BALA301 – Emerging Techniques in Business Analytics

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Abstract –

The overall objective of this report is to utilize various business analysis techniques taken from BALA301 and analyse a given dataset portraying managerial perceptions of different independent variables that hold an effect on the overall digital business performance of a small fashion business in the southeast of the United States. Methods used for analysis will be both descriptive and prescriptive analytics, statistical frequency tests, multiple linear regression tests, coefficient tests, and model summary tests. Some limitations that will be faced upon analysis will be finite social media marketing goals (SM MKTG Goals), a restricted sample size of 3,000 followers of the small business's social media, and the absence of clustering, topic modelling, and various text classifier techniques used in analysis. The findings generated from analysis are as follows: All hypothesis were confirmed true as KPIs AWR, ENG, CON, and RET were found to have significant relation and explain DV DBP.

Introduction -

In this report we will be uncovering analysis of the relationship of various Key Performance Indicators (KPIs) such as Awareness (AWR), Engagement (ENG), Conversion (CON), and Retention (RET) and their relationship with a small fashion business's Digital Business Performance (DBP). Various analysis techniques will be applied using data sourced from a social media platform (i.e., Facebook Insights), and a dataset of a company's managerial perceptions of AWR, ENG, CON, and RET after 2 years of implementing social media analytics. After thorough review of an article titled "Mapping social media analytics for small business: A case study of business analytics" (Kim, 2021) we will review the business analytics process and interpret the strategy making map associated with such process. We will also be trying to determine if different IV's (KPI's) have significant impact on the DV (DBP) and how this impacts the business's Social Media Goals (SMG), sales growth, profitability, return on investment, and overall financial performance. The purpose of this research is to try and create a winning strategy based on insightful business analytics to achieve multiple social media goals at once by implementing one single marketing strategy. We must also keep in mind that when creating such winning marketing strategy not all KPI's are considered and depending on our goals KPI's are chosen and analysed. It will be vital that once our KPI's are selected and our strategy is developed that we run this in the market,

measure effectiveness, and re-run descriptive and predictive analysis based on changes of our KPI's and strategy.

Relevant literature and hypotheses -

Upon critical review of the given case study article, we gain valuable insights into how each SM MKTG Goal and KPI is measured and what value it holds for the company. All KPIs will be tested to determine if they play a role in the business's digital performance. We will first look at awareness. Awareness can be seen to be as an important KPI as it provides effective online strategy through impressions, reach, number of followers, etc. It is mentioned that "businesses need to have an effective online strategy to increase brand awareness and grow." (Paun, 2022) Awareness has also been proven to be a previous driving factor in performance, for example, "Results from a cross-industry study of more than 300 B2B firms show that brand awareness significantly drives market performance" (Homburg et al., 2010). If we want to make the most out of the digital marketing strategy, we must make sure that AWR is performing at its best and will be tested to see where AWR stands among the influence of the DBP.

H1. *Independent Variable AWR has a significant impact on the dependant variable DBP.*

Engagement between consumers and the business is also a very important driving factor in DBP. Page views, number of mentions, and email list growth are all KPI's of SM MKTG goal ENG. A study by Constellation Research reported that "companies who improve engagement can increase cross-sell revenue by 22 percent, up-sell revenue by 38 percent and order size by 5 to 85 percent." (Fertik, 2019) This is important as it directly effects SM MKTG goals. Furthermore, we will be testing ENG for such reasons and see if there is a present relationship with the DBP.

H2. *Independent Variable ENG has a significant impact on the dependant variable DBP.*

The third independent variable being tested will be the business's conversion. Conversion is the action of turning a lead or reach into a physical action or sale. Creating action from a call-to-action (CTA) as result of our marketing strategy is the goal. This is goal is important to the small business as it is mentioned in the given article that *"*Businesses

should always improve the conversion rates" (Kim, 2021). For such reasons we will be analysing CON and drawing conclusions to if this IV has any effect on the DBP.

***H3**. Independent Variable CON has a significant impact on the dependant variable DBP.*

Lastly, we will engage in the analysis on independent variable RET or retention. Retention is the company's ability to retain conversions over a given period as said by *Dormand* "retention brings in additional recurring revenue from repeat customers for an extended period of time" (Dormand, 2022). Kim also states that *"*The importance of customer retention cannot be understated. It is one of the most effective time/cost saving strategies for a business's success.*"*(Kim, 2021). From this we can clearly understand the importance of retention and will be testing IV RET against the DBP to see if the business if effectively implementing their KPI.

***H4**. Independent Variable RET has a significant impact on the dependant variable DBP.*

Research design -

Sample:

Our dataset at hand that will be analysed consists of systematic sampling holding 250 responses of managers within the company. The responses are an accrual of opinions regarding the business's KPs, SMGs, and different demographics of the managers. The sample will hold responses of managers that work within small firms with less than 20 employees and larger firms that consist of 200 or more employees. Additionally, the dataset also provides information regarding how much experience in the field of data analytics each manger possesses. This experience ranges anywhere from less than 5 years to more than 10 years in the field of data analytics. Alongside these statistics, demographics such as age and gender will be taken into consideration as well. The 250 responses consist of male, female, and 'do not wish to be disclosed' managers and are spread out among the ages of less than 25 years old all the way up to respondents being older than 45 years. With an assorted dataset at hand, there is a vast distribution of diversity amongst responses and represent the ever-changing, heterogeneous managerial team working in hand with the dynamic business operations and marketing endeavours.

Procedure:

Descriptive analysis of these demographics can be seen below in figures 1-4. Key takeaways from these statistics will be how many managers fall under each category and what portion they contribute to the demographics.

Descriptive Analytics of Managers (all under 250 opinion-based responses):

***FIG.1* - Firm Size (Number of employees)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 20 X	73	29.2	29.2	29.2
20 to less than 200x	112	44.8	44.8	74.0
200 or more x	65	26.0	26.0	100.0
Total	250	100.0	100.0	

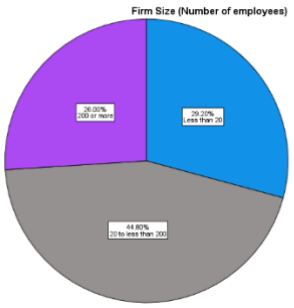


***FIG.3* - Respondents Age**

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 25 years x	28	11.2	11.2	11.2
25 to less than 35 x	94	37.6	37.6	48.8
35 to less than 45 x	56	22.4	22.4	71.2
45 years or more x	72	28.8	28.8	100.0
Total	250	100.0	100.0	

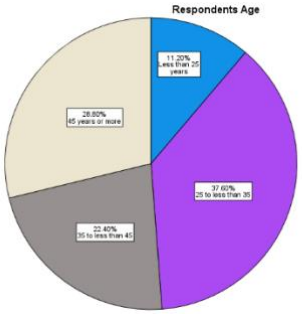


***FIG. 2* - Total Data Analytics Experience**

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 5 years x	99	39.6	39.6	39.6
5 to less than 10 years x	105	42.0	42.0	81.6
10 years or more x	46	18.4	18.4	100.0
Total	250	100.0	100.0	

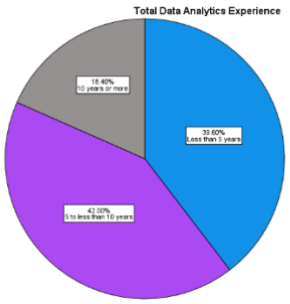
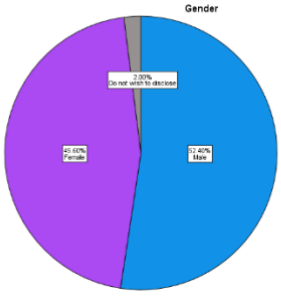


***FIG. 4* - Gender**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male x	131	52.4	52.4	52.4
Female x	114	45.6	45.6	98.0
Do not wish to disclose x	5	2.0	2.0	100.0
Total	250	100.0	100.0	



The target respondents at hand will be analysed not only by their backgrounds and experience but also by critical review of what responses they have made regarding the business's KPIs, and SMGs. Managers were asked to give their opinions on the business's digital performance, awareness, engagement, conversion, and retention. They were asked to relay opinions regarding different variables within each KPI on a scale of 1-7 with 1 = "Strongly Disagree" and 7 = "Strongly Agree". As reference: "As a Manager of Company X, I perceive that:" was the structure answered upon each response. For awareness, managers gave their opinions on "The brand is easily recognisable.", "The brand has a strong social media presence.", and "Customers can quickly recall the brand.". Engagement is "Engage with the online platform to search for brand information.", "Enjoy interacting with its online features.", and "Exchange ideas with others on the platform.". Conversion is "More customers are purchasing the brand.", "Potential customers who browse the site are starting to make purchases.", and "More customers continue to use the brand's website." Lastly, Retention consisted of "Customers provide positive reviews for this brand.", "Share its excellent attributes after making a purchase.", and "Overall, high likelihood of returning to this brand.". Variables that make up the digital business performance are sales growth, profitability, return on interest, and overall digital performance. For more information regarding the digital business performance (DBP) refer to appendices ***FIG.A1-5*** for descriptive analysis of each individual variable.

Measures / Analysis:

In this study different methods of analysis such as bivariate linear regression tests, multiple linear regression tests, frequency distributions, and descriptive analysis will all be implemented via statistical software IBM SPSS in order to better understand the KPIs and SMGs. Frequency distributions and descriptive analysis will provide basic analysis and provide valuable insights into the distribution and characteristics of our variables in our dataset. They will serve as initial exploratory tools to better understand the data before moving on to more advanced statistical analysis. Bivariate and multiple regression tests will be run to examine the relationships between our independent variables (KPIs) and our dependent variable (DBP). Bivariate linear regression is used to determine the strength, direction, and relationship of one independent and one dependent variable. Multiple linear regression extends upon bivariate where there is more than one independent variable and how multiple IVs collectively influence the dependent variable. The strength of which each IV

controls the DV will be determined so we can better understand which IV has the most influence on the DV and create a more effective marketing strategy based upon the results. The outputs of both tests that will be of important information to us will be the significance value, r-squared value (a measure of how well the model fits the data), and the mean average. These results will provide us with an evaluation of the overall goodness-of-fit each relationship holds. It is also noted that for each bivariate and multiple regression test conducted; a 95% level of confidence will be implemented giving the condition that the test is significant if the level of significance is less than < .005.

Findings and implications –

Below you will find four test results looking further into the relationships of the DBP and various KPI's through bivariate linear regression analysis via IBM SPSS. Figures 5-8 display one independent variable against one dependant variable in a single test. From our bivariate regression tests, there will be two key findings. The first finding will be the R-Square value and the second finding will be the significance value. Figure 9 will display the results from our Multiple Regression test and will have three key findings. The keys findings utilized will be the mean value, r-square value, and significance value of each KPI ran against the digital business performance.

Fig. 5 - **Awareness (AWR) - Digital Business Performance (DBP)**

Bivariate Regression:

Model	Variables Entered
1	Awareness

Anova:

Model	R	R Square	Adjusted R Square
1	.711[a]	.506	.504

Coefficients:

Model		Sig.	95.0% Confidence Interval for B	
			Lower Bound	Upper Bound
1	(Constant)	<.001	.898	1.844
	Awareness	<.001	.637	.817

Fig. 6 - **Engagement (ENG) – Digital Business Performance (DBP)**

Bivariate Regression:

Model	Variables Entered
1	Engagement

Anova:

Model	R	R Square	Adjusted R Square
1	.689[a]	.475	.473

Coefficients:

Model		Sig.	95.0% Confidence Interval for B	
			Lower Bound	Upper Bound
1	(Constant)	<.001	.994	1.970
	Engagement	<.001	.621	.808

Fig. 7 - **Conversion (CON) – Digital Business Performance (DBP)**

Bivariate Regression:

Model	Variables Entered
1	Conversion

Avova:

Model	R	R Square	Adjusted R Square
1	.676[a]	.457	.455

Coefficients:

Model		Sig.	95.0% Confidence Interval for B	
			Lower Bound	Upper Bound
1	(Constant)	<.001	1.059	2.052
	Conversion	<.001	.580	.763

Fig. 8 - **Retention (RET) – Digital Business Performance (DBP)**

Bivariate Regression:

Model	Variables Entered
1	Retention

Avova:

Model	R	R Square	Adjusted R Square
1	.611[a]	.373	.371

Coefficients:

Model		Sig.	95.0% Confidence Interval for B	
			Lower Bound	Upper Bound
1	(Constant)	<.001	1.116	2.249
	Retention	<.001	.531	.736

Fig. 9 – **AWR, ENG, CON, RET – Digital Business Performance (DBP)**

Multiple Linear Regression Test -

Descriptive Statistics:

	Mean	N
Digital Business Performance	5.0980	250
Awareness	5.1267	250
Retention	5.3907	250
Conversion	5.2733	250
Engagement	5.0600	250

Model Summary:

Model	R	R Square	Adjusted R Square
1	.780[a]	.609	.603

Coefficients:

Model		Sig.
1	(Constant)	.097
	Awareness	<.001
	Retention	.198
	Conversion	.039
	Engagement	<.001

The data above shown in figures 5-8 are the results of 4 bivariate regression tests consisting of one IV either (AWR, ENG, CON, or RET) run against the single DV (DBP).

In ***Fig.5*** the independent variable at hand (AWR) was found to have a high level of significance of < .001. This confirms our initial hypothesis of awareness holding a significant relationship with dependent variable DBP. The r-squared value which measure the proportion of variation of DBP explained by AWR was found to be .506. This mean that the KPI awareness explains 50.6% of the digital business performance.

In ***Fig.6*** the independent variable being analysed (ENG) was also found to have a high level of significance of < .001 which confirms our hypothesis of engagement holding a significant

relationship with dependent variable DBP. The r-squared value for this relationship is .475, revealing that engagement explains 47.5% of the digital business performance.

In ***Fig.7*** the independent variable being analysed here (CON) was similarly to the previous figures with a level of significance of < .001 confirming that conversion holds a significant relationship with dependent variable DBP. The r-squared value is .457, indicating that conversion explains 47.5 of the digital business performance.

Finally In ***Fig.8*** the independent variable at hand (RET) was found to have a level of significance of < .001 which confirms our hypothesis of retention holding a significant relationship with dependent variable DBP. The r-squared value is .373, suggesting that retention explains for 37.3% of the digital business performance.

Our multiple linear regression test in *Fig.9* gave an output of all KPIs and their relationship with DBP in one single test. We first look at a mean value given for each IV based on all 250 responses added up then divided by 250. AWR has a mean value of 5.13, ENG = 5.06, CON = 5.27, RET = 5.39, and DBP has a mean of 5.10. With an r-squared value of .609, we can conclude that all four KPIs explain 60.9% of the digital business performance. AWR and ENG are the most significant variables having significance values of less than .001. While CON has a significant relation with DBP of only .039. KPI RET was found to be NOT significant in this test with a level of significance of .198 or more than .05.

The findings above can guide the business's marketing strategy in many ways with the first way being the prioritization of awareness, engagement, and conversion in the marketing strategy while reassessing the significance of retention within the marketing strategy in order to improve overall performance in the digital realm of social media.

Recommendations and Conclusion:

As a business analyst I was given the task of analysing a given dataset and finding out whether all variables AWR, ENG, CON, and RET are significant and explain the DBP which was uncovered to be true. Although there are implications. Variable RET was found to be insignificant after the test of multiple regression running all independent variables at once against the dependent variable DBP. I recommend various strategies for future research such as enhancement of the user experience, personalized communication and offers,

implementation of loyalty programs, attention to community value, consistent monitoring of RET, and continuous improvement must be taken into consideration when creating the SM MKTG Goals and strategy making map. Overall evaluation of the business was found to be successful and on track for social media goals such as the business's sales growth, profitability, return on investment, and the overall financial performance.

References:

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Appendices:

Fig.A1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Sales growth	250	1.00	7.00	5.0080	1.42832	-.506	.154
Profitability	250	1.00	7.00	5.0560	1.49593	-.582	.154
Return on investment	250	1.00	7.00	5.2080	1.37269	-.812	.154
Overall financial performance	250	1.00	7.00	5.1200	1.38610	-.764	.154
Valid N (listwise)	250						

Fig.A2

Sales growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	much worse than competitors	6	2.4	2.4	2.4
	2.00	5	2.0	2.0	4.4
	3.00	22	8.8	8.8	13.2
	4.00	54	21.6	21.6	34.8
	5.00	67	26.8	26.8	61.6
	6.00	53	21.2	21.2	82.8
	much better than competitors	43	17.2	17.2	100.0
	Total	250	100.0	100.0	

Fig.A3

Profitability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	much worse than competitors	5	2.0	2.0	2.0
	2.00	8	3.2	3.2	5.2
	3.00	29	11.6	11.6	16.8
	4.00	43	17.2	17.2	34.0
	5.00	50	20.0	20.0	54.0
	6.00	71	28.4	28.4	82.4
	much better than competitors	44	17.6	17.6	100.0
	Total	250	100.0	100.0	

Fig.A4

Return on investment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	much worse than competitors	5	2.0	2.0	2.0
	2.00	6	2.4	2.4	4.4
	3.00	15	6.0	6.0	10.4
	4.00	40	16.0	16.0	26.4
	5.00	67	26.8	26.8	53.2
	6.00	74	29.6	29.6	82.8
	much better than competitors	43	17.2	17.2	100.0
	Total	250	100.0	100.0	

Fig.A5

Overall financial performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	much worse than competitors	5	2.0	2.0	2.0
	2.00	8	3.2	3.2	5.2
	3.00	15	6.0	6.0	11.2
	4.00	46	18.4	18.4	29.6
	5.00	63	25.2	25.2	54.8
	6.00	76	30.4	30.4	85.2
	much better than competitors	37	14.8	14.8	100.0
	Total	250	100.0	100.0	