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RESEARCH ARTICLE

The Impact of Socio-Cognitive Factors and Psychological Attributes on Undergraduates' Entrepreneurial Intention and Intensity in Ghana

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Abstract

Entrepreneurial thinkings and ideas aspire to motivate and nurture Ghanaian students to self-employment and having the intention to start new jobs or ventures. Undergraduates and graduate students possess a great potential of becoming entrepreneurs and are somewhat near the stage of choosing a career. Although, entrepreneurial education among undergraduates were introduced and made compulsory in Ghana universities over the past two decades, little research have been done with the aim of assessing its impact on socio-cognitive factors as well as psychological attributes and to ascertain whether there exist relationships between entrepreneurial intentions and entrepreneurial intensity and students' career of becoming entrepreneurs. This research seeks to contribute to the field by investigating the impacts of Internal Locus of Control, Motivation, General Self Efficacy, Entrepreneurial Self Efficacy, Perceived Desirability, Perceived Enterprenuerial Success Factors and Subjective Norm (LOC, MOT, GSE, ESE, PD, PESF and SN) on Entrepreneurial Intention (EIN) and Entrepreneurial Intensity (EIY) for the purpose of seeing the importance of certain socio-cognitive factors and psychological attributes of Ghana undergraduates on their entrepreneurial intention and intensity. The study was carried out among 184 students as a sample and gives insights into appraising entrepreneurial mind-sets of undergraduates in Ghana. It was discovered that to a large extent LOC, PD, ESE, MOT, and PESF have a positive impact on EIN and ESE, MOT, and PESF were found to have a positive impact on EIY among this same group of people.

1. INTRODUCTION

Entrepreneurship contributes enormously to the economic development of individuals and countries at large; serving as a major facilitator (Oppong et al., 2014). People with entrepreneurial mind-sets help in establishing small ventures or jobs that later may lead them to the creation of big businesses capable of earning substantial wealth (QAA, 2012). Mostly, people who have got any form of exposure to

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entrepreneurship or involve themselves with job creation believe in having control over their own lives, have self-esteem and are at advantageous and strategic position to put into use, their creative freedoms (Holmgren & From, 2005). In most developing countries of which Ghana is one, political uncertainties transcended into private businesses and hindered the progress of entrepreneurial intention and intensity (Amankwah-amoah et al., 2019). In the 21st century, a paradigm shift globally in choice of career has prevailed and this coupled with the introduction of entrepreneurial education in developed countries has propelled Ghana to rethink and appreciate the potential of psychology in entrepreneurial intention (Buame 2012). Ghana's introduction of entrepreneurial programs to boost intentions in its universities was aimed at equipping students with basic entrepreneurship skills in addition to their acquisition of basic education (Owusu Ansah, 2004). This study examines the role of socio-cognitive structure and psychological attributes on affecting the enterprenuerial intention and entrepreneurial intensity of undergraduates in Ghana.

Social learning theory by Albert Bandura (1986) proves that behavior is caused by the environment and vice versa. Bandura asserts that, people measure the control on their own feelings, thoughts, motivations as well as actions through the aid of an auto-system they possess. The theory employs self-regulation to empower people on entrepreneurial behaviour that is. people who possess aptitude to impact their own cognitive actions and processes in such a manner to change their environment. The impact of socio-cognitive factors and psychological attributes on Ghana's undergraduates' entrepreneurial intention and intensity in imitating former entrepreneurs could intervene upon students' cognitive factors which eventually have the potential to help them. Entrepreneurial goal intention which a psychological construct, was applied as a measure of impact instead of actual outcomes, including others, like, the quantity of fresh businesses or ventures established or generated on the part of students because of its robust predictive consequence on said results (Bandura, 1986).

The gross unemployment and economic decline in graduates have propelled several studies into entrepreneurial mind-sets, capabilities, activities, and actions in Ghana (Mkandawire & Soludo, 2003). However, it seems that the goal to improve undergraduate entrepreneurial intention and intensity is not achieved after students graduate from their education. Instead of coming out to be self-employed, they rather settle down as employees and this defeats the purpose of inculcating entrepreneurial intention and intensity (Ajzen, 1985). It has become imperative therefore, for entrepreneurial effect on socio cognitive factors and psychological attributes on undergraduate students in Ghana, since little is known; although, there is an urgent need to comprehend. This research set off with the aid to explore the impacts that socio-cognitive factors and psychological attitudes have on undergraduate students' entrepreneurial intention and intensity. To the knowledge of the researcher, no empirical work has been done in the study area and the current research at hand aims at closing this literature gap (Ajzen, 1985).

The study filled in the research gap by investigating the impacts of socio cognitive factors (General Self Efficacy (GSE), Entrepreneurial Self Efficacy (ESE), Perceived Desirability (PD) and Subjective Norms (SN), and psychological attributes (Internal Locus of Control (LOC), Motivation (MOT), Perceived Entrepreneurial Success Factors (PESF)) of Ghana undergraduates on their entrepreneurial intention and entrepreneurial intensity and provide suggestions to increase entrepreneurial career intentions in their future.

The study determined whether socio-cognitive factors as well as psychological attributes have positive impacts on entrepreneurial intentions of the entrepreneurial education participants in Ghana and again determine whether socio-cognitive factors as well as psychological attributes has an affirmative effect on entrepreneurial intensity of the entrepreneurial education partakers.

2. RESEARCH MODEL
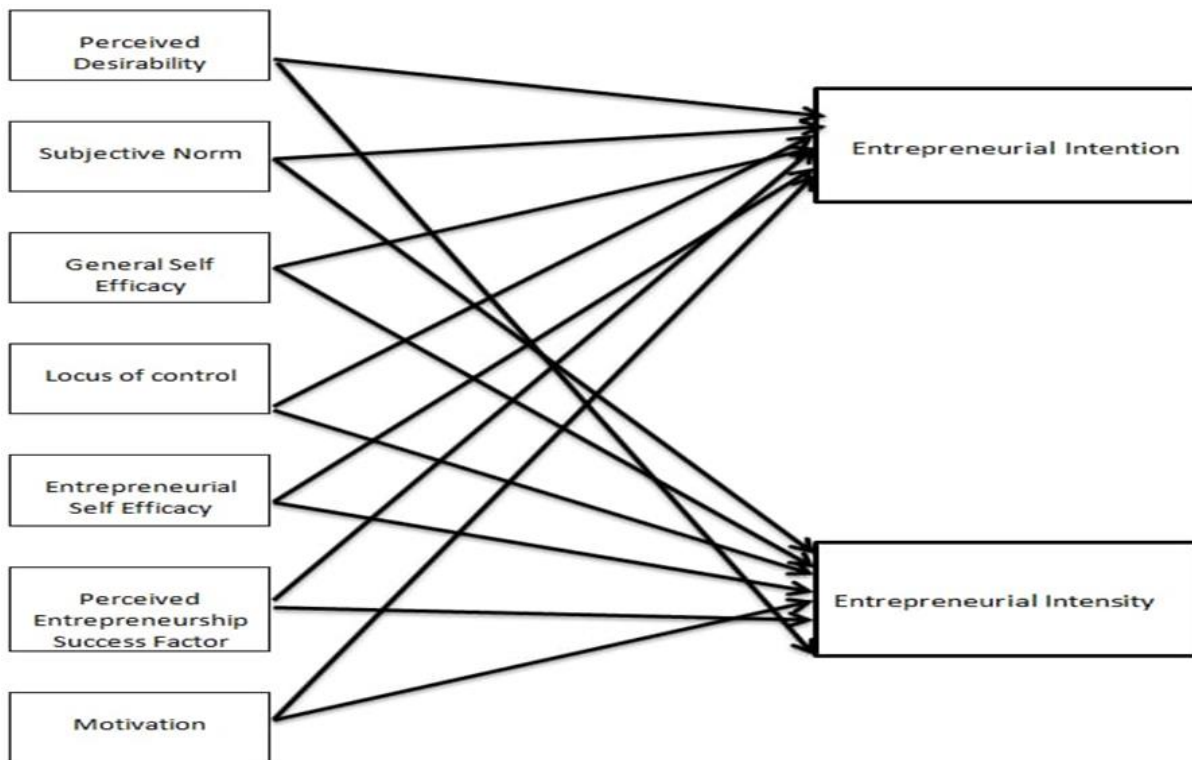
Figure 1. Proposed Research Model (adopted from the work of Muzaffar, Özdemir & Ceyhan (2015))

Entrepreneurial Intention (EIN)

Entrepreneurial Intention could be understood to mean a point to possessing a venture or being self-employed. Entrepreneurial intentions are equally regarded as individual backgrounds or alignments that have the tendency to result to the creations of businesses. Intention is an important predictor of behavior; just like social psychology authors have indicated (Ajzen, 1991). Ajzen (1991), provided a generic definition as "a person's readiness to perform a given behaviour". He further suggests that intentions constitute feasibility to act based on general opinions, social norms and individual attractiveness (Ajzen, 1991).

Entrepreneurial Intensity (EIY)

Morris & Kuratko (2002) indicate that entrepreneurial intensity (EIY) is understood to be a function of the degree as well as the frequency of entrepreneurship. Therefore, entrepreneurial intensity as a term specifies the variable make-up of entrepreneurship that an individual possesses. "Entrepreneurial intensity" as a concept, was advanced with the aim of assessing holistically the level of entrepreneurship considering together both its degree and frequency (Morris et al., 2008).

Internal Locus of Control (LoC)

Locus of control has to do with the capacity of a person to fully be in charge of actions in his or her life. According to Rotter (1966), the term has to do with the level to which people understand or agree that, though they are opposed to forces outside their power (external forces), the resultant outcome of events in their lives can be controlled by themselves. This means that, it shows the views of individuals' ability to have influence on the outcomes of actions their own. Locus of control is categorized into two main types. The first of which is, the internal locus of control where a person believes he is the master of his or her own life and can act to change circumstances that arise (Rotter, 1996). Secondly, external locus of control is a

perspective which suggests that outside factors control lives and by which individuals cannot influence (Rotter, 1966). Thus, a person possessing the attributes of external locus of control relates reasons to the happenings in his life to external environmental factors beyond him. Hence, it is suggested that,

H_{1a}: Locus of Control has a positive effect on Entrepreneurial Intention

H_{1b}: Locus of Control has a positive effect on Entrepreneurial Intensity

Percieved Desirability (PD)

Perceived desirability refers to the amount to which an individual is personally attracted toward the concept of creating a business. Beliefs in desirability are twofold: on the one hand there is the belief pertaining to the outcomes of creating ones own company and those pertaining to the social environment on the other. Linan (2004) asserts that, perceived desirability's composition, Shapero & Sokol, (1982) has resemblances with attitudes of individuals as well as subjective norms (Ajzen, 1991). That is to say that both are expounding variables of intention. Hence, it is proposed that:

H_{2a}: Perceived Desirability (PD) has a positive effect on Entrepreneurial Intention

H_{2b}: Perceived Desirability (PD) has a positive effect on Entrepreneurial Intensity

Subjective Norm (SN)

The belief that a prominent individual or group of people will approve and support a certain perculiar behaviour is what is described as subjective norm (Ajzen, 1991). Socially perceived pressure emanating from people for an individual to behave in a particular way as well as their motivation to heed to those people's opinions is the determinant of subjective norms.

Subjective norm, another determinant of entrepreneurial intention, is well elucidated by Fishbein & Ajzen (1975, p. 354) as; "The person's perception that most people who are important to him think he should or should not perform the behaviour in question". Ajzen (1991), attributes the action of people or individuals in a certain manner due to the influence of peers as a subjective norm. Engle et al., (2010) equally associate themselves with this; however, they termed it as social norm while further indicating that such influence can emanate from friends, parents or partners. This could be associated with an individual's views about whether peers and people of significance to the person anticipate he or she should involve himself or herself in the behaviour. Subjective norms are a person's peculiar decision of the social forces to act on mark behaviour. As a result, it is proposed that:

H_{3a}: Subjective Norms (SN) have positive effect on Entrepreneurial Intention

H_{3b}: Subjective Norms (SN) have positive effect on Entrepreneurial Intensity

Entrepreneurial Self Efficacy (ESE)

As attested by Bandura (1997), the conviction that an individual possesses ample capabilities to excel in what he resolves or desires to accomplish, is what is pointed out to as Self-efficacy. He emphasises that, entrepreneurial self-efficacy (ESE) is a significant stimulus quality of the entrepreneurial process for the fact that, people agree to the provisions of ambiguity with respect to business conditions that necessitate these individuals to put in effort, persevere, and plan well. As maintained by Miranda et al., (2017), individuals with outrageous self-efficacy have a propensity to demonstrate higher intrinsic interest in entrepreneurial manners and actions. , it is expected that a disclosure to ESE is supposed to boost the potential of an individual to will the essential cognitive processing, coupled with behavioural facilities to be able to deal efficiently with the risk accompanying the creation of a venture, and reinforce one's self confidence in relation to careers of entrepreneurship. Hence, it is suggested that,

H_{4a}: Entrepreneurial Self Efficacy (ESE) has a positive effect on Entrepreneurial Intention.

H_{4b}: Entrepreneurial Self Efficacy (ESE) has a positive effect on Entrepreneurial Intensity.

Motivation (MOT)

Motivation has to do with the process of encouraging individuals to embark on actions with the aim for them to accomplish their goals. MOT is the centre of biological, cognitive, and social regulation that activates the energy, way, guideline and perseverance in addition to intention (Carsrud & Brännback, 2011). It means therefore that motivation guides or dictates to people to act in certain manners. According to Vroom's theory, it is expected of an individual to opt for the best action which will produce the most expected outcomes.

Results from studies conducted by Olugbola (2017), disclosed the fact that undergraduates whose motivation level is at its maximum are more likely to embark on entrepreneurial activity and the reverse is true. While it a well-accepted view that motivation leads to entrepreneurial intentions, it should be made noted that, one may pass through an entrepreneurship program and acquire knowledge but his or her motivation towards entrepreneurial intention might not be developed. Intentions are influenced by motivational factors but on the other hand, immediate actions are not guaranteed by intentions, therefore; it is suggested that latent intentions could be converted into results by entrepreneurship motivation boost (Edelman et al., 2010). Observed studies suggest that proof on this measurement is scanty and therefore propose further researches to be embarked upon. When feedbacks are offered and personal task exercise is taken, it is expected that this will increase the motivation of the participants. Hence, it is suggested that;

H_{5a}: Motivation (MOT) has positive effects on Entrepreneurial Intension.

H_{5b}: Motivation (MOT) has positive effects on Entrepreneurial Intensity.

General Self Efficacy (GSE)

Generalized self-efficacy (GSE) reflects a general tendency for an individual to consider his or herself as able or unable of summing task demands in a comprehensive range of situations (Bandura, 2001). People with greater sense of GSE are further probable to demonstrate the tendency to take personal initiative, explore challenging but achievable prospects, as well as tackle ensuing challenges with greater sense of perseverance (Chen et al., 2004). GSE encapsulates the variances within people in the propensity to glimpse them as having the capability of assembling task demands in a wide variety of contexts. It could be understood that the GSE construct holds the pertinence to entrepreneurship and has been applied to connect inventors with novel business establishment (Markman et al., 2002). the validity of empirical evidences indicating that individuals who have self-efficacy are more prone to consider establishing entrepreneurial ventures as possible, attractive and lucrative. Hence, it is proposed that;

H_{6a}: General Self Efficacy (GSE) has positive effect on Entrepreneurial Intension.

H_{6b}: General Self Efficacy (GSE) has positive effect on Entrepreneurial Intensity.

Perceived Entrepreneurial success factor (PESF)

Success factor" as a term was first used in management literature, by D. Ronald Daniel (1961) and he asserted that these factors are in relation with all entrepreneurs inside the very industry. Rockart (1979), later maintained that these success factors are the basic factors applied by chief executive officers with the aim of accessing information that ought to be managed cautiously. It is again asserted that success factor approach initially was just applied purposely for information gathering, but recently, they could as well be applied in all capacities of business management (Khandelwal & Ferguson, 1999). It is again proposed by Dora et al., (2013) that this phrase has prospective essential application in each way of business engagements. It should therefore be comprehended that, apart from financial outcomes and growth, entrepreneurs apply several other criteria when their entrepreneurial success is being evaluated. Hence it is suggested that:

H_{7a}: Perceived entrepreneurial success factor (PESF) has positive effects on Entrepreneurial Intension

H_{7b}: Perceived entrepreneurial success factor (PESF) has positive effects on Entrepreneurial Intensity

3. METHODS

A sum of 278 questionnaires was retrieved from undergraduate students in Ghana's universities. However, only 184 were filled completely and could be used for analysis purpose. Universities in Ghana were the target area for this thesis, thus, the whole study revolved around the university campuses and among the students.

The research is probed by assesing the differences in participants' socio-cognitive factors and psychological attributes by applying quantitative techniques. Therefore, the cognitive factors based on TPB were used for the measurement of the socio-cognitive factors. These measurements comprise: Subjective Norm, Entrepreneurial Self-Efficacy, Entrepreneurial Intention, Perceived Desirability and General Self-Efficacy. With the psychological attributes I used Internal Locus of Control, Perceived Enterprenuerial Success Factors, Enterprenuerial Intensity and Motivation.

4. RESULTS

Table 1: Age range of Participants

Range	Frequency	Percentage
20 and Below	29	15.8
21 - 30	81	44.0
31 - 40	48	26.1
41- 50	13	7.1
51 - 60	10	5.4
61 and Above	3	1.6
Total	**184**	**100.0**

The study considered the ages of the undergraduate students. The ages ranged between 20 years to 61 years and above. Table 1 shows that larger number of the respondents were aged between 21-30 years (n=81, 44.0%), followed by those aged between 31- 40 (n=48; 26.1%) and those aged 20 and below (n=29; 15.8%) while few were aged between 41-50 years (n=13; 7.1%), 51-60 years (n=10; 5.4%) and 61 and above years (n=3; 1.6%).

Table 2: Gender/sex

Gender	Frequency	Percentage
Female	99	53.8
Male	85	46.2
Total	**184**	**100.0**

The study factored the gender or sex of the respondents. Table 2 shows that greater number of the respondents were females (n=99; 53.8%) while minority of them were males (n=85; 46.2%).

Table 3: Holding a job in addition to going to school.

Holding Job	Frequency	Percentage
No	131	71.2
Yes	53	28.8
Total	**184**	**100.0**

The study assumed that some respondents might be working as well as school. Table 3 shows that most respondents answered no (n=131; 71.2%) as not having any job at the same time attending school while some answered yes (n=53; 28.8%) as having been working and schooling at the same time.

Table 4: Best descriptions where your parents work.

Parents Job	Frequency	Percentage
Self Employed	52	28.3
Government (Local or National)	39	21.2
Large Business	17	9.2
Small Firm	25	13.6
Non-profit or charity	10	5.4
Unemployed	29	15.8
Military	9	4.9
Retired Teacher	1	0.5
Single	1	0.5
They are dead	1	0.5
Total	**184**	**100.0**

Table 4 shows outcomes on where parents of the respondents' work. Places of work were between self-employed to the death of parents. The study showed that most parents were self-employed (n=52; 28.3), followed by parents who work for government (n=39; 21.2%), followed by unemployed (n=29; 15.8%), followed by those operating small firms (25; 13.6%) while the least were those whose parents are dead (n=1; 0.5%), whose parents are single (n=1; 0.5%), and those whose parents had retired (n=1; 0.5%).

Table 5: Family member owning a business.

Owning a Business	Frequency	Percentage
No	72	39.1
Yes	112	60.9
Total	**184**	**100.0**

Table 5 shows results of family members of respondents owning businesses. It was found that majority of the respondents answered yes (n=112; 60.9%) as members of their families own businesses.

Table 6: Working in a business owned by a member of your family

Working in Family Business	Frequency	Percentage
No	100	54.3
Yes	84	45.7
Total	**184**	**100.0**

Table presents results on whether respondents had worked in businesses owned by family members. It was found that majority indicated no (n=100; 54.3%), followed by yes (n=84; 45.7%)

Table 7: When you graduate do you intend to work for the family business.

Working in Family Business After Graduation	Frequency	Percentage
No	152	82.6
Yes	32	17.4
Total	**184**	**100.0**

Table 7 shows results on respondents' intention to work in family business after graduation. The study divulges that majority of the respondents indicated no to the question (n=152; 82.6%) while some indicated yes (n=32; 17.4%).

Table 8: Have you ever started a business

Ever Started a Business	Frequency	Percentage
No	123	66.8
Yes	61	33.2
Total	**184**	**100.0**

Table 8 indicates results on whether respondents have ever started a business. It was found that majority of the respondents never started any business (n=123; 66.8) while few ever-started business (n=61; 33.2)

Table 9: Are You Currently Operating your Own Business

Operating Own Business	Frequency	Percentage
No	119	64.7
Yes	65	35.3
Total	**184**	**100.0**

Table 9 shows respondents' responses concerning whether they are operating their own businesses currently. The study revealed that majority of the respondents indicated no (n=80; 43.5%) while some of them indicated yes (n=65, 35.3%) and others maybe (n=39; 21.2%).

Table 10: Do you see starting a business as a viable career options for university graduates in your society

Ranks	Frequency	Percentage
1	6	3.3
2	4	2.2
3	21	11.4
4	23	12.5
5	130	70.6
Total	**184**	**100.0**

Table 10 indicates results on respondents seeing business as an optional career after graduation. In this, a rank from 1 to 7 was established. The study revealed that majority of the respondents picked 5 as a rank

(n=130, 70.6%) signifying that business is a possible career after graduation, followed by a rank of 4 (n=23; 12.5%) and a rank of 3 (n=21; 11.4).

Table 11: Do you see yourself starting your own business as a viable career

Starting Your Own Business	Frequency	Percentage
No	53	28.8
Yes	131	71.2
Total	**184**	**100.0**

Table presents results on respondents starting their own business as a viable career. The study revealed that most of the respondents answered yes (n=131; 71.2%) signifying that they are likely to begin their own businesses as a viable career option while some indicated no (n=53; 28.8%)

Table 12: Reliability Summary Table

Factor Count	Variable (Factor)	Number of Items	Cronbach's Alpha
1	Locus of Control (LOC)	24	.974
2	Perceived Desire (PD)	5	.973
3	Subjective Social Norms (SSN)	3	.939
4	Ent. Self. Eff. (ESE)	10	.984
5	Entrepreneur Intention (EIN)	5	.974
6	Entrepreneur Intensity (EIY)	4	.940
7	Motivation (MOT)	16	.969
8	Perceived. Enterprenuerial. Success. Factor. (PESF)	12	.987
9	Gen. Self. Est. (GSE)	8	.990

In such a grouping of variables (Factor Analysis) we always checked for the reliability of each variable with the use of the Cronbach's Alpha as a measurement tool. The mostly accepted benchmark is a Cronbach's alpha value of at least 0.70. In this analysis, it is clear in table** above that all the factors had a Cronbach's Alpha way higher than minimum threshold of 0.70. They were all above 0.90 indicating the high reliability of the factors.

In table*** below, the correlations among the factors were examined to access the strength of their relationships. The matrix was a 9*9 matrix with one plotted on its main diagonal representing the perfect correlation of each factor to itself. The off-diagonal correlations were the centre of our attention as they reveal the correlations among the different factors used in this research. The table revealed a moderate to strong correlations among the factors of which all were positively correlated too. In other words, for example if the PESF increases of any respondent, her/his EIN/EIY are expected to increase too as the level of correlation among these variables is 0.844 and 0.801 respectively.

Table 13: Summary of Correlations Analysis

	LOC	PD	SSN	ESE	EIN	EIY	MOT	PESF	GSE
LOC	1								
PD	.632**	1							
SSN	.454**	.693**	1						
ESE	.535**	.756**	.713**	1					
EIN	.692**	.805**	.693**	.828**	1				
EIY	.570**	.678**	.696**	.758**	.800**	1			
MOT	.603**	.730**	.722**	.733**	.793**	.751**	1		
PESF	.614**	.801**	.767**	.810**	.844**	.801**	.826**	1	
GSE	.587**	.587**	.757**	.802**	.822**	.764**	.812**	.923**	1

Furthermore, this research tested the strength (contribution) of a GSE, LOC, SSN, ESE, PD, MOT, and PESF in explaining whether a respondent will a level of EIN. I used the regression analysis where EIN was taken as a dependent variable while the above listed factors were taken as independent variables. In the ANOVA table below (Table**) it can be seen that the model was statistically significant at the 0.05 significant level indicating the ability of the model to perform its task of prediction.

Table 14: Regression Outputs EIN Dependent variable

ANOVAª						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	660.799	7	94.400	121.703	.000ᵇ
	Residual	136.516	176	.776		
	Total	797.314	183			
a. Dependent Variable: EIN						
b. Predictors: (Constant), GSE, LOC, SSN, ESE, PD, MOT, PESF						

Table 15 below shows the percentage of variance (measured with R Square) in the dependent variable that is explicated by the independent variables. From the table, this percentage was at a high of almost 0.83 percent. This was a very good percentage as more than ¾ of the variance in the dependent variable could be attributed to the independent variables and thus confirmed the viability of the chosen independent variables to understand the phenomenon of EIN.

Table 15: Model Summary

Model Summaryᵇ				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.910ª	.829	.822	.88071
a. Predictors: (Constant), GSE, LOC, SSN, ESE, PD, MOT, PESF				
b. Dependent Variable: EIN				

Table 16 below depicts the individual contributions of the independent variables in explaining the dependent variable (EIN). Two variables (SSN and GSE) were statistically non significant and thus could not be said to be good predictors of EIN. On the other hand, LOC, PD, ESE, MOT, and PESF were all significant

predictors of EIN. In addition, their beta values were positive too signifying the positive relationship that they possess with the dependent variable of EIN.

Table 16: Coefficient of the independent Variables

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients				95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.714	.214		-3.344	.001		-1.136	-.293		
	LOC	.283	.060	.199	4.703	.000		.164	.402	.541	1.847
	PD	.160	.060	.156	2.664	.008		.042	.279	.285	3.514
	SSN	-.022	.058	-.020	-.383	.702		-.136	.092	.356	2.811
	ESE	.376	.068	.321	5.545	.000		.242	.510	.291	3.440
	MOT	.181	.077	.140	2.342	.020		.029	.334	.271	3.692
	PESF	.191	.092	.190	2.074	.039		.009	.373	.116	8.649
	GSE	.054	.092	.051	.586	.558		-.127	.235	.131	7.652
a. Dependent Variable: EIN											

Table 17: Regression Outputs EIY Dependent variable

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	470.857	7	67.265	59.185	.000[b]
	Residual	200.030	176	1.137		
	Total	670.887	183			
a. Dependent Variable: EIY						
b. Predictors: (Constant), GSE, LOC, SSN, ESE, PD, MOT, PESF						

In table** below, the model summary which shows the percentage of variance explained by the independent variables is presented. The model showed an R Square of 0.702 indicating an approximate 70 percent of the variance in EIY being explained by the independent variables.

Table 18: Model Summary[b]

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838[a]	.702	.690	1.06608
a. Predictors: (Constant), GSE, LOC, SSN, ESE, PD, MOT, PESF				
b. Dependent Variable: EIY				

Next, we looked at the individual contributions of the independent variables as depicted in the table of coefficients below. Set on the significance level, it was discovered that the first three independent variables namely LOC, PD, SSN, and GSE were not good predictors of EIY. They were all non-significant

contributors in explaining EIY. On the other hand, the variables of ESE, MOT, and PESF, were significant. These variables could be termed as the ones that accounted for the variance in EIY that could be described by the independent variables. This information is shown in table** below.

Table 19: Coefficients

Coefficients[a]										
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.126	.259		-.487	.627	-.636	.384		
	LOC	.133	.073	.102	1.829	.069	-.011	.277	.541	1.847
	PD	-.073	.073	-.077	-.995	.321	-.216	.071	.285	3.514
	SSN	.122	.070	.121	1.747	.082	-.016	.261	.356	2.811
	ESE	.287	.082	.266	3.490	.001	.124	.449	.291	3.440
	MOT	.214	.094	.180	2.280	.024	.029	.398	.271	3.692
	PESF	.335	.111	.364	3.004	.003	.115	.555	.116	8.649
	GSE	-.022	.111	-.022	-.195	.846	-.241	.198	.131	7.652
a. Dependent Variable: EIY										

5. Conclusion

Bottomed on the findings from the study, it was discovered that LOC, PD, ESE, MOT, and PESF have a positive straight effect on entrepreneurial intentions among undergraduate students. This presupposes that entrepreneurial intention could serve as significant means of empowering and developing the capabilities of the undergraduate students in Ghanaian universities. ESE, MOT and PESF have a direct positive impact on entrepreneurial intensity. In this case, quality, ESE, MOT, and PESF would latitude a pivotal capacity in equipping students with required capacity; skills and right type of professional business attitude that could enable argue them with the entrepreneurial intensity to engage in new business opportunities to create businesses for the growth of Ghana.

In light with the effect of socio-cognitive factor and psychological attributes on enterprenuerial intention and enterprenuerial intensity of undergraduates in Ghana, personality trait approach's contribution to our understanding of the phenomenon of entrepreneur cannot be disregarded (Gartner, 1990). Entrepreneurial spirit is affected by personality in Ghana by considering mediating factors as motivation and attitudes. Entrepreneurial cognition embraces aspects of cognition that have the potential to render a notable capacity in specific effect facets of the entrepreneurial process. Cognitive can be very useful as applied tools for developing entrepreneurial learning, competencies and intentions (Mitchell et al., 2007). The cognitive approach impact entrepreneurs to study and more so, to elucidate undergraduate student's behaviour, which is associated with the recognition of chances for the establishment of ventures and business expansion. The theory of social cognition initiates the notion of knowledge structure; that is, the mental models (cognitions) that are cast-off to accomplish individual efficiency in some specific conditions.

Cognitive psychology helps in comprehending undergraduates and their behaviour, it also addresses the environment in which undergraduate's entrepreneurial participants in Ghana interact bearing in mind their mental processes with other people. Cognitive approach signifies as well as encompasses knowledge, and represent how such knowledge is acquired and put into use by undergraduates. Socio-cognitive factors and psychological attributes are positively linked to students' intentions to begin their personal businesses. Personality and environmental factors incorporated in entrepreneurial intention and entrepreneurial intensity; as a strong predictor and, ultimately, of action. It is crucial to study the interaction between learning and entrepreneurial intention (behavior, competencies; and the relationship between entrepreneurial intention and

students in Ghana becoming entrepreneurs. Knowledge acquired through the impact of socio-cognitive factor and psychological attributes on undergraduates enterprenuerial intention and enterprenuerial intensity serves as a tremendous foundation for interventions geared towards the modification of behaviour.

With respect to the findings resulting from the study, act of employment creation on the part of students helps in the reformation of their own career objectives and consequently provides significant benefits to the community, nation, and world at large. It is recommended for undergraduate students to be motivated by encouragement among certain entrepreneurial behaviours and numerous variables within student settings, business plans and profit motive which is a vital factor in motivating in the direction to the creation of new ventures.

Future generation could have a better planned efficacy and more positive attitudes in relation to business education that aids in enhancing their personality creation and, most significantly, good networks to enhance traits in relation to building entrepreneurial career. Undergraduate students should be assisted in developing psychological characteristics, possessing a daring spirit, aggressiveness, the spirit of creativity to develop and own their personal businesses and as well gain employment as a result of their innovation which will provide students the opportunity in the reformation and developing of their career by aspiring to become agents of change in their chosen career paths.

Undergraduate students need to be assisted in developing entrepreneurial awareness and innovation by building confidence, capability of promoting the spirit of self-help, promotion venture creation, agree to the fact of building entrepreneurial intentions and promoting teamwork among students. It is contended that undergraduate students will build personal uniqueness with the cognition that consequently will impact their future choice of work which were affected by individual characteristics of their own which encompasses their beliefs, and attitudes; consisting of previous entrepreneurial experience, risk trends and the effects of perceived learning from the intention to become entrepreneurs on the part of students.

Government as well as educational institutions are required to perform a more proactive role by coming up with a strategy to back students that have made their intention to establish a business venture, by way of introducing incubator programs, while in school and after graduation. By so doing, graduates will be encouraged to embark on their career aspirations with respect to business venture start-ups and again motivate graduates entrepreneurial attitude concerning self-employments. In Ghana the responsibility lies on universities to create an entrepreneurial attitude among graduates and students alike to trigger them to recognize self-employment and innovative activities as a great prospect for their career choices in the future. This can be realized through the promotion of teaching and learning in the universities of entrepreneurial courses ,workshops and training since graduates require not just academic achievements, there is the need for them to acquire entrepreneurial skills that has the potential to propel them to grab opportunities and construct the greatest part out of them; create and convey concepts which has the prospect of making a difference in their various communities. It is as well crucial for youth enterprise development if, the universities see to the establishment of savings clubs on campuses.

Entrepreneurial psychology has to do with a special psychological experience that manifests itself during entrepreneurial behaviour, meaning, and the state of mind of the entrepreneur's regulation as well as dominance of entrepreneurial behaviour. It is vital for policy makers, educators and government to comprehend the demand to have a diversity of cognitive and psychology modules that will assist students to select sectors on their own that will influence their intentions to commence an enterprising activity.

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REVIEW ARTICLES

The Impact of Covid-19 Pandemic Crisis on Online Shopping

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Abstract

The coronavirus (COVID-19) epidemic that occurred in Wuhan, China in December 2019 affected the whole world in a short time. The World Health Organization (WHO) declared it as a global pandemic on March 11, 2020. In order to prevent spread of the pandemic, countries worldwide started to impose curfews in whole or in part, and certain changes occurred in the shopping methods of consumers in line with these decisions, and new changes occurred in different sectors. During the pandemic, stores and shopping centers physical sales are adversely affected due to movement restrictions and business shuttering. Considering the crowded environments as the transmission source of the COVID-19, consumers choose online shopping. Since the risk of physical contact with e-commerce has decreased to zero, it has started to attract more intense attention from customers in order to protect their health during the pandemic process. In addition to protecting people's health with the product they want, it also eliminated the loss of time and comforted people in terms of practicality. As a result, online sellers have seen an opportunity in this crisis and increased their sales volumes at a record level. The overall aim of this study is to examine the effects of COVID-19 on online shopping behaviors and trends, and the impact of COVID-19 on the online shopping of different consumer products.

1. INTRODUCTION

The pandemic caused by the coronavirus, which first appeared in the Wuhan region of China in December 2019 and called COVID-19, unexpectedly affected the world in a short period of time in terms of health and economy. The World Health Organization (WHO) has characterized and recognized COVID-19 as a global pandemic on March 11, 2020 (WHO, 2021). Considering the rapid spread of the virus and the danger of death, it is obvious that it will affect people's behaviors and lifestyles for a long time.

It is clear that the pandemic has affected societal trends related to how we work, how we behave, how we trade, how we shop, and how we use technology very rapidly. While these trends were already changing before the crisis, world is seeing an acceleration that will result into a new normal coming out of the crisis (He & Harris, 2020).

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During this pandemic, physical trade has been negatively impacted due to various reasons such as people wanting to stay away from physical contacts and curfews (OECD, 2020). Customers are avoiding going brick and mortar shopping stores and crowded areas. Especially the retail sector has been badly influenced by the pandemic due to movement restrictions and business closures and problems arising from the complexities of the supply chain due to curfew restrictions or bans. In a way, the coronavirus has seriously accelerated the transformation of the trade that is already taking place, in other words, the shift from the physical environment to the virtual environment (Ticimax, 2020).

COVID-19 has been exceptionally challenging for businesses worldwide and brought to the fore the special role of e-commerce can play in this crisis and beyond. In the post-COVID-19 world, the unparalleled growth of e-commerce businesses will disrupt retail frameworks. The spread of digital technologies and the Internet allows humans to still connect and communicate–and companies are able to interact with their customers despite being physically distant (Anam et al., 2020).

On the other hand, the global efforts to contain the pandemic has changed the consumers' daily habits, consumption patterns, and ways of thinking, resulting in a boost to the "home economy" and a further improvement in online shopping and services that were already gaining traction worldwide (Deloitte, 2020). Due to COVID-19, online demand has increased for multiple categories, including entertainment and food and beverages, which are delivered by using innovative non-contact formats.

The aim of the present study is to have an overview about the impact of COVID-19 on the online shopping behavior and trends. The study will look at the online shopping trends and behaviors in Turkey and the world. In this qualitative research, the scanning method is used. The current literature, articles and the news sources about the impact of COVID-19 on online shopping behavior and trends are examined. This study is among the limited number of studies on online sales during the COVID-19 pandemic crisis.

2. TRANSITION TO ONLINE SALES FROM RETAIL TRADE

The world is renewing itself through continuous and fluid change and transformation. Companies and business cannot avoid adapting to the changes in their internal and external environments in order to ensure the continuity of their activities. If companies and businesses cannot keep up with these innovations, they will have to forever lose their profitability and competitiveness, and may even have to stop their operations. In the process of adapting to the latest developments, the methods of businesses reaching their customers and communicating with their customers have also changed (Akyazı, 2018). Today, it can be said that the world market has become universal as a result of technological developments. This form of trade, which allows the trade of all known products to be carried out electronically and in a short time, is called e-commerce or online sales. With the globalization of online sales, its place in daily life has become very clear.

Online sales and shopping have been able to gain a place and progress in all areas of economic life with the degree of spread and easy ways it has provided. The most important reason why these developments are so fast is that online sales are available on the internet and instantly.
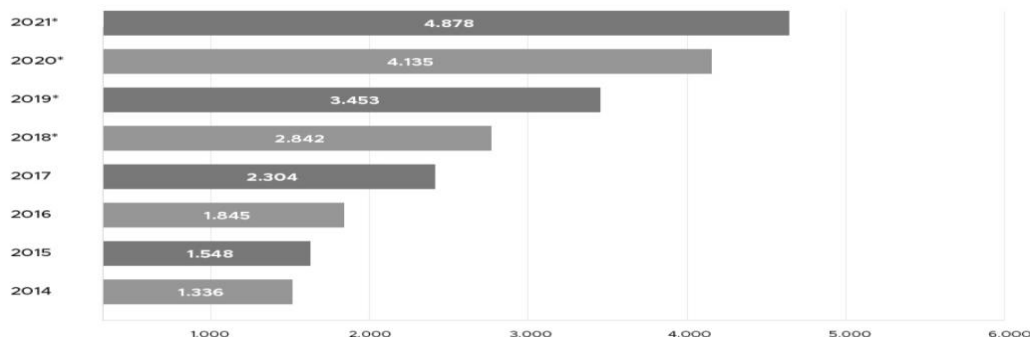

Sales in billion US dollars

Figure 1. Online Sales Trend (Source: Statista: E-commerce worldwide- Statistics and facts)

As seen in the graph above (Figure 1), the development of new technologies in the online sales sector has led to behavior changes in recent years. Online sales and sales graph have been determined as a large increase by 2019 and it is determined that it is very likely to exceed US $ 4.878 billion by the end of 2021.

E commerce, or online sales, is a concept that has emerged as a result of globalization and has become more prominent in daily life. The development of the concept of virtual organization with the transition to the information society is one of the important reasons that led to the widespread use of e-commerce (Demirel & Eriş, 2019).
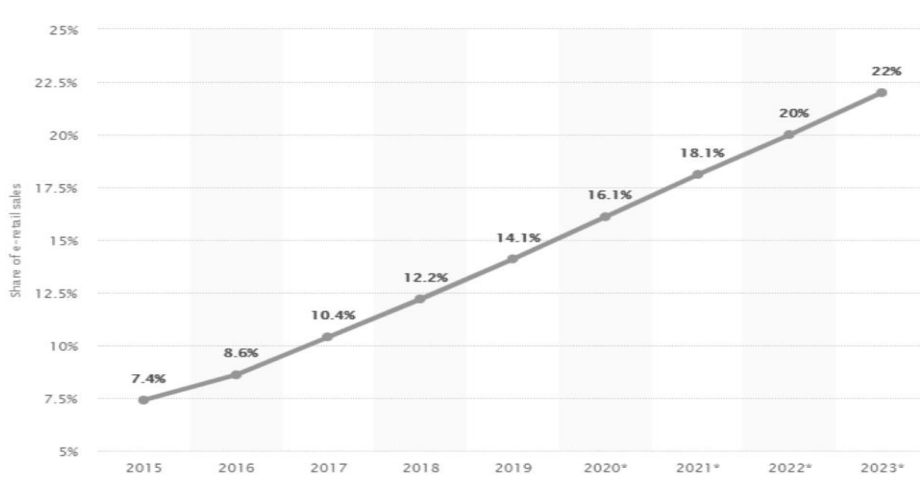
Figure 2. Share of online sales in global retail sales (Source: Statista: E-commerce worldwide- Statistics and facts)

The share of online sales in worldwide retail sales was recorded as 7.4% in 2015. Looking at 2019, it is estimated that the share of online sales in global retail sales, which was 14.1%, will increase up to 22% in 2023 (Figure 2).

3.   COVID-19 PANDEMIC CRISIS AND ITS IMPACT ON ONLINE SHOPPING

Online sales have increased rapidly since the outbreak of COVID-19, with the addition of new and active users (Anam et al., 2020). In addition, the COVID-19 pandemic changed the consumer behavior unpredictably and restructures the sector. People who think about their health have abandoned shopping in physical markets and turned to online sales, and as a result, online sales volume has increased considerably.

The graph below (Figure 3) shows the changes that occurred in the online sales volume since January 2020 to May 2020 in Germany, USA, UK and Turkey. The graph evidently showed that the biggest jump in COVID-induced online shopping is in Turkey especially after the first cases seen in March 2020. This increase is almost 200%. Due to the changes in the measures taken in Germany, the increase has decreased. After March 2020, as a result of the preventing measures, there were increases in USA and UK.

Beside the increase in the volume of online shopping, it has been noted that the preferred online shopping products has also been changed. In 2018, clothing (57%) was one of the most common and preferred online shopping categories worldwide. Footwear (47%) and consumer electronics (40%) follow the clothing category (Orendorff, 2020).

As a result of the impact of the COVID-19, it was determined that before the pandemic period, customer spending in online sales was mostly in the travel and accommodation expenses and clothing category. However, as a result of the outbreak of the COVID-19 pandemic crisis, there have been different and justified changes in the demand of products and product groups resulting from the pandemic. These changes are clearly shown in the graph below (Figure 3).
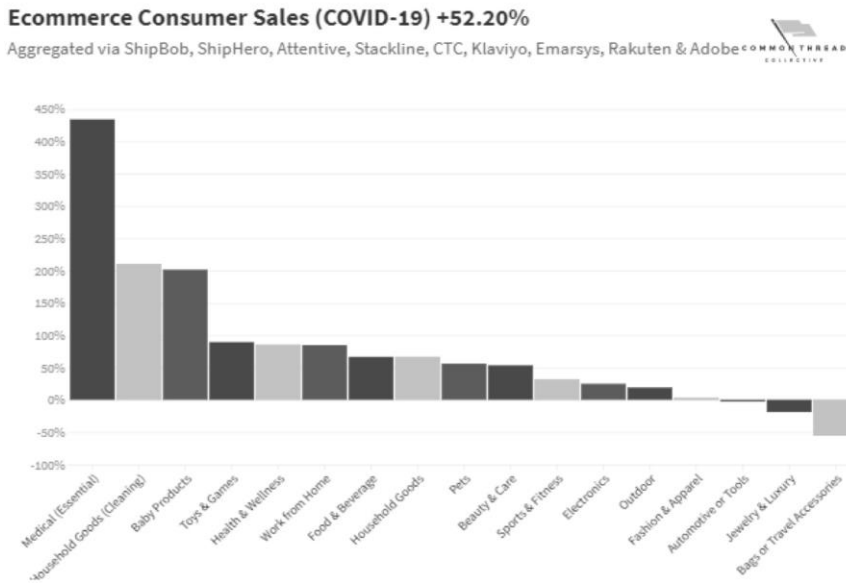
Figure 3. E-commerce consumer sales during COVID-19 (Source: Orendorff, 2020)

According to the information given by the data of Common Thread Collective and the graph given above, while the product group with the highest increase in online sales was medical products for health reasons, there were many great changes in baby products and cleaning categories. However, there was a decrease in the sales of product groups in the jewelry, clothing, automotive and travel sectors. The tourism and travel sector had the most negative impact due to the coronavirus bans and restrictions.

4. THE IMPACT OF THE COVID-19 ON THE ONLINE DEMAND OF PRODUCTS AND PRODUCT GROUPS

It has been noted that the COVID-19 pandemic clearly changed the online demand of products and product categories. Due to COVID-19 generated conditions the online demand of some products decreased while the online demand of certain products increased significantly (WTO, 2020). The table below shows the change in online demand for products between March 2019 and March 2020, when the COVID-19 began to appear. A certain and quite high increase in the field of health is clearly evident. In addition, basic needs and other factors have significantly increased online sales volume.
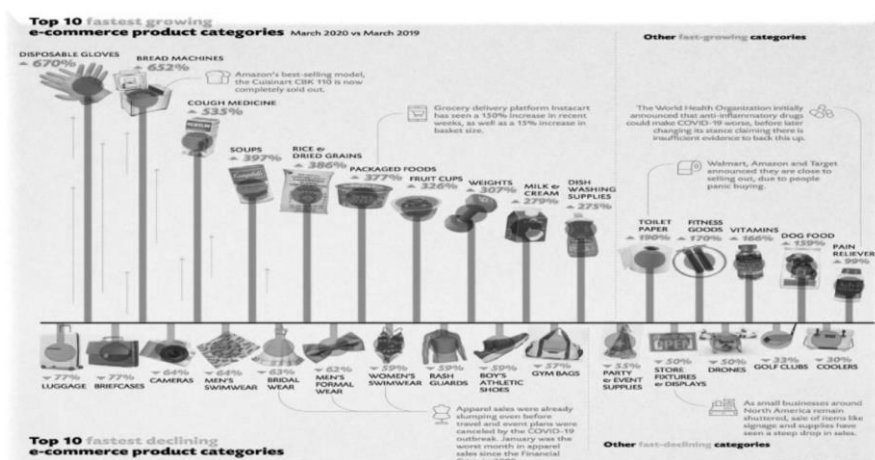

Figure 4: Changes in online shopping products during COVID-19 (Source: Jones, 2020)

As can be seen from the graph above, after COVID-19, serious changes have been observed in people's online buying behavior and product purchase rates. Major changes have been experienced, especially in the field of cosmetics, health and education (Jones 2020). Figure 3 exhibits that there is an increase in online shopping of the food and hygienic products while there is a considerable decrease in the online shopping of the certain product categories such as textile.

Additionally, in the survey conducted by UNCTAD, in which 3008 people participated from different countries, it has been found that an overwhelming majority of people want to get their products deliver to their home address (Figure 4).
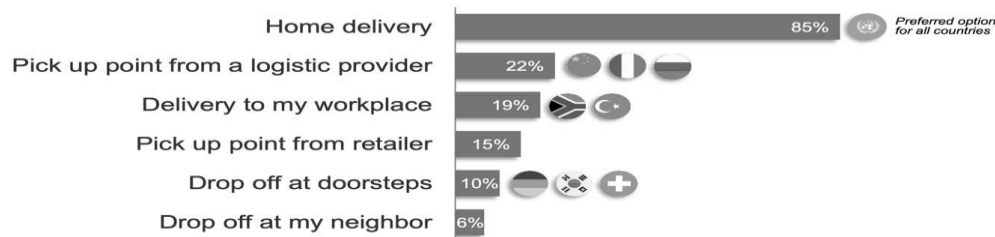
Figure 5: People's preference for product deliveries during COVID 19 (Source: UNCTAD, 2020)

Clothing and Accessories Products

Due to the pandemic, certain changes have occurred in all sectors and the clothing sector has experienced a decline. People did not worry about clothing, as they had to stay at home due to the restrictions imposed by the epidemic and wanting to avoid getting sick, and they reduced shopping. The online revenue for clothing in online sales decreased by 10.9% on an annual basis as of the end of March 2020, in USA (Mcdowel, 2020). Clothing stores serving online in the UK experienced a 23% decrease in their sales in March 2020. Especially in terms of men's products, there was a decrease in the sales of men's shoes at 33% and the decrease in men's clothing was around 43% (Güven, 2020). As a result of the harsh and rapid epidemic and fearful at home, people did not shop for clothing, while the sales volume started to increase with reduced measures and attractive discount campaigns.

Food and Beverage Products

The demand for all products of the food industry has been one of the leading sectors where the change in online sales was felt the most during the pandemic period. Before the rules on staying home for the coronavirus epidemic, its share in the market turnover is not even 1 percent, but it has increased to 3 percent (Sakarya, 2020). Similarly, Turkish customers increased their online sales share on food to around 42%. However, half of this customer base stated that they will shop this way from now on and will remain in the online sales area (Güven, 2020). People avoid physical contact by not going to markets to shop and to be find themselves in crowded environments have increased online sales of food and beverage products in this context. Accordingly, the markets have made efforts to make the online sales applications faster and more convenient. Due to the high demand for online applications established by supermarkets to serve customers, the delivery times were seriously negatively affected.

It has been observed that consumers tend to save money due to the decrease in professional and office life due to the epidemic. In order to make use of the time spent at home, people tend to cook as a hobby. Researching different recipes and mixtures to strengthen their immune systems, consumers also tried to find easy ways to make them at home. As of March 2020 and April 2020, the searches for "bread making at home", "yeast making" and "bread making machines" on Google significantly increased. The family consumption research data of Ipsos Research Company in March 2020 coincide with this trend. According to the research findings of the company, online flour shopping increased by 98 percent and online yeast

shopping increased by 80 percent in March compared to the previous period (Güven, 2020; TRT Haber, 2020).

After the rapid spread of the COVID-19, there were also increases in the product groups in the beverage market demanded through online sales and trade. In China, which is the starting point of COVID-19, there has been an increase in the demand for fresh food products as well as drinks on online trade sites during the pandemic. It has been observed that there are serious demands for water, alcohol and even dairy products (Güven, 2020). In line with this, the UK-based Naked Wines company stated that the profit from alcohol sales will be increased for 2020 (Rigby, 2020).

Health, personal care and cleaning products

After the World Health Organization declared COVID-19 as an epidemic, certain restrictions came in almost every country, and people tried to stock up and protect their health because of these restrictions. People who are afraid of this pandemic have made serious efforts to reach products such as hand sanitizer and surgical masks and products such as toilet paper and bread (Meyer, 2020).

Since the start of the pandemic, medical experts have warned that hands should be washed frequently and for at least twenty seconds. People used more soap and hand sanitizer products due to warnings. Sites making profit from the sales of these products experienced problems in the sales and distribution of these products during this period. Since soap and hand sanitizers are effective in combating the virus, these product varieties started to be sold very quickly. Therefore, the demand for health-protecting and health-safety items is rapidly increasing. In Turkey, since the start of pandemic in Turkey the online sales of cologne increased 34-fold, sterile gloves 19 times, hand sanitizer 10 times, soap 4 times, medical masks 4 times, the toilet paper sales increased 3.5 times (Günyol, 2020). This situation has occurred all over the world in the same manner. As a result of the serious impact of the pandemic in the USA, the increase in sales of hand sanitizer products increased by 73% in four weeks (Nielsen, 2020).

It has been determined that the most frequently searched products on the internet during the period when the COVID-19 started were masks, hand sanitizers and disinfectants, which are in the category of cleaning and health products. Due to the exorbitant and disproportionate price hikes the prices of these products have increased significantly (Güven, 2020).

Other health related products that gain attention during the pandemic are vitamin products. Vitamins are considered to be an important source of boosting tha immune system in order to beat the coronavirus and experts stated that especially vitamin C supplements should be used in this regard. This leads to a high increase in the online sales of vitamin related products. In Turkey the vitamin products see an increase of average 10 percent (Meral, 2020).

Due to the closure of beauty saloon industry as a precautionary measure to prevent the spread of COVID-19 the online shopping of hair and care products enhanced significantly. The online sales of beauty products increased significantly around the world (Güven, 2020). The main reason for this is that people who do not want to be affected by the pandemic are sensitive about social distance and hygiene and do not find it appropriate to go to hairdressers. The situation is similar in Turkey. The hairdressers, who were closed to prevent the pandemic, pushed people to buy shavers and hair care products online.

Luxury Consumer Products

The product groups in the luxury consumption category suffered serious declines in the world wars and during the Spanish flu of 1918 and other crises. During the COVID-19 pandemic this product category has been subjected to serious blows. It is predicted that the coronavirus outbreak will bring greater challenges to the industry than the economic crisis that broke out in 2008. It is estimated that the global luxury consumption product groups will decrease by approximately 80 billion euros this year. In 2019, expenditures of over 350 billion euros were recorded for goods in the luxury consumption group such as clothes, shoes and jewelry. It is estimated that customers will spend less than 80 billion euros this year (Deloitte, 2020).

Books and Hobby Products

As a result of the quarantine process, people who chose to stay at home to protect themselves and their loved ones also gained the habit of online buying of book and reading. According to Iyzico data, people who habitually buy and read books at home have exceeded the sales average. In the quarantine, which started with the process of staying at home, the level of online book purchases increased (Güven, 2020).

Technology and Electronic Products

Due to the uncertainties created by the pandemic one of the sectors that saw the most impact from this situation is the technology sector. People have started to acquire different hobbies and habits to spend time at home and have started to play online and other games based on advanced technology. The revenue of online stream applications increased by around 30%. Another technological product that has increased in the pandemic area is the sales of smart watches. While at the beginning of 2019, an average of 11.5 million smart watches were sold all over the world, with the pandemic in 2020, an increase of over 20 percent occurred, and 13.8 units were sold (Güven, 2020).

5. HOW COVID-19 SHAPED THE FUTURE OF ONLINE SHOPPING

The coronavirus pandemic, which has affected the whole world, has had a great impact on online sales and E-commerce environment and can be regarded as a turning point that will lead people to more online shopping in future. COVID-19 pushed the people to online shopping. Some of the online shoppers are the people who never shopped online before the pandemic. After isolation, people inevitably had to obtain some of their needs through online shopping.

According to experts, there will be some changes and differences in our behavior in almost every field of life, even after the pandemic (He & Harris, 2020). Accordingly, some products that uses in daily life need to be supplied quickly and are expected to be purchased faster through online sales instead of physically procuring from the market. In this context, companies and online sales sites suffered some problems during the pandemic for distribution and inventory (OECD, 2020). With the increasing number of users due to the pandemic, many businesses have seen it as an obligation and necessity to overcome their shortcomings in the digital world. Physical stores will be replaced by more online sales and people will be able to reach these companies more easily. At the same time, companies will discover new models and give more importance to advertising on social media in order to provide faster and higher quality service to customers. After the coronavirus, there has been a sharp turn from physical stores to online trade and sales and will continue to increase. Regardless of age, almost every age group is now striving to be in this area. The online shopping which was not growing before the pandemic got a huge impetus by the pandemic generated conditions and people around the world are now engrossed in more online shopping.

Moreover, COVID-19 become a source of awakening for countries across the globe that they have to be self-sufficient with national and domestic production and they shall develop the technological infrastructure to deliver the products and services to people through online platforms. The first and most useful way that comes to mind in terms of selling this to other countries is definitely E-commerce and online sales method. The main lesson from the pandemic for the businesses and governments is that online shopping and e-commerce will reshape international trade in the coming years and online sales is going to play an active and vital role in the sale and trade of almost every product and product group.

6. CONCLUSION

As a result of the rapid growth of the internet and the digital world all over the world, people have been affected by this technological development in every sense from social life to cultural activities. With this innovation, customers can instantly see new products and access to all kinds of information about products has become easier and simpler. Although online sales and e-commerce have been developed in recent years, people generally relied on physical stores for shopping. However, with the coronavirus pandemic, people are

pushed turned to online sales and physical shopping experience is rapidly started to be replaced by online sales.

As a result of the effect of the pandemic, the social and economic life has been changed drastically. Due to the precautionary measures of governments and the fear of COVID-19 people minimized the physical contact and started to use the online platforms for shopping. This results into a whopping increase in online shopping and trade volume during the pandemic as compared to previous years. There were curfews and some prohibitions, and later these were eased or ended. Despite this, people have acquired the habit of online sales and started to continue. With the ending of bans and restrictions in some countries, the volume of online trade has decreased, albeit slightly, but has made great progress for the future and will continue. Until the vaccine is successful, every family will find it logical to make every need, including the grocery store, through online sales. If it is to be made, while there has been a significant increase in the sales and demand of some products and goods groups in the impact area of this pandemic, there has been a decrease in the sales of some products. COVID-19 has significant impact on e-commerce of the world and in some cases negative impact but overall e-commerce is growing rapidly because of virus. Coronavirus compelled to customers to use internet and make it habit in their daily routine (Abiad, Arao, & Dagli, 2020). During the pandemic period, consumers especially buy health, personal care and cleaning products.

To conclude, while the world is at war with the COVID-19 in every sense, businesses and companies have to evaluate the economic consequences of this crisis. They can learn a lot from this crisis and can explore new the opportunities that arise due to crisis and businesses can exploit those opportunities.

The public health crisis in the form of COVID-19 showed that businesses and governments should make radical changes in the areas of production and distribution so that in such crisis the necessary infrastructures should be there to meet the requirements of distribution and demand of the different products and services.

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REVIEW ARTICLES

From Agile to DevOps, Holistic Approach for Faster and Efficient Software Product Release Management

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Abstract

Release management is one of the most important software processes and is a set of processes that includes the compilation, configuration, and management of software versions in different environments. In recent years, changes in processes, technologies, and tools and changes in practices and understanding have paved the way for more effective, efficient, sustainable, reusable models and methods in this field. The purpose of this study is to examine the DevOps idea to produce a flow, highlight their benefits, and investigate with a model how these philosophies, which are two of the most important processes and methods in software development today, can reveal an effective release management process. What has been learned from the research is how the agile and DevOps practices, which have become widespread in recent years, can be positioned in a general flow in the release management process, although there are different practices, flows, disciplines, and technology. Sharing a case study on these issues in future studies and an experience sharing research where the flow is applied as a case study will reveal positive feedback on the real-life application and results of the flow and the model. Further, a literature review studies in which deficiencies in the literature are identified will be useful in determining the gaps in the process.

1. INTRODUCTION

Software processes are both defined by many international standards and are widely used today with their practices. Release Management, which is included in all of these international standards (such as ISO 27001, 27005, 20000, 31000, ITIL V3, CMMI, etc.) in software processes and includes the practices of publishing the code, product, software after the development phase, is a very critical phase. The basic principles underlying this challenge are complicated by differences in business processes, differences in environments and services, and even differences in standards. Also, especially developing technologies, emerging new approaches, new services, and the increase of companies that develop solutions in this field make these processes very open to change and development, which creates the need for frequent updating of models. The first of these, which emerged with a manifesto written in 2001 is one of the most important methods in the software world today, Agile Manifesto (Highsmith & Fowler, 2001). The other is the DevOps idea, which

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was put forward at the Agile Toronto conference in 2008. In this study, the DevOps idea will be examined to produce a flow, highlight their benefits, and investigate with a model how these philosophies, which are two of the most important processes and methods in software development today, can reveal an effective release management process.

General Situation

According to the definition of Newman (2015), the state of a system in a specific configuration is called a version. Release management is the name given to the flow that covers all of the processes in which these specific versions are defined and kept in a recordable state. However, Gordon and Hernandez (2016) define the concept of release management as a computer science discipline that is used to control the release of applications, software, updates, and patches in different domains and environments. The importance of software release management has always been high in the field of software development where versioning is very important and documentation, configuration, and even implementation are based on version. Many companies have release manager and release coordinator roles. Because actually, release management refers to the stage and this process in which the pure source code turns into a software product.

It is difficult to separate the issue of release management with agile, which is one of the most used methodologies in software development today. Because the goal of Agile development is to be able to create stable releases more often than traditional development methodologies allow. In other words, new features and functions are released at short intervals or even several versions per month instead of being developed for a long time and released in a single version, which makes the release management more critical. (Shore, 2007)

2. LITERATURE REVIEW

Although issues such as Agile and DevOps are newly emerging concepts, while Agile was introduced in 2001, DevOps started to come to the fore in 2008, there are studies for different disciplines in this field (Fowler & Highsmith, 2001). For example, in agile software development keyword search, approximately five thousand articles are listed in Web of Science. For DevOps, this figure approaches a hundred. However, these models and technologies are examined from the perspective of the release management, which is one of the most important steps and objectives of the software management and software development life cycle, and there is no flow suggestion that all these models can work end-to-end. This study focuses on this deficiency in the literature and aims to offer a holistic flow and model proposal.

Software Development Life Cycle

According to the definition of Chapple and Seidl (2020), the Software Development Life Cycle (SDLC) describes the steps in a model for software development throughout its life. In other words, every development process, especially the product development process, includes certain stages. It should not be forgotten that software is also a product. In this context, it is possible to talk about various stages for the development of a production item, a vehicle, or a product, and there are similar stages for the software. The sum of these stages is the software life cycle and the development process is called the software development life cycle. There are different approaches to this model. The first approach reduces the SDLC steps to 4 and these can be counted as follows (Blanchard and Fabrycky, 2006). These stages can be listed as planning, analysis, design, and finally adaptation and operation.

Another approach in this area is the 7-step approach presented by Kendall and Kendall. This approach consists of the following steps (Kendall and Kendall, 1992): 1. Determining the problem, opportunities, and goals 2. Determining the human level information needs 3. Determining the system needs (demands) 4. Designing a system that responds to the requests obtained in the light of the steps so far 5. Development and documentation of the software. 6. System tests and determination of maintenance steps. 7. System realization and evaluation. It is also possible to get rid of the software development life cycle from a step-based approach, and a view in which different methods come to the fore and are shaped by different principles and approaches. There are different software development life cycle models, such as the waterfall, incremental,

spiral, and rapid prototyping (Pressman, 2007). In this life cycle, which can be defined as the journey of the software product from scratch to infinity, software release management also takes an important place. Besides, methods such as Agile and DevOps have been included in different stages of this cycle over time.

Release Management and Change Management

Release management is defined as "*a software engineering discipline that controls the release of applications, updates, and patches to the production environment. The goal of release management is to provide assurance that only tested and approved application code is promoted to production or distributed for use*" (Gordon & Hernandez, 2016). On the other hand, the coordination of the deployment of the change is the responsibility of the change management. Change management is defined as "*a set of processes that deals with the management, uploading, tracking, monitoring, and retrospective recording of all changes. It is closely related to release management and deployment processes and matches all business processes*" (Gallacher & Morris, 2012).

Latest Methods and Principles

The release management process has a structure that contributes greatly to the increase of service quality and continuity in IT, to decrease the risks, costs, time of product release, and to increase the consistency of the live environment. Many different technologies and tools continue to emerge to increase this contribution and efficiency. Especially release automation systems and process automation systems contribute to increasing the efficiency of release management. However, some important principles and technologies emerge throughout the entire life cycle before the release management process. These are, CI / CD, Cloud DevOps Systems, Build Automation Platforms and Processes, Agile, Pipeline Management Systems and Technologies, Deployment and Release Technologies, Snapshot and Version Management Softwares, etc.

These new methods and principles enable the release management to be handled more effectively in many areas. Keeping the configuration in version management systems such as git enables monitoring and control mechanisms. It also provides a structure that allows changes to be implemented, moved, and rolled back. Also, it provides the opportunity to manage without the need for patches in live environments, working with branches and managing different environments, real-time data management, and determining the needs and conditions of the environments can be listed as other advantages. Besides, backed up servers, real-time server management, virtual and cloud environment management also provide a very clear management opportunity. Also, pipeline logic and philosophies such as pipeline as a code provide very advantageous management. This structure means the implementation of pipelines and steps in this pipeline such as test and deploys as software components in continuous management environments. In addition to these methods, infrastructure as a code and configuration as code structures also ensure effective handling of DevOps principles and release management.

Agile in Release Management

Agile Software Development Method is a frequently used software development methodology. The main feature of this software development methodology is that it is easy to integrate and adapt quickly to customer notifications. One of the most valuable features of agile projects is the release of functions and the frequent release of new versions, which significantly increases the value and makes the release management process important to agile (Shore, 2007).

Overlooking the release processes while dealing with agile process implementation and agile transformation will result in huge losses. Within the Agile structure, it is a quality release management of the product that customers and stakeholders expect from the software development team. The new features of the product may be developed quickly, but it would not be correct to say that agile processes can be advanced if these innovations take days or even weeks to be brought to life and loaded into different environments. The way to get frequent and fast releases in integration with Agile is also through a proper DevOps structure. The problems in the quality control/test engineering part are also valid here. Insufficient resources make the automated start-up system imagine.

DevOps in Release Management

Release Management provides content packaged in a full version to the production environment and indeed different working environments. Also, the planning of the releases systematizes the management of large-scale releases and versions that we can call release candidates (Agarwal et al., 2010). Especially the management of such multimedia broadcasts, versioning, and deployment processes can become very complex processes, and the need to use different pipelines arises (Sharma, 2017). If the process starts, one of the things that is needed the most in such a process is to establish an organization and technology network that can act in an integrated manner throughout the entire life cycle of an application, from development and testing to deployment and operations. It is named DevOps. In other words, this philosophy, which follows the planning, monitoring, and development flow from the beginning to the end, by establishing a structure that enables development and operation teams to work together, and sometimes even bringing these two teams into one team, takes its name from these teams. Another important feature of DevOps is that it automates and uses applications that automate manually performed processes that are inefficient in terms of time management by incorporating different technologies and principles into the process. These automated processes and tools also enable developers and operations teams to communicate with each other, while ensuring efficiency by ensuring that interactive work is done independently.

According to Hüttermann (2012), DevOps is the job of creating a flow by closing the gap between development and operation teams throughout the entire software development process and managing the process without loss. This job reduces batch size and cycle size rates in software development projects, and also facilitates automated publication management and handling deployment and release processes together.

While DevOps is a set of philosophies and operations, many reasons make DevOps have such a positive impact on release management. These basically can be listed as Continuous Integration, Continuous Deployment, Infrastructure as a Code, Monitoring, Web Services, Log and Data Management and Institutional Structure, Communication, and Cooperation culture. One of the main factors that make the release management process successful in the DevOps perspective is to understand the dynamics and structures that make up it. For this, it will be useful to examine these structures one by one.

Continuous Integration: It is a pipeline system that enables the developed versions and codes to be integrated with the previous version by going through certain stages and tests in a pipeline logic. Continuous Deployment: Continuous deployment is the ability to deploy the desired version by manually triggering it to the desired environment. The basis is that when releasing the software, establishing a trust mechanism and developers have to trigger manually (Arundel and Domingus, 2019). Hering (2018) argued that the definition of infrastructure as a code can be expressed as an architecture in which all infrastructures connected to operations are kept in a specific configuration unit and the configuration setup is defined in a structure that can be processed sequentially. According to Janca (2020), microservice is an acronym that characterizes microservice architecture, and when we see this definition, we need to think of an architecture based on multiple services running on the same unit and used through the application programming interface. Also, corporate cooperation and culture feed the DevOps principles in terms of business conduct and processes, and tracking and retrospective records in terms of incident and log management. And all these possibilities enable the DevOps philosophy to provide a functional framework for proper release management.

Model for Faster and Efficient Release Management

Changes in software development processes and technology, the emergence of new applications, tools, architectures, and philosophies also reveal the need to model and define processes within a practice. When the principles are examined from the perspective of release management, it is seen that end-to-end management, process, and model are needed. Agile methods, practices, end-to-end application habits, and especially with the effect of DevOps practices, philosophy, and dynamics such as CI / CD, which have started to increase in importance and value in recent years, it is necessary to define a model that includes all of these principles and handles the software development process from end to end.

To address such a model, it is necessary to consider the entire software development lifecycle from end to end. Because in Winkler (2011) argued that the goals of version management do not only cover the release

phase. These goals include effective management of all stages, from planning and calculating the relevant version, to developing the processes to be used in the project presentation, and to managing customer expectations during and after project delivery. Such a model should follow the structure below. A model with this structure can find a holistic place in the literature in terms of both implementation of quality functions, ease of configuration management, agile adaptation, and integration to DevOps processes, and can be followed in real-life scenarios with its compatibility with the flow of SDLC processes and steps.

1. Requirements and Analyzing Step: This step should include three steps. Gathering software requirements, their analysis and planning based on epics, user stories, and issues following agile principles At this stage, it is determined which of the relevant methods of the agile will be used, the collected requirements are divided into business and functional requirements, business requirements are parsed to functional requirements and epic-based plans are made on board basis.

2. Change Management: This step is the stage in which issues related to the relevant requirements are created as change requests and their approval processes are advanced by the relevant product, project manager, or product owner. Items that will enter the release process are created and approved at this stage.

3. Development and Testing: This stage is the stage where approved change requests are coded, developed, and tested. This stage is more critical in one aspect because, according to Gordon and Hernandez (2016), the release management process starts in QA testing activities. In other words, it can be stated that release management processes and criteria come into play from this stage. It is important to take into account the agile practices applied in the previous stages in the development and testing process for the healthy walking of this stage.

4. Configuration and Deployment: The most important part of the process in terms of release management is here. The agile practices, CI pipelines, CD practices and DevOps applications applied throughout the entire process are actually for the versioning of the code that has passed certain tests, verified, authorized by QA under the correct configuration, and emerged as the output of the release management process. Planning the configurations, which is the first stage of this process, is very critical. Hohmann (2003), emphasizes that the configurations that are used in the release management process, known as institutional and widely used, make the release management more effective. Sharma (2017) examines release and deployment together. It even expresses that release and deployment are referred to as the whole set of processes related to the media-based deployment of products and services that emerge as a result of an iterative process and deal with their distribution in different ways. From this perspective, the Configuration, QA Authorization, and Deployment processes stand in the middle of release management and affect it end-to-end, even the deployment is the stage where this process emerges as a product. For this reason, the practices and technologies to be applied here are important in terms of applying the release process as a model.

5. Review and Closure: It is the step that includes the monitoring and review phase and the closure of the release after the implementation of the product that emerged during the release management process in different environments. It is the last step of the release management process, in this process, steps such as evaluation, retrospective from agile practices are applied, and the implementation of the existing monitoring and plan stages within the DevOps process will make the last step of release management more healthy and functional. Besides, this stage also reveals the success of the release, so at this stage, it may be necessary to check whether the processes are fully functioning, the use of official standards and procedures, the functionality of control and acceptance gateways, and a closing audit. After explaining the model with principles and stages, we can list it as follows;

1- System requirements are collected from users and customers. These requirements are kept integrated with requirement management systems.

2- Business and software analysis processes are improved, business requirements evolve into functional requirements.

3- Sprint plans are started about the requirements, issues are designed in story and epic-sized backlog.

4- CRs i.e. change requests are created for relevant updates and defects.

5- It is determined that the CRs regarding the project manager, product manager, scrum master meetings will be approved and developed.

6- The system is coded and developed. The coding of the system is completed at this stage. At this stage, working with agile methods and taking advantage of the flexibility and iteration opportunities provided by the agile provide a serious advantage for the model.

7- Developed codes are tested. Using agile methods and DevOps practices during the test phase helps the stages such as continuous integration, development, test, deployment to progress effectively.

8- Authorization of QA, Configuration, and other stakeholders is provided.

9- The code is deployed to the relevant environment. Integration of CI/CD and DevOps processes is important at these stages.

10- Post-implementation reviews are made, certain audits are made.

11- Relevant publications and CRs are closed, the version is completed. Since this version is integrated with DevOps processes, it is very open to testability, traceability, and progress in an automated pipeline. However, it is important that these approaches and methods advance in an iterative and repetitive manner at every stage and the integration of both Agile applications and DevOps tools and technologies into processes.
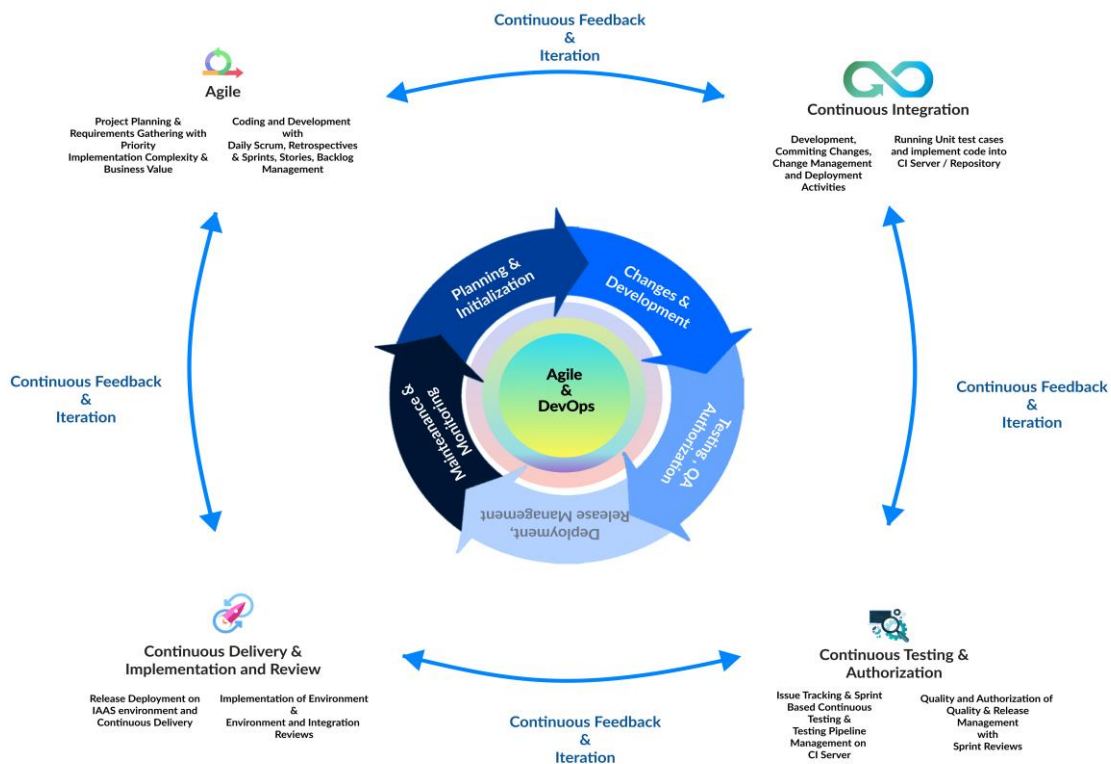
Figure 1: Model Suggestion with Agile and DevOps in Release Management

3. Advantages and Disadvantages of the Model

The most important feature of this model is that it handles change and release management processes together and while doing this, it progresses in a structure suitable for DevOps and Agile practices. After planning the flow in general terms, agile principles can be applied especially throughout the entire flow and provides a structure suitable for DevOps processes. The implementation of these practices reduces the risks

in software release processes, minimizes the possibility of disruption, facilitates communication and documentation management, provides an iterative structure, providing modularity, reusability and applicability. Besides, automatic release, which is a stage of the effective implementation of DevOps practices, makes the release management process much faster, time-saving, and lean (Hüttermann, 2012).

Also, according to the results of their research and suggested in Logue and McDaid (2008), incremental and renewable release methods that can be integrated with agile methods and can be planned following the changes that occur as the project progresses contribute to efficiency. But the study by Elberzhager et al. (2017) shows that; In addition to the case study where we have seen prosperous applications of companies such as IBM and Netflix, in the case of Fujitsu, the goals, processes, questions and end-to-end pipeline must be well defined for the success of DevOps applications and the release processes managed by DevOps. Dyck et al. (2015) measure the following clearly in their study; An advanced and competent release management and engineering process is in line with the DevOps mentality and takes a highly supportive approach to it. Besides, applying the release processes within the companies in a correct management model and compatible and integrated with DevOps increases the efficiency in the production processes and thus the efficiency and value of the product. However, teams that are not competent in agile may experience serious problems with this integration. It is proclaimed in this study that providing a more flexible, more adaptable, and more fragmented structure in our study and in the model we present can facilitate this transition. Furthermore, it can be said that these processes require very serious measurement and analysis, otherwise their impact will decrease.

4. Acquisitions and Future Researches

This study, was mainly followed by a literature review and documenting a flow obtained from practical experience, literature, and established standards and proposing a model in which different standards and practices would be interconnected. What has been learned from the research is how the agile and DevOps practices, which have become widespread in recent years, can be positioned in a general flow in the release management process, although there are different practices, flows, disciplines, and technology. Sharing a case study on these issues in future studies and an experience sharing research where the flow is applied as a case study will reveal positive feedback on the real-life application and results of the flow and the model. Further, a literature review study in which deficiencies in the literature are identified will be useful in determining the gaps in the process.

Furthermore, it will be useful to examine different technologies and practices in this field. New management techniques that have started to emerge and their adaptations to software management have revealed new practices in software management. It will be useful to examine these practices in the context of change and release management. There is a serious gap in the literature in this sense, too. In addition to this, examining the integration of DevOps practices with all processes, and measuring efficiency, and sharing the results with case studies in which technologies and tools that will deepen this research, which deals with release management as flow, can also enable the expansion of the model and its verification with different researches.

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RESEARCH ARTICLE

Evaluation the Regional Effect of Covid-19 on the Stock Price of Airlines

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Abstract

The novel coronavirus – officially named COVID-19 – is rapidly spreading from its epicenter in Wuhan to the rest of China and the world. There have been 5,404,512 confirmed cases of COVID-19, including 343,514 deaths, reported to World Health Organization in 25 May 2020. Business face revenue losses and quarantine policies propagate worldwide and restrict travel, trade and industry. The very crucial negative influences were on the demand side, with national and international civil aviation flights critically affected in the short-term. The aim of study analyzes the changes in the abnormal return of the relevant stocks around the date of COVID-19 to investigate the rebound of the stock market. The transportation economy's stock market value for Asia-Pacific, North America, and Europe weakly impacted the region 's abnormal return that suffered from a global event-based pandemic. As a result, all civil aviation stakeholders should try to get rid of this global crisis with minimal damage, focusing on coordination, transparency and traceability by using information systems and tools.

1. INTRODUCTION

Air transportation is a major industry in its own right and also provides for well-connected inputs into economic, social and political processes. The aviation industry promotes $2.7 trillion (3.5%) of the world's Gross Domestic Price, therefore; it increasingly deploys strategic position in transportation economy (ACI, C., & IATA, 2019). Demand for air transport is firmly. associated with economic development and mutual air transport is a driver in an economy (Akyildirim et al., 2020). The impact of aviation industry on economy can be monitored by three indicators: the employment and expenditure generated by airline companies and their supply chain, the progressions of exchange, tourism and investment resulting from users of all airlines serving the country, and the city pair connections that allow these flows (Economics, 2018).

To understand the structure of aviation industry, the dominated international region by Asia-Pacific, Europe, Middle East and Africa, North America and Latin America should be individually investigated. From both macro and national perspective, airport hub or airline hubs have important structural advantages for the hinterland economy in each region. These benefits lead to strength in terms of employment and income and, taxation revenue for local government additionally (Song & Ma, 2006). Besides, each hub mutually supports

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and benefits from their aviation sector and other sector such as robust industrial, trading, maritime and tourism ecosystem (Christidis & Devetsikiotis, 2016).

The European aviation industry has the biggest and busiest airports in the country, which play a leading position as a regional and global network owing to the amount of planned connections to and from foreign flights and the amount of destinations served from the airport. (ACI, C., & IATA, 2019). The aviation markets in the EU Member States have been consolidated into a single EU aviation industry and since 1992 all national carriers are known as EU carriers (Christidis & Devetsikiotis, 2016). This alignment showed benefits by evolving the novel airway business models and integrating recent information technologies resulted in increase in travel demand.

The long-haul transfer passenger traffic in Middle East and Africa region has intensified significantly in recent years. In general, and especially, Gulf carriers have young fleets equipped with the new generation of in-flight products; earned varied award-winning customer service grants; created low unit operating costs; capitalized on their geological position by aggregating traffic bi-directionally from European, North American, and Asia-Pacific hubs (O'Connell & Bueno, 2018). Nevertheless, political tensions in some countries such as Egypt and Syria and ongoing armed conflict in Iraq have both hurt tourism sector in the region and diminished travel demand.

The aviation sector in Latin America region has been growing in recent years despite economic and political difficulties. Latin America and Caribbean aviation sector is a driver force for regional economic growth, generating $156 billion in Gross Domestic Price and sustaining 7.2 million jobs (Rodrigue, 2016). The taxation on air travel purchases and/or use, infrastructure deficiencies have hampered creating jobs and generating economic benefits in the region (ACI, C., & IATA, 2019).

North American region have the largest share of the global market regions expenditure due to status of manufacturing powerhouse (MacDonald, 2017). In North America, largest aviation area on the market, the total number of commercial units in service is higher than in other regions (MacDonald, 2017). As a cornerstone of the aviation industry North American hubs dominate the market.

According to IATA forecast to 2034, the routes to, from, and within Asia-Pacific will carry 42% of all world traffic. The network airlines in Asia have reacted to low-cost carriers (LLCs) in multiple ways, and competition increases depend on the firm's internal resources and external environment (Pearson, O'Connell, Pitfield & Ryley, 2015). Asia-Pacific comprises China and India, emerging markets in global aviation. Airline hubs have contributed greatly to domestic and international markets in these countries. According to IATA (Forecasting, 2005), in total, 0.93 percent of the China's GDP is supported by inputs to the aviation industry and foreign tourists arriving by air.

Unfortunately, the pandemic crisis has caused dramatic improvements in all aviation sector ignoring the regional superiority. This new pandemic has devastated the medical, public health infrastructure, economic in the world. Furthermore, transportation has impacted the contagion of coronavirus; at the same time public health has affected the transportation in many ways.

Highly connected international regions in the world are member of bipartite network that has intense interaction. In fact, the aviation industry already has difficulties as terrorist attack, sabotage, cyber-attack, biological, chemical and radiological attack leading to mass losses, economic or tourism damage, and weak security and security standards. In addition, this industry is severely affected by pandemic, causing subsidiary damage for many sectors in the regions. The literature contains a number of papers which examined the effect of threats on the aviation industry (Ito & Lee, 2005; Blunk, Clark & McGibany, 2006; Chance & Ferris, 1987; Bosch, Eckard & Singal, 1998; Kim & Rhee, 2017) but few of them have focused on whether the stock market-based effect of the pandemic on the aviation industry. The effect of COVID-19 pandemic on the transport economy is discussed in this study that aims to add to research on the pandemic's economic consequences as well as its limited literature on the impact of COVID-19 on transport economy.

2. THE PANDEMIC CRISIS THE AVIATION INDUSTRY FACES

Civil aviation, as one of the world's most competitive sectors, is obviously extremely susceptible to internal and external factors. Learned from numerous crises of the past decades, air traffic has been proven to

be vulnerable to economic crises such as the World Recession and the disease outbreak (ACI, C., & IATA, 2019). While the aviation industry has been exposed to many unique threats over the past decades, the pandemic is a fairly rare occurrence, causing more damage compared to others.

Coronaviruses are a wide family. of viruses that may cause respiratory infections ranging from common cold to more serious illnesses such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The last day of the year 2019, a cluster of pneumonia of unknown etiology was reported in Wuhan City. On 9 January, Chinese authorities reported in the media that the cause of this viral pneumonia was originally identified as a new type of coronavirus, different from other coronavirus found to date.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is type of coronavirus disease that circulates among animals with some of them also known to infect humans. Currently, the COVID-19 outbreak has infected nearly 5,404,512 people and caused 343,514 deaths in the world (on 25 May). The distribution of these cases on the world map is also shown in the Figure 1 below.
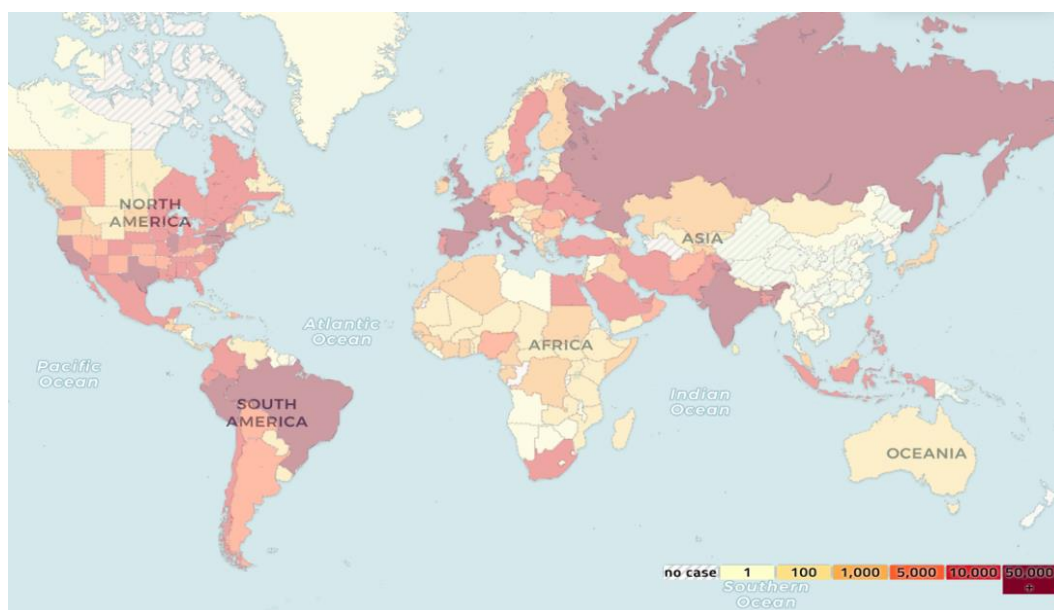
Figure 1. Coronavirus COVID-19 Coronavirus Confirmed Cases (25 May 2020)

The speed and effect of SARS and COVID-19 dispersion is explained in more than one statement. The propagation center is different. A man infected with severe acute respiratory syndrome ion Air China Flight lead to SARS spreading to northern Mongolia and southern Thailand (Twu et al., 2003). Wuhan, the COVID-19 epicenter, incorporates many elements that are difficult to handle. Wuhan is a major hub of transport and an industrial and commercial center. The COVID-19 is rapidly spreading from its epicenter in Wuhan to the rest of China and the world, surpassing the impact of the 2002 SARS-CoV and 2012 MERS-CoV outbreaks (Peng, Ho & Hota, 2020). The time span for COVID-19 outbreak is unique. Isolation was effective for SARS, transmission did not occur from asymptomatic or mildly symptomatic patients. While COVID-19 contagion process appears to contribute to the overall transmission in the early stage of infection (Bastola and et al., 2020). Hence, it is too late to isolate affected patients after infected individuals have reached health care facilities. Contamination of COVID-19 can be greater than SARS (Wilder-Smith, Chiew & Lee, 2020). Temperature monitoring is even less successful when pre-symptomatic exposure exists (Liu, Funk & Flasche, 2020). There is a heterogeneous scientific continuum. Though SARS has become a big epidemic distributed in hospitals, COVID-19 still has widespread contagion. On April 03, 2020, WHO published the data of round 1 million cases with confirmed COVID-19 in 205 countries around the world. Any other projections suggest that there might even be hundreds of thousands of pathogens around the world. Most contaminated people can acquire an infection under close medical care and are not quarantined.

Such individuals would be missing even though there was a more robust monitoring program in effect, so certain patients might secretly transmit the illness, comparable to influenza.

When SARS struck, global passenger traffic dropped by 18.5 per cent in April 2003 compared with the previous year, with Asia-Pacific falling by nearly 45 per cent (Pham & Luengo-Oroz, 2020). There were no travel restrictions at that period but travel advisories were provided by many governments to discourage non-essential travel to countries impacted by SARS (Wilder-Smith, 2006). Throughout 2003, the social impact of SARS, combined with travel bans levied by numerous national and foreign officials, culminated in a major economic decline for the airline sector and the global economy well outside the key areas impacted by SARS. On the other hand, the International Air Transport Association IATA published an initial impact assessment of COVID-19 estimating that total global airline revenue lost could be as high as $29.3 billion, with a potential 13 per cent full-year loss of passenger demand and a $27.8 billion loss of revenue in 2020 for carriers in the Asia-Pacific region (Rodrigue, 2016). The loss of value in the transportation economy will be very strong regard to long-standing travel bans.

3. THE IMPACT OF PANDEMIC ON TRANSPORTATION ECONOMY

Pandemic influenza leads to widespread mortality and morbidity. Traditional economic health practices focus on the specific impact of the health sector, while the general macroeconomic situation goes unnoticed. The decline in labor supply, the avoidance of public places and events, the possible closure of schools will inevitably affect the global economy and so a multidisciplinary approach is needed to capture the real potential impact rather than traditional methods to estimate health costs (Turnbull, Blyton & Harvey, 2004).

Investors fear coronavirus spread will destroy economic growth and government efforts are not enough to halt the decline. Central banks responded by lowering interest rates in many countries, including the United Kingdom and the United States (Hagedorn & Mitman, 2020). It will, hopefully, allow funding easier, and increase investment to improve the economy.

Not only China, but the whole world is suffering the most direct and severe effects from the epidemic. The huge export-led economies are almost paralyzed if not only for production, even consumption and other social activities go into hibernation with no obvious prospect of return (Lucchese & Pianta, 2020). In addition to the human costs, the epidemic has several direct consequences. Commercial losses or loss forecasts have been reported in all sectors: retailers, restaurants, cinemas, transportation companies, hotels, etc (Fernandes, 2020).

The financial impact of the coronavirus COVID-19 should not be measured using the simple billing device. Businesses can use generally accepted accounting principles to "hide" negative information while highlighting cheaper news such as new routes and increased passenger miles. In addition, insurance payments to the company can offset a large part of the loss, and subsequent higher premiums are difficult to record in the income statement. A more accurate measure of an event's financial impact is the response to the price of the company's common stock. In an efficient stock market, stock prices react quickly to new information and fully reflect its economic content. Many previous studies (Zitzewitz, 2003; Chen, Chen & Su, 2001; Kale, Dyer & Singh, 2020; Lee, Jiang, & Indro, 2002) have shown that the stock market is efficient enough to respond to events that are relevant to shareholders' assets.

In economic theory the reason for analyzing the stock market response as a indicator of an event 's financial effect is explained. The share price reflects an estimation by investors of potential discounted cash flows of a business. In other words, it reflects the company's profitability which will be defined by its future capacity to generate cash. The share price therefore represents the shareholders 'properties and indicates the investors' ability to provide the business with cash. If the market price responds adversely to a case, this implies investors anticipate potential lower and/or riskier cash flows. If the stock price does not respond, the incident cannot be deemed to contain any material information about the expected value or the uncertainty of the company's future cash flows (Hammersley, Myers & Shakespeare, 2008).

After the epidemic began on 31 December 2019 (Abodunrin, Oloye & Adesola, 2020), the Financial Times Stock Exchange (FTSE), Dow Jones Industrial Average and the Nikkei have all seen big declines. The Dow and the FTSE have witnessed their highest one-day drop recently since 1987 (Abubakar, 2020). With over a million confirmed cases of COVID-19, companies face revenue losses and disrupt supply chains as business

closures and quarantine measures spread worldwide and restrict movement and business. The travel and tourism industry were affected early by the economic disruption caused by the epidemic. On March 5, before the US travel ban was announced, IATA predicted that the COVID-19 epidemic could cost airlines $ 113 billion in lost business income because fewer people fly (FCE & Welbeck, 2020).

Brian Pearce, chief economist at IATA, told the Associated Press that "There are many airlines with relatively narrow margins and debt, which could put some in a very difficult situation" (Nseobot et al., 2020). In addition to the impact on airlines, the United Nations International Civil Aviation Organization (ICAO) predicts that in the first quarter, Japan could lose $1.29 billion in tourism revenue to Chinese travelers due to the drop-in passenger numbers, while Thailand would lose $1.15 billion (Стежко et al., 2020).

4. METHODOLOGY

According to the United Nations Development Programme (UNDP), "The rising COVID-19 epidemic is starting to affect developed countries heavily, not just as a short-term health problem but also as a crippling social and economic epidemic in the coming months and years.". Given the aforementioned statement, COVID-19 cases selected for the aim of this paper is considered to determine the effect of pandemic on transportation economy, including stock market. The use of civil aviation data is mandatory practice for making real-time decisions involving situation awareness, evaluations of alternatives and risk assessment within a restricted time space (Li et al., 2011).

This paper addresses the following research questions to discuss the effect of COVID-19 on airlines stock market values, as well as their potential effect towards airline hubs in the region.

- Did the number of. COVID-19 cases affect the value of the airlines stock price? Did it have regional effect on aviation industry? (The regions are the Asia-Pacific, North America, . Latin America, and Europe, Middle East and Africa).
- If yes, was the regional effect permanent or transitory? (No, so we cannot predict the outcome of a random experiment)
- Did the response of the stock market to such events change over time or stable? More specifically, .do more vulnerable stock certificate have a minimum number of public listing due to high risk?
- What is the possible effect of COVID-19 on the structure of global aviation? Can the policy towards to COVID-19 outbreak improve by using different argument for airlines, airports managements, aircraft producers and governments?

The research questions in this paper refer to the likely effects COVID-19 has had on the airline's market price endured from the pandemic. To this end, we are analyzing this impact in relation to large foreign airlines and, more precisely, stock market prices for airlines. In this study, each hub with airlines, the most connected airports, around the globe, represents each region for aviation industry due to detection of regional effect. For example, when we examine an event related to COVID-19 in the Asia-Pacific, we look at the impact of this event on the airlines' stock price in this area. Both data were obtained from investing.com and 90 trading days were obtained from 1 January to 1 April.

While determining the airlines in the study, which is a comprehensive and globally valid data set; OAG Megahubs (Regions) report was used. However, in this report, all overtaking airlines are not included in the analysis as they do not comply with certain compliance. For example, airlines that are not listed on the analysis which is not occur world stock markets. Besides, airlines in more than one stock market value only the stock market values of their own countries market are included in the analysis. In addition, the airlines with the highest transaction volume of the stock exchange were used from the airlines that have more than one name and sizes in a stock exchange. Exchange days differ due to the change of holidays in different countries. To overcome this, stock exchange trading days in 2020 were calculated for each country separately.

Examining the financial market 's response to a case, we analyze the changes in the average return of the relevant stocks around the date of the event. The daily return on a stock is defined as the percentage change in price plus the daily dividend yield, or where Rt is the return over the time interval ending at time t, Pt is

the price at time t, Pt-1 is the price at time r-1 (the previous day), and Dt is the dividend paid during the time interval (Brown &. Warner, 1985).

$$Rt = (Pt-Pt-1+Dt)/Pt-1 \qquad\qquad (1)$$

In an attempt to understand COVID-19 external influences, this paper examines temporal effect of COVID-19 on the airlines stock market and transportation economy. In this study it is offered to evaluate the COVID-19 effects on region event study approach. An event study in the areas of business/finance studies are an analysis to find out whether a statistically significant reaction to past certain type of event has occurred in the financial markets, which should affect the market values of public companies. For instances, some study focusses on event study approach on air transportation such as 9/11 impact of air transportation on economy (Tam & Hansman, 2002), effect of air transport disasters on the air transport sector (Walker, Walker, Thiengtham & Pukthuanthong, 2014) financial crises (Goh & Rasli, 2014; Mwangi, 2013) impact of oil prices fluctuation (Nandha & Faff, 2008; Elyasiani et al., 2011; Tsai, 2015), outbreak (Loh, 2006; Bogoch et al., 2015), terror attacks (Balcilar et al., 2015; Brounen & Derwall, 2010; Kolaric & Schiereck, 2016).

5. RESULTS

The temporal effects of Coronavirus COVID-19 on the stock price of airlines and the differences of pandemic impact within this broad sector are investigated. In particular, COVID-19's impact on the economy can be described as a "depression" in international finance, covering international loans, international capital flows, global financial markets, export finance, and foreign exchange sector determination.
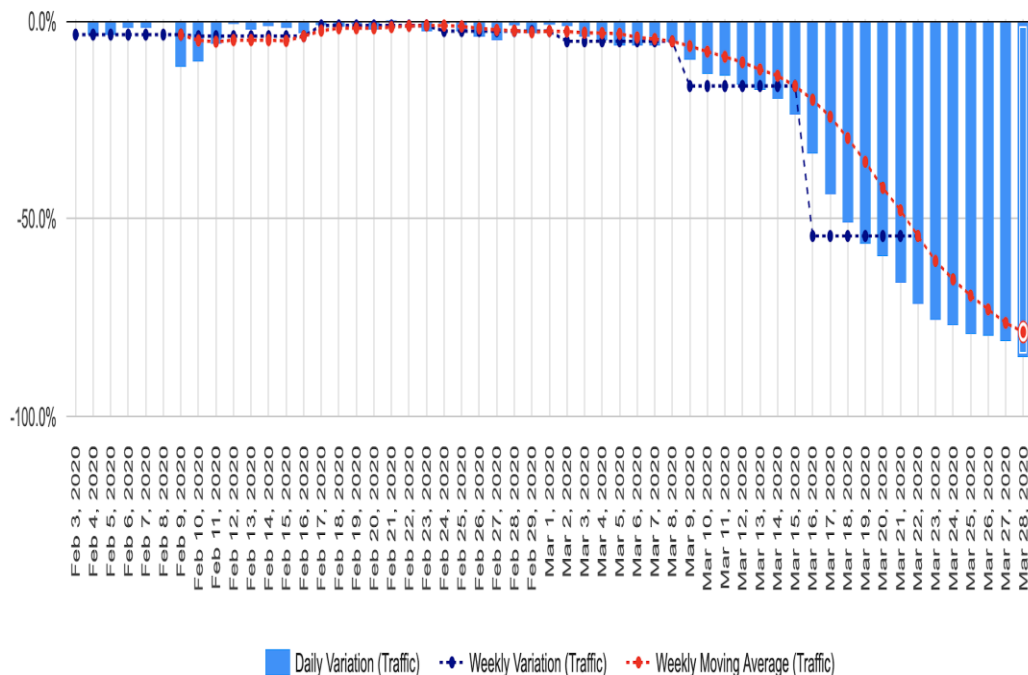
Figure 2. The change of all flight values in Europe

Therefore, the transport economy has a downward trend in the crisis; there is reference to a bigger economy, the economic collapse is quite prominent for smaller trading partners. Reducing the amount of flight by sudden moves like COVID-19 leads to loss of money including implicit and explicit charging.

In this section, we proceed with the presentation of our results that contain the correlation between the total cases of COVID-19, on the day of the pandemic that is identified new case number for country and world,

cumulative case number for country and world, with the abnormal returns (daily change) in trading days consisting of 30, 60, and 90 days. In Table 1, on the day of the pandemic, the relationship exhibited between case numbers with negative abnormal returns. (a) There is no significant correlation on the stock price based on the number of cases per country in the first 30 days and 60 days; (b) in the 90 trading days, the correlations exhibit statistically significant however correlation coefficient is low; (c) beyond the event day, the correlations shows gradually positive relationship between number of case and negative abnormal return though it is weak. The stock market reaction remains in limbo to assess the effects of COVID-19, mostly due to the period following the pandemic. It also analyzes whether this impact is constant or temporary, calculated by variations between recent days of trading and earlier ones. There seems to be an impact based on global events, yet it is not absolutely permanent.

Table 1. The relationship between the numbers of COVID-19 cases with abnormal returns

Correlation coefficient & sig. value	30-days	60-days	90-days
New Case Number for Country	-0.021 (0.614)	0.023 (0.445)	0.060 (0.014)**
Total Case Number for Country	-0.022 (0.597)	0.002 (0.943)	0.030 (0.224)
New Case Number for World	-0.086 (0.037)**	0.056 (0.061)***	0.109 (0.000)*
Total Case Number for World	-0.098 (0.017)**	0.256 (0.000)*	0.059 (0.013)**

Note: *significance at the 1%, **significance at the 5% level and ***significance at the 10% level

The global influence of COVID-19 outbreak on the Asia-Pacific, Middle East, Latin and North America, Africa and Europe financial markets is addressed in Table 2 and its implications are contrasted with those of earlier trading days. (a) National impact indices revealed a statistically important link between irregular returns and certain events on pandemic trading days, but the size of the correlation coefficient was greater than in earlier trading days. (b) The aforementioned weak correlation, the stock market value of transportation economy for the so-called 'birthplace of COVID-19' and Europe impacted against the abnormal return of the country that suffered from pandemic based on global events. (c) As far as the countries events are concerned, there appears the regional effect on North America in the long haul. (d) There is not notable variant between former and latter trading days; the effect inconsiderably appears to persist for at least of some cases in the latter trading days.

Table 2. Multi-dimensional perspective to relationship between the COVID-19 and stock price

Correlation coefficient (sig. Value)		Latin America	Asia Pacific	Europe	Middle East	North America
World new case	**30-days**	0.089 (-0.417)	-0.116 (0.091)**	-0.148 (0.093)**	-0.088 (-0.436)	-0.095 (-0.389)
	60-days	0.072 (-0.361)	0.027 (-0.59)	0.133 (0.036)*	-0.102 (-0.202)	0.077 (-0.33)
	90-days	0.086 (-0.18)	0.132 (0.001)*	0.096 (0.061)**	0.156 (0.014)*	0.104 (-0.103)
World total case	**30-days**	0.065 (-0.554)	-0.108 (-0.118)	-0.165 (0.061)**	-0.154 (-0.17)	-0.104 (-0.344)
	60-days	-0.296 (0.000)*	-0.148 (0.003)	-0.318 (0.000)*	-0.252 (0.001)*	-0.389 (0.000)*
	90-days	0.042 (-0.507)	0.091 (0.022)*	0.045 (-0.382)	0.09	0.038 (-0.556)
County new case	**30-days**	. (.)	-0.11 (-0.888)	0.034 (-0.699)	-0.042 (-0.707)	-0.458 (0.000)*
	60-days	-0.249 (0.006)*	0.05 (-0.312)	-0.205 (0.001)*	-0.045 (-0.578)	-0.404 (0.000)*
	90-days	0.124 (0.089)**	0.04 (-0.32)	0.069 (-0.182)	0.052 (-0.422)	0.113 (0.075)**
Country Total case	**30-days**	. (.)	-0.012 (-0.859)	-0.042 (-0.637)	-0.075 (-0.505)	-0.185 (0.091)*
	60-days	-0.214 (0.018)*	0.018 (-0.72)	-0.203 (0.001)*	-0.138 (-0.085)	-0.488 (0.000)*
	90-days	0.091 (-0.21)	0.019 (-0.639)	0.055 (-0.282)	0.04 (-0.537)	0.067 (-0.296)

Note: *significance at the 1%, **significance at the 5% level and ***significance at the 10% level

In Figure 3, the impact of COVID-19 on transportation economy is considered in terms of variation of response time towards the airlines stock price value. This trend between the abnormal return and volume may signify how important coronavirus news in vulnerable eventual return. The trend is closely dealing with the power network of investor, who have at their disposal a lot of trade volume in the world.
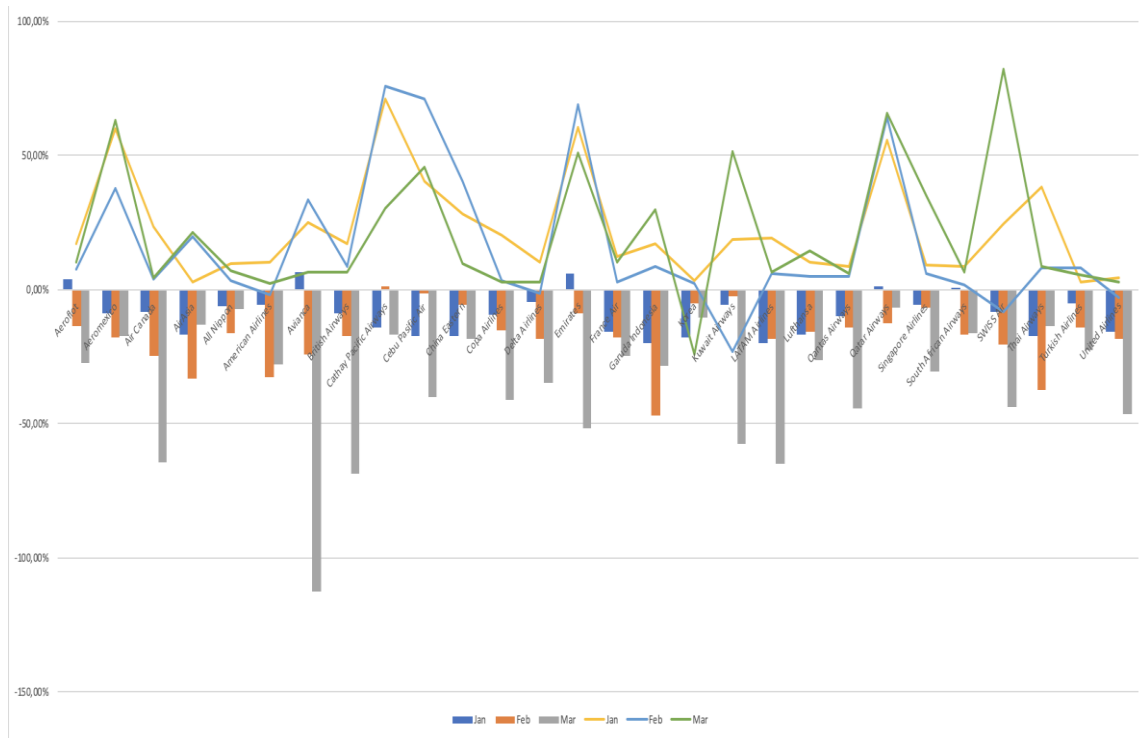
Figure 3.The comparison of the airlines stock price and volume

Figure 3: The comparison of the airlines stock price and volume

In the case of a pandemic, passenger aircraft use decreases, while demands from medical and cleaning supplies for cargo aircrafts may increase. Therefore, cargo operations should be increased, and passenger planes are used in cargo transportation as much as possible. Aviation industry has become fiendishly complex, and the converting their passenger jets into cargo planes to keep business afloat in stock market positively impacted on transportation economy.
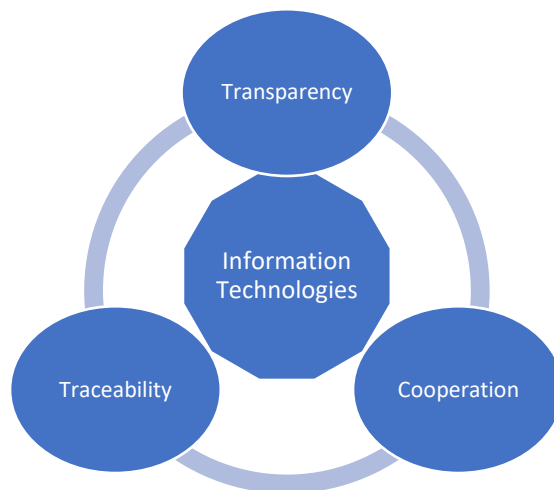
Figure 4.The manageable functions with information technology

In the light of all these results, aviation is a customer-focused economic sector that is affected by the coronavirus pandemic. In order to survive this global crisis with minimal damage, civil aviation sector with all stakeholders should take responsibility as a member of the sectorial team. Fulfilling the roles and responsibilities of team members might be possible with the open communication channel, transparency and

traceability for achieving stated objectives as in Figure 4. Major stakeholder groups, including airlines, airports, governments, employees and passengers can realize the importance of a combination of three key factors, thanks to information systems technologies.

6. CONCLUSION

Coronavirus drive stocks down especially in civil aviation markets. COVID-19, which spread to 148 countries (31 March), has put pressure on businesses and supply chains around the world. This global health crisis threatens to overwhelm global supply chains in China. In customer-focused economic sector, consumers change their behavior such as delaying or cancelling flights.

The pandemic often alleviates market demand because of travel bans or staying at home, also without a policy directive to do so. As the impact of coronavirus and multiple government travel reactions was caused into technical bankruptcy or in breach of debt covenants. Cash reserves are running down quickly since demand is drying up in ways that are completely unprecedented.

Airlines companies closed sharply lower and their stock prices tumbled at the start of trading. The airlines particularly Asia-Pacific airways flight and their load factor fall down therefore their stock prices collapsed. The share price of airlines not only in Asia-Pacific region but also more active carriers in North America and Europe have sharply fallen since outbreak began. Stock market manages the uncertainty through alliance with government and industry (airports, airlines and also manufacturer)

In short, the coronavirus outbreak environment has made a geopolitical standoff. However, the aero-political conflict along nationalistic lines would have colossal implications for the entire industry. The adjustment progress in close global collaboration can manage with open communication channel, transparency and traceability using by information technologies.

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RESEARCH ARTICLE

Illustration of Customer Analytics in Public Procurement

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Abstract

According to European Commission and OECD, the share of public procurement in national economies (GDP) is 14% in EU countries and 12% in OECD countries. This rate is an important policy tool in Turkey is 7%. Public procurement is essentially made under the Public Procurement Act 4734. Besides, exceptions have been arranged for some institutions and organizations in order to meet the needs quickly and on-site. At this point, the State Supply Office appears as a central purchasing institution based on the role of intermediary between suppliers and public institutions. The aim of the study is to determine the profiles and purchasing tendencies of the customers who buy from the State Material Office by catalog method within the framework of customer analytics. In this context, customer segments based on value and behavior were created through analytical marketing methods RFM (recency, frequency and monetary) analysis. A strategy map was determined with the results obtained and the results were monitored on the business intelligence platform. Customer analytics are used extensively by the leading companies of the banking, telecom and retail sectors and significant outputs are achieved. Within this framework, customer analytical studies conducted in the public market are also important.

1. INTRODUCTION

The appropriation allocated for information and communication technologies (ICT) investments from the central government budget in 2018 amounted to approximately 5 billion ₺, an increase of nearly 5.5 times since 2002. While the ratio of investments made in information and communication technologies, which returned in a short time and made significant contributions to business efficiency, to total public investments in 2002 was 2.9%, this ratio was 5.8% in 2018.

Although there is no clear data on how much is invested in analytical applications in the public sector, it is known that analytical application projects exist and that these projects are increasing gradually. It is very important that the information technology investments of public institutions, which understand the

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importance of the difference these applications will make, are in the direction of data recording, processing and security. From this point of view, analytical and predictive studies in the public procurement sector are considered to be very important.

Considering the share of public procurement in national economies and public expenditures, and as a development and policy tool in national economies, it is an area open to research. Public procurement is a policy tool that needs to be analyzed especially as it builds and develops national technological capability and capacity, and thus accelerates economic development. (Yulek & Tiryakioğlu, 2015).

The most important guide of the Directorate General of State Supply Office (DMO), which is the official implementer of public procurement in Turkey, in achieving its medium and long-term goals is the strategic plan of the institution. There are two performance indicators. One of the important strategic objectives in the plan was stated as "Providing effective, efficient, fast and sustainable central supply service", and this strategic objective was determined as "Increase rate in the number of customers purchasing (compared to the previous year)" and "Customer satisfaction rate". In the public sector, as in every sector, knowing the customers, determining their profiles, understanding what they want and distinguishing the most valuable ones are of vital importance in terms of customer relationship management. It has been seen that approaches such as analytical marketing methods and customer relationship management are needed at least as much as companies in the private sector, since there are no customer analytics-like studies with public institutions in the position of customers of the sector and DMO is a for-profit government company. Thus, it is aimed to increase sales and efficiency by offering the right value proposition to the right customer at the right time, while designing more effective and less costly action plans.

In terms of marketing, companies don't need to put in the same effort to win or retain every customer. Some customers are in a position to bring more profit to the business because of their purchasing habits or because the business's products add more value to it. The important thing is to get in touch with the right customer at the right time and on the right subject. This is also aimed with customer relationship management (Corbae et al., 2003).

Establishing and managing close relationships with customers is an important success factor for any business (Corbae et al., 2003). Developments in information and communication technologies, especially the significant increase in the amount of data stored in electronic media, and the difficulty of interpreting this data in terms of human capacity have led researchers to analytical studies (Balaban & Kartal, 2015).

Public procurement; especially when it is supported with analytical tools such as business intelligence and data mining, many studies can be done on savings, efficiency, appropriateness and sustainability. Namely, it is known that investments have been made in recording and storing data in the public sector, but the studies on processing and analyzing the data have just begun. In terms of public procurement, it is very important to analyze the purchasing tendencies of public institutions, which are considered as customers, on the basis of value and behavior, and to determine the future procurement profiles of public institutions.

Briefly; Issues such as the need to increase its market share and profitability according to the market conditions as required by the DMO business model, and the presence of a "customer" stakeholder who does not have any purchasing obligation, have made customer analytics studies in the public procurement sector essential. With the study, while evaluating the customers, in addition to the total purchase amount, other parameters that are important in customer loyalty and customer valuation, such as the date of the last purchase and the frequency of purchases within a certain period, are included in the analysis; Segmenting them into value-based segments such as "Star", "Loyal", "Potentially Loyal", "Hold-Develop" and "Risky", behavior-based segments such as "churn", "passive", "single purchase" and it is aimed for DMO to develop and implement marketing strategies by setting targets according to segments.

The organization of the study is as follows; In the method section, the tools and methods used to make the data suitable for analysis, the outputs and effects of the model in the findings section, and the results in the discussion and conclusion section are explained within the framework of the research problem.

2. METHOD

CRISP-DM approach, which is a widely used data mining standard today, was used in this study. (Shearer, 2000).

Within the scope of the study, instead of exporting the data in the ERP (Enterprise Resource Planning) system and analyzing it statically with data mining tools, the IBM SPSS Modeler product was directly connected to the Oracle database and a dynamic model setup was preferred. Thus, historical records are provided to affect the model instantly and it is possible to obtain up-to-date outputs at any time. A customer datamart was created by moving the tables containing the descriptive data of the customers in the ERP, recorded during registration, and row-based data covering all the historical data generated during sales and purchasing, to the data warehouse scheme with the SQL and ETL tool. By adding customer information in other modules to the aforementioned datamart, target data sets were created and finally, the data were made relational by making the data suitable for analysis. The application was modeled with the IBM SPSS Modeler analytical tool. After the data required for analysis was taken from the database in all streams where the analysis was made (analysis area, stream), operations such as data cleaning, deduplication, editing, and creating new variables from existing data fields were performed.

While cleaning the data, the inconsistencies in the analysis data fed from the operational systems were eliminated, arrangements were made according to the constraints in line with the business needs, and abnormal records were excluded from the analysis. The data made suitable for the analysis were subjected to RFM analysis, which is known as an effective analytical marketing model in the field of customer analytics, and with this method, value and behavior-based customers were segmented.

RFM Analysis; It is an abbreviation of the words Recency, Frequency and Moneatry and is an analytical method used for effective marketing method. Its main premise is that customers with recent, frequent, and large purchases are the most promising customers in future marketing campaigns. The results obtained in the researches showed that;

There are three main factors that increase the likelihood of a customer to respond to campaigns, and these are listed in order of importance:

• If the customer has shopped recently, customer can still shop. Recency

• If the customer is shopping frequently, customer can still do it. Frequency

• If the customer's total purchase amount is high, customer can still shop.

In this framework, in the RFM analysis, current customers are scored with values between 1 and 5 in terms of Relevance, Frequency and Amount based on their shopping history. Thus, existing customers are divided into 125 different customer types with 3-variable RFM scores ranging from 1 to 5.

In the study, data cleaning and editing of the customer records that are consistent in 2016 and after, respectively, were carried out. RFM segments (star, loyal, potential loyal, retain-develop, risky) are defined. In addition, due to the nature of the RFM model, behavior-based segments such as loss, passive and single purchase were determined for the data not included in the model. Then, for the customers in the RFM segments, Two Step clustering processes are performed separately for the vehicle, catalog and mixed sales types and on the basis of each R, F, M parameter information, and the most discrete cluster is determined as the first segment according to the separation status of the clusters. By re-clustering with Kohonen networks, other segments were defined and in which segments the customers were located was analyzed. Finally, the generated RFM segments were separated according to lost, passive and single purchase customer segments and defined as separate data sets.

3. RESULTS

As a result of the scoring and segmentation made by looking at the expenditures made by the customers, the currenity and frequency of the expenditures since 2016, the segments detailed below were obtained.

STAR: It is the customer group that makes purchases most frequently, most up-to-date and in the highest amounts. It is the customer group with the highest score in terms of purchase frequency and currency, and purchase amounts.

LOYALTY: It is a group of customers who buy frequently, recently, with high amounts.

POTENTIAL LOYALTY: This is the customer group with lower purchase relevance compared to the loyal customer segment.

HOLD / DEVELOP: This is the customer group with low frequency and up-to-dateness. The purchasing stability of this group is low.

RISKY: It is the customer group with the lowest purchase frequency and up-to-dateness.

RFM analysis, which allows only value-based segmentation, was completed in a sense and combined with behavior-based segments, and the subject was discussed with a comprehensive CRM perspective. Behavior-based segments and their definitions can be examined below.

SINGLE PURCHASING: It is the customer group with a single order number and therefore not included in the RFM analysis.

LOST: It is a group of customers who have not arrived in the last 4 quarters, and who have returned two or more in the previous 4 quarters.

PASSIVE: It is the customer group that has never arrived in the last 4 quarters and has come once or never in the previous 4 quarters.

When value-based segments are examined, it is seen that important information is obtained for the marketing department. The knowledge that nearly half of the customers are not very valuable according to the model, but only 2.2% of them are very valuable, is very critical in terms of marketing costs.

Figure 1.RFM Segments

In order to minimize analytical and operational marketing costs, customers are segmented with the most valuable label instead of the most purchaser. To give an example of the information in Figure 1; Although the customers in the star segment were 2.2% of the total customers, they made 19.4% of the sales. Customers in the risky segment, on the other hand, made up only 8.5% of the sales, despite being 45.4% of the total customers.

	The Number of Customers	Customers (%)	Revenue (%)
Star	82	%1	%16,4
Loyal	575	%6,9	%33,6
Potential Loyal	546	%6,5	%15,6
Hold & Improve	844	%10	%11,9
Risky	1703	%20,3	%7,2
Single Purchase	3175	%37,9	%3,1
Valuable Churn	36	%0,4	%6,3
Churn	838	%10	%4,2
Passive	588	%7	%1,6

Figure 2. Segment Overview

Customers who are not included in the RFM model due to rule sets are further grouped into five RFM segments according to their behavioral-based buying trends. Thus, all customers were evaluated with a holistic approach. According to the information in Figure 2; While 38% of the total customers were included in the RFM model, 45% of the total customers were in the single purchase, 10% lost and 7% passive segment. On the other hand, customers included in the RFM model realized approximately 85% of the total sales.

4. DISCUSSION AND CONCLUSION

In the previous parts of the study, the usage areas of the concept of customer analytics in customer relationship management processes and the public procurement sector, and the importance of the public procurement economy for the world and our country were mentioned. Then, the methodology and findings of the study were shared.

As a result of the studies, since not every customer is included in the analysis due to the nature of the RFM model, some rules were defined for non-model customers, so that the study was holistic. At the end of the study, customers were segmented based on behavior and value, and no out-of-segment customers were left. Behavior-based segments are defined as single purchase, loss, and passive, while value-based RFM segments are defined as star, loyal, potential loyal, retain-develop, risky.

In order to use this holistic model, various analytical reports have been designed that can be easily accessed by sales units. With these reports, sales units will be able to easily determine which customers can visit and within what framework, promotion distribution, focus customers and priorities.

Analytical reports are designed to automatically create tables in the database to be shared with all sales units quarterly. Thus, it was also possible for both business units and senior management to monitor the reports, actions taken and their results on the business intelligence platform. The reports are designed in a flexible structure so that they can be monitored by important categories such as sales units, budget type, top administration and province. And finally, two new performance indicators have been introduced for sales units that are followed only by sales targets. These;

1. RFM Segment Pass Rate (the goal of moving each customer to the next segment)

2. Loss Recovery Rate (target of recovering abandoned customers identified as lost)

When the reports and performance indicators produced as a result of the study are examined, it is seen that important inputs are produced for studies such as customer loyalty program, customer visit/event program

and incentive model. Thus, it is aimed to make customer relationship management more centralized and less costly.

When the performance indicators determined for the sales units are analyzed, as can be seen in the "RFM Segment Transition Target" table detailed below; It is aimed to move at least 5% of the customers in the segments to the next segment for the next period. If the sales units achieve these targets for the customers in their portfolio, an additional income of at least 285 Million ₺ is expected.

Table 1: RFM Segment Transition Target

UNIT AND SEGMENT CUSTOMERS	5.RISKY	4. HOLD& IMPROVE	Transition (%5)	3. POTENTIAL LOYAL	Transition (%5)	2.LOYAL	Transition (%5)	1. STAR
PAZARLAMA DAİRE BAŞKANLIĞI	241	131	7	101	5	102	5	21
İZMİR BÖLGE MÜDÜRLÜĞÜ	186	99	5	76	4	65	3	17
BURSA BÖLGE MÜDÜRLÜĞÜ	188	104	5	68	3	70	4	9
İSTANBUL BÖLGE MÜDÜRLÜĞÜ	182	100	5	77	4	77	4	20
TRABZON BÖLGE MÜDÜRLÜĞÜ	145	65	3	53	3	36	2	6
ESKİŞEHİR BÖLGE MÜDÜRLÜĞÜ	148	61	3	47	2	53	3	8
MERSİN İRTİBAT BÜRO MÜDÜRLÜĞÜ	124	61	3	39	2	36	2	7
GAZİANTEP BÖLGE MÜDÜRLÜĞÜ	93	48	2	33	2	35	2	4
ERZURUM İRTİBAT BÜRO MÜDÜRLÜĞÜ	94	36	2	24	1	20	1	2
ELAZIĞ BÖLGE MÜDÜRLÜĞÜ	78	49	2	23	1	18	1	3
DİYARBAKIR İRTİBAT BÜRO MÜDÜRLÜĞÜ	61	34	2	34	2	11	1	1
VAN İRTİBAT BÜRO MÜDÜRLÜĞÜ	44	22	1	14	1	20	1	
TOTAL	1.584	810	41	589	29	543	27	98
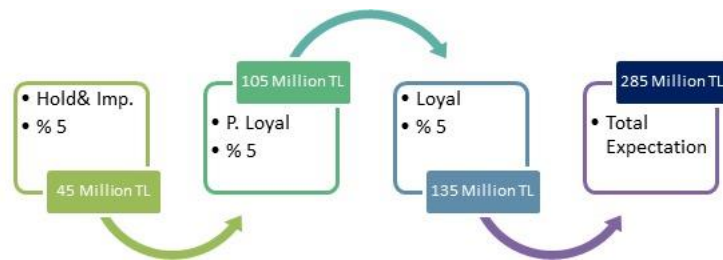
Figure 3: Segment Transition Expectations

When another performance indicator determined for sales units is examined, considering the sales statistics for the 2016 - 2018 period, the table with details below; According to the CRM model, a total of 813 catalog customers did not use any purchasing method in the last 4 quarters and showed an "abandonment tendency".

In this context, it is aimed for sales units to "recover" at least 15% of the customer institutions that have tended to leave in 2019.

Table 2: Lost Gain Targets

Sales Units	Churn Customers	Churn Recovery Targets
STOK SATIŞLARI VE ÖDEMELER ŞUBE MÜDÜRLÜĞÜ	136	20
İZMİR BÖLGE MÜDÜRLÜĞÜ	100	15
BURSA BÖLGE MÜDÜRLÜĞÜ	98	15
İSTANBUL BÖLGE MÜDÜRLÜĞÜ	78	12
TRABZON BÖLGE MÜDÜRLÜĞÜ	73	11
MERSİN İRTİBAT BÜRO MÜDÜRLÜĞÜ	67	10
ESKİŞEHİR BÖLGE MÜDÜRLÜĞÜ	59	9
ERZURUM İRTİBAT BÜRO MÜDÜRLÜĞÜ	47	7
GAZİANTEP BÖLGE MÜDÜRLÜĞÜ	47	7
DİYARBAKIR İRTİBAT BÜRO MÜDÜRLÜĞÜ	37	6
ELAZIĞ BÖLGE MÜDÜRLÜĞÜ	36	5
VAN İRTİBAT BÜRO MÜDÜRLÜĞÜ	35	5
Total	**813**	**122**

In summary, if at least 15% of the customers with a sales potential of 700 Million ₺ and who have a tendency to leave are regained, it is aimed to generate an additional 105 Million ₺ income to the total sales. As a result, the expected results for the CRM approach and RFM analysis were achieved with the study.

The results of the study were found to directly benefit the DMO business objectives. In particular, it is thought to contribute to the realization of strategic goals. Marketing units have become able to follow their customers with determined segments with monthly or weekly reports. Analytical information generated by segment transitions and lost customer reports will be used to make data-driven decisions. Thus, as in any business, all expenses spent on customer communication can be optimized. On the other hand, it is seen that the outputs of the study also meet the concepts and requirements of CRM and RFM.

On the other hand, with the study; Academic contributions were made to subject areas such as analytical studies in the public procurement sector and customer analytics in the public sector.

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