |
| Sale of clothes | -41029.169 | 16683.855 | -.345 | -2.459 | .018 |
| a. Dependent Variable: Kindly indicate the average monthly revenue/sales of your product...(ksh) | | | | | | |

When holding all factors constant the average monthly revenue/ sales is 48023.844.

For each unit increase in the daily expenses incurred in the business, the average monthly revenue /sales increases by 3.196

For each unit increase in the average number of customers, the average monthly revenue /sales increases by 246.509

For each unit increase in the months running the business, the average monthly revenue /sales decreases by 187.415

A cyber business is associated with an expected decrease in revenue by approximately 27976.310 compared to nail parlour

Fast-food businesses are associated with an expected decrease in revenue by approximately 40150.812 compared to nail parlour.

Other businesses are associated with an expected decrease in revenue by approximately 33487.936 compared to nail parlour.

Sale of clothes are associated with an expected decrease in revenue by approximately 41029.169 compared to nail parlour.

The daily expenses incurred in the business, fast foods, others and sale of clothes are statistically significant at 5% level of significance, this implies that they are crucial in determining the average monthly revenue /sales.