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Mobile Application Classification Method Using Machine Learning Based User Emotion Recognition

Taewon Kwak, Sungkyunkwan University, wonny2001@naver.com

Abstract: In this paper, we propose a convolutional neural network based application method which shows superior performance in image classification. Recently, various requirements such as emotional UI, rather than the existing Touch UI method, have been presented in the mobile UI field, and a methodology for this is presented. First, it recognizes human facial expressions through Convolutional Neural Networks (CNN).Based on the second recognized facial expression, a multi-layer perceptron (MLP) Learning. This enables the application to be executed only by the user's face when the mobile application is restarted. In order to implement and experiment on this, we implemented and experimented with the Google inception model structure to enhance the performance of face recognition in the first CNN - based facial recognition step. In the second application classification step, We implemented a method using multidimensional data for recognition. As a result, CNN - based facial expression recognition achieved about 98% accuracy, and based on this, the application classification to be studied in this paper was able to obtain a maximum of 97.9% accuracy

Keywords: CNN, MLP, Emotion Recognition, Facial Recognition, Mobile Application

Geometric Programming: A Strong Optimization Tool for Biological Systems

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Abstract: Geometric Programming: A Strong Optimization Tool for Biological Systems Sherry Swartwout1, Ehsan Atefi2, and Nand Jha3 1Undergraduate student, Mechanical Engineering, Manhattan College, sswartwout01@manhattan.edu. 2Assistant Professor, Mechanical Engineering, Manhattan College, ehsan.atefi@manhattan.edu. 3Professor, Mechanical Engineering, Manhattan College, nand.jha@manhattan.edu. We used Geometric Programing to develop a computational model of the human respiratory system for studying the influence of ambient air quality on cell metabolism. The respiratory system was modeled as a system having two inputs with two outputs consisting of three phases. Each phase has several components that are exchanged between air and blood in the human respiratory system including oxygen, carbon dioxide, hydroxyl group, ions, etc. This model has been discussed in detail by Beightler and Philips [1]. Next, Gibbs free energy was developed for the block model using thermodynamics of phases with multiple components. Finally, Geometric Programing was implemented to minimize the Gibbs free energy resulting in finding the phase-forming component concentration. Geometric Programing enabled us to precisely study the effect of change in ambient air quality on the levels of oxygen and other components delivered to the cells. The outcome of this study is used to analyze the effect of ambient air component on tissue metabolism. [1] C. S. Beightler and D. T. Phillips, "Applied Geometric Programming", John Wiley & Sons Inc; 1St Edition, 1976.

Keywords: Operation Research, Optimization, Geometric Programming, Sensitivity Analysis, Biological Systems, Human Respiratory System

A Simulation Approach for Estimating 112 Emergency Department Capacity Under Changing Population

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Abstract: 112 Emergency departments play an important role in the case of accidents and emergency health problems. The number of ambulances and the location of 112 service stations have vital importance on reaching to the emergency case as well as the time of arrival and departure of the ambulances from the stations. Effective planning of the capacities of 112 services in an appropriate manner facilitates the management of the process. Determining the capacity by using of real data based estimation methods will bring a more effective management process. The purpose of this study is to plan the capacity requirements of 112 Emergency Service Stations by estimating the growth of population in the European side of Istanbul. The population data of selected region was obtained by TURKSTAT (Turkish Statistical Institute) web site for 2008 to 2017. Some interviews ware done with 112 Emergency service directors and 10 years of call-time data was taken by providing necessary permissions and ethical statements. This call-data was transformed to inter arrival call time data. This data was tested by Kolmogorov-Smirnov conformity test to observe if it fits with exponential distribution through SPSS software. After following these steps, a regression model was created between the growth of population and inter arrival times of call-data. New inter arrival times were obtained and a simulation model was built to mimic the new behavior of 112 Emergency Service in the European side of Istanbul. By simulating the 10 years of data obtained from estimation, the 112 Emergency Service capacity requirement of selected region was forecasted.

Keywords: Discrete Event Simulation; Regression Modelling; Emergency Department Capacity Estimation; Capacity Planning

Androıd Applıcatıon "Gamarc" As Support To Green Campus Concept – Case Study Ugm Yogyakarta

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Abstract: University of Gadjah Mada (UGM) is the oldest university in Indonesia located in Yogyakarta city, precisely in Bulaksumur region. In the framework of educopolis area, a conducive environment for learning process and responsive to ecology issues, the provision of campus bicycle service as one of the manifestation of the vision is required. In the process of borrowing bicycles in the preceding system exist some problems with the manual paper recording system used by some campus bicycle lending stations. As a response to the ineffectiveness of the previous campus bike lending service process, an Android – based lending application which facilitates services is necessary, concerning the mobility and touchy traits of communication among academic community that is more fluent in using the smartphone nowadays. This application is made by waterfall method using Android Studio software. Users of this application are Students, campus bike administrator, Lecturer and the internal employees of UGM (Civitas academica UGM). This research produced an UGM campus bicycle lending application called GamaRC. This application can facilitate users to make the process of borrowing and refunding the campus bike with barcode scanning facility. GamaRC application is expected to be implemented in the internal environment of UGM campus so that the concept of educopolis and green campus UGM can be fulfilled.

Keywords: Green Campus; Campus Bike Applications; Lending System; SDLC Waterfall Method

Mechanical milling as green technology to produce novel bio-based polymer nanocomposites

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Abstract: The introduction of novel functionalities into polymers, by means of mechanical milling, is one the greatest challenges of science and technology of materials. Mechanical milling has been demonstrated to be an efficient and green technique for the production of polymeric nanocomposites with advanced structural and functional properties. The possibility to avoid solvents and high temperatures contains within itself several advantages. Solvents generate inevitable disposal and environmental problems; high temperatures and shear stresses cause degradation in polymers. The main advantages, in comparison with the traditional technologies, are the simplification of the processes, ecological safety and decrease in number of technological stages. Mechanical milling is a green and cost-effective method that involves the use of mechanical energy to produce novel materials. Very recently it has been used as revolutionizing technique for the manufacture of many advanced polymeric nanocomposite. The methodology to incorporate fillers into the polymeric materials are those currently used, such as casting from solution and melt blending at high temperatures. Mechanical milling at low temperature and with no solvents has been demonstrated to be not only the most suitable for natural polymers that undergo degradation phenomena before melting, but also useful for the incorporation of nano-fillers with labile (active) molecules. In this work are presented several examples of novel bio-based nanocomposites having multifunctional properties obtained using this green technology. The development of this alternative technology for produce polymer nanocomposites allow the possibility: 1) to produce advanced materials at ambient temperature, 2) to modify polymer structure and physical properties without chemical reactions, 3) to introduce thermo-labile molecules into nano-structures, 4) to process thermosensitive polymers and nano-fillers

Keywords: Mechanical Milling, Green Technology, Polymer Nanocomposites

Wearable Technology for water dispersal of Clear surfaces

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Abstract: This research project aims to investigate the design and development of an electronic, wearable anti-water device to address the problem of reduced visibility, on clear plastic and glass surfaces, caused by collected surface water. The research integrates a number of disciplines including electronic engineering, IOT and wearable technology. Central to the project is the use of the principals of centrifugal and centripetal forces and it includes the development of custom electrical and engineered prototype components as well as 3D printed housing units. It is hoped that the proposed device will offer a practical and permanent solution to a major safety concern across a range of industry sectors. Crucially it also provides an alternative environmentally friendly solution that avoids use of damaging chemicals. Preliminary research has shown significant commercial potential for the development of such new wearable technologies. For example, the motorcycling industry generated a gross output of approximately $7.3 billion in 2016, yet there are currently no technology solutions (helmet, visor or goggles) on the market to provide a reliable, safe and robust water dispersal options. There are also a range of other industry sectors with significant cross-over potential as many other areas are impacted by reduced visibility on clear surfaces. Eg. Camera technology. Drone technology, Emergency Services, Sport & Recreation and Military.

New Eclat Algorıthm Based on Map Reduce Framework

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Abstract: The data mining is an approach that is used to draw the relations, correlations, patterns from the data that exists in the data repository. Association rule mining is one of the data mining techniques that are used for mining/ extraction of items/ trends from the set of data. Mainly association rule mining is used for mining frequent itemsets that leads to generation of associations among the data set. The proposed work is to develop an Eclat algorithm with Map Reduce framework to carry out the extraction process effectively. The Algorithm is implemented in four phases that are Data Extraction, Partition into groups, Map reduce technique and Redistribution process. The transactional data from FIMI repository is collected. The data file contains list of transactions that is transaction Ids with corresponding set of items. During data extraction phase the tids and itemsets are separated out for further processing. The items are then partitioned into groups by using k-means clustering based upon the centroid values. Third map reduce technique is applied, in which data items are mapped with each other than shuffled and reduced to eliminate same set of data. In end redistribution is carried out, with the split and merge process on the basis of the minimum support count that is computed and items are categorized into frequent and infrequent itemsets. The factor on with the performance of the proposed algorithm is computed are computational speed and processing time.

Keywords: Data Mining, Eclat, Map Reduce

The application of long range ultrasonic testing (LRUT) for examination of Crack, Wear, Fatigue Stress and Corrosion on Turbine Shaft.

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Abstract: LRUT (Long range ultrasonic testing) is a rapid way of screening for corrosion in pipelines in oil, gas and petrochemical industries. LRUT is performed using a system which is made up of a low frequency flaw detector, a pulsar receiver unit, some transducer rings, and a laptop computer which contains the software that controls the system. The technique differs from conventional ultrasonic testing, in this method, when generated in pipes these plate waves are known as guided waves. This method of NDT is available for difficult or impossible condition of test (e.g. where the pipe is buried, insulated, sleeved elevated on pipe racks, etc. LRUT provides information about the presence of flaws and their location along the pipe. This paper presents the methodology of using LRUT on Turbine Shafts, LRUT have many significant capability that by that capability we can inspect the considerable and sensitive shafts like turbine shaft, for example LRUT can test up to 100 meters screening distance on pipelines, the we can most of shafts by different long around 100 meters. LRUT can Focusing capability to evaluate corrosion distribution around pipe circumference, by this ability we can inspect and find damage, corrosion distribution and crack on around surface of shaft. LRUT have ability to Testing of pipe from 2" up to 48" diameter then LRUT have ability to testing of shaft in different diameters. And one of special and unique capability of LRUT is possibility to do test shaft with don't need to Disassemble of turbine. Also LRUT can detection of metal loss > 3%, this ability of LRUT is very useful to find detection on shaft surface. And finally LRUT can more than 100 times faster than traditional ultrasonic methods and Low cost screening with 100% coverage and available to test inaccessible sections. Keywords: LRUT, Shaft, Turbine, Pipeline, Damage.

Keywords: LRUT, Shaft, Turbine, Pipeline, Damage.

Using an Expert System to Optimize Energy Conservation in the Newark Public Schools

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Abstract: Energy auditing is widely used in existing facilities in order to determine how energy is used and how it can be conserved. In the design of new buildings, there are numerous tools to reduce energy usage through certifications systems like LEED and programs like ENERGY STAR® Portfolio Manager. It is often difficult, however, to make realistic prediction of improvement levels in existing buildings and to achieve desired results. The research team at the New Jersey Institute of Technology has developed an expert system using the science of heuristics to better model usage in existing commercial buildings and to predict future improvements more accurately. The software performs an initial audit analysis of all the major building systems including building envelope, HVAC, lighting, office equipment and appliances, water and hot water, and waste handling. A novel feature of the expert system is that it analyzes energy flow within the building more interactively and cohesively, as opposed to looking at each system individually as do most energy analysis tools on the current market. During the auditing process, the software queries user habits and system controls to understand occupant behavior, which can have a significant effect on actual energy usage. Responses are analyzed using Bayesian functions to develop heuristic factors, which are then applied to the results of the audit analysis. This ensures that energy usage is modeled as it is used and operated, as opposed to how it was designed, which can differ significantly. Once the heuristic factors are applied to audit results, the expert system performs a synchronization step with a forcing function to converge the calculated energy usage with actual consumption from the utility bills, so that energy efficiency may be optimized in the target building. The software then generates a list of recommended upgrades that are prioritized by cost, ease of implementation, and projected energy savings. Sustainable and resilient strategies are also recommended by the system, since it is becoming increasingly important that a building not only be "green" but also be resilient in the face of a disaster, natural or otherwise. It also identifies and directs the education and training that needs to be applied. The expert system has been calibrated and validated at ten school buildings within the Newark Public Schools District. These provide ideal test cases given the range of age, construction type, and extremes of heating and cooling loads associated with the Northeast climate.

Keywords: Green Technologies; Performance Management; Managing Sustainability; Energy Management; Energy Auditing;

Optimized Least Squares Support Vector Regression for Time-Series Prediction of Construction Stock Price

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Abstract: Stock prices are predicted to determine the future value of companies' stock or other financial instruments that are marketed on financial exchanges. However, the stock market is characterized by nonlinearities, discontinuities, and high-frequency multi-polynomial components because it interacts with many factors such as political events, general economic conditions, and traders' expectations. Therefore, making precise predictions of stock values are challenging. Recent research suggests that hybrid forecasting models can be usefully applied to the stock market's fluctuations, yielding satisfactory forecasting precision. This study used a sliding-window least squares support vector regression model to capture the linear and non-linear characteristics of a stock price time series and confirmed that hybrid forecasting models are powerful tools for practitioners in management science. To evaluate the proposed approach, it was applied to construction stocks in Taiwan. Historical daily closing stock prices were taken Yahoo! Finance, a publicly accessible website. The performance measures that were used to assess the predictive accuracy of the proposed system included the root mean square error (RMSE), the mean absolute error (MAE), the mean absolute percentage error (MAPE), and the mean square error (MSE). These indexes are used to measure whether the predicted values are close to the actual values. For the day-ahead prediction of construction stocks, the average RMSE, MAE, MAPE and MSE values were in the ranges of 1.372-2.308, 0.558-0.863, 1.372-1.745% and 1.883-5.239, respectively. In particular, the one day-ahead prediction of the price of the 2597.TW stock was better than those of the other construction companies in this investigation. Therefore, the proposed model can be used as a tool to forecast stock prices for short-term investing. The proposed model is a promising predictive technique for highly non-linear time series, whose patterns are difficult to capture by traditional models. It may be of great interest to home brokers who do not possess sufficient knowledge to invest in such companies. In the future works, the model can be verified by other stock markets such as China, Japan and Hong Kong.

Keywords: Least Squares Support Vector Regression, Metaheuristic Optimization, Hybrid Model, Construction Company, Stock Price Prediction.

Factor Analysis in Fault Diagnostics using Random Forest

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Abstract: Factor analysis is generally used in regression and classification problems for identifying the significance of each factor that contributes to the formation of class variable. This type of analysis is extensively used in application such as customer segmentation, data mining and predictive maintenance. Predictive maintenance or condition-based monitoring is a machine maintenance methodology where the health of the critical components of the machine is continuously monitored. The main modules of predictive maintenance are data collection, feature analysis, early fault detection, fault diagnosis, severity analysis, time to failure prediction and factor analysis. Factor analysis plays a trivial role in predictive maintenance to identify significant factors that contribute to the formation of each failure mode in the machine. This information is perceived as a feedback mechanism in the life cycle of a product. Key factors contributing to each failure mode is generally used to redesign the product to eliminate the potential failures. In this paper, an industrial rotating machine is used where vibration and ambient temperature data is collected for monitoring the health of the machine in real time. The optimal number of groups are identified by using within sum-of-square method and elbow method. Gaussian mixture model-based clustering is used to cluster the data into significant groups, and frequency spectrum analysis is performed to diagnose each cluster to a specific failure mode of the machine. The significant features that attribute to a particular mode of the machine are identified by using random forest classification model and variable importance analysis.

Keywords: Predictive Maintenance, Fault Diagnosis, Clustering, Factor Analysis, Random Forest

Investigating biopolymers enhanced with NFC for 3D printing

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Abstract: 3D printing is a relatively new manufacturing process by which parts are manufactured from a computer model in layers by selectively adding and consolidating the raw material in successive layers. Currently, the polymer based additive manufacturing industry mainly uses petroleum based filaments a limited and nonrenewable resource, and dominate the marketplace for traditional manufacturing methods such as injection molding. Recently, biopolymers that are more sustainable, such as polylactic acid (PLA), have started to gain traction as a competitor to these traditional synthetic polymers. These biopolymers, which are derived from renewable sources, can help reduce the dependence on petroleum based polymers which are generally considered non-renewable. The objective of this research is to investigate the use of polylactic acid enhanced with nano-fibrillated cellulose for 3D printing

Keywords: Biopolymers, Nano-Fibrilated Cellulose, 3D Printing

Correlation Analysis of Industrial Robotic Trajectory for Consistency and Motion Rate

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Abstract: This research is devoted to develop an empirical correlation mathematical based for consistency and time of a robotized industrial task simulating an automated manufacturing work-cell such as the robotic leaser cutting using an educational robotics test-cell. The correlation is to investigate contributions of the impact parameters on the performance of robotized work-cell. Processing time models the cycle time and quality of the task has been modeled in terms the consistency of cutline. A set of mathematical formulas have been used to simulate the consistency and cycle time in order to tackle the variability of proposed sources as pieces of time and dimensions that need to be processed in the loaded parts the work-cell; in addition the relationship that suggestively correlates the impacts. A set of experimental tests has been conducted responding to the predicted formulas for the cycle time and consistency. Experimentation factors that have been leveled from minimal to maximal values are selected based on the robot's computer operating system in terms of processing speed, motion properties, and termination types the default characters of the programming. Analysis the results shows that the correlation can be used to tradeoff the programming solutions objectively depending on the task design requirements. The contribution of this research work is to introduce a new depiction of optimizable factors of robotic computer programs that directly affect the performance criteria

Keywords: Industrial Robots, Manufacturing, Factors, Responses, DOE Analysis

Civil Engineering Education in Iran: From Curriculum Issues to Educational Policies

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Abstract. This study tries to provide a general overview of civil engineering education in Iran and specifically to present some of the major curriculum issues as well as misleading policies. To this end, a review of the available literature was conducted. Also, some public data, including policies and curriculum of civil engineering at the level of university were analyzed. From the curriculum perspective, the results of the study revealed that there are two main issues resulting in the failure of many civil engineering programs to train young engineers. First, the curriculum has not been updated for many decades so it does not reflect the new state-of-the-art technologies and advancement in the field of civil engineering. Second, the curriculum is theory based and lacks practical training for the students. By the same token, the policies in Iran toward education in general and engineering in particular are based on an overemphasis on localization which can deprive faculties and students from having enough collaborations with their counterparts in other countries. Therefore, by providing some suggestions, the researchers argue that in order to improve the quality of civil engineering programs in Iran, both the curriculum as well as the policies need to be revised to reflect the current needs of the students in the 21st century.

Keywords: Civil Engineering, Curriculum, Educational Policy

Relating Individual Characteristics and Task Complexity to Performance Effectiveness in Collaborative Problem Solving

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Abstract: The number of crews, teams, and collaborative systems within organization is expanding significantly. As the complexity of the environment in which employees operate increased, turning to team-based structures is increased. Some examples of the complex environments can be foreseeing the organization 10 years forward, team coordinating to save a life in an emergency room, or fighting with an ever-changing enemy in an ever-changing battle field. Regrading to increase in use of team, research studies are more interested in the prediction of effective team performance and factors that may have impact on performance. Team composition has been a popular topic because of its theoretical and practical implications. Theoretically, team composition research goes to the heart of understanding how individual attributes combine to form effective interdependent groups. Since about couple of decades ago, the team composition has been assumed to influence team processes and outputs. It has also been recognized as a crucial factor that impacts team performance. Yet, despite recognition of the importance of team composition variables, the effect of non-demographic composition characteristics on team processes and performance in work settings has seldom been studied. As one of the team-based skills, the term collaborative problem solving (CPS) is being developed more and more in a different variety of group task environments (e.g. face-to-face and with peers) specifically for novel and non-routine tasks. Several research studies and reports over the past two decades indicates the importance of CPS. The main purpose of this research is to evaluate how individual characteristics (e.g., personality and ability) of functioning work teams relate to differences in team performance effectiveness. This research includes evaluations of factors such as the task characteristics and personal characteristics on distributed collaboration groups engaged in problem solving tasks. Significant interactions might be found to indicate that there are combinations of traits more (or less) productive than expected, giving evidence that group composition affects group performance. Applying this alternative conceptual approach in the present experiment, it may be hypothesized that some combinations of individual traits would yield group performance

effectiveness differ. Characteristics such as interpersonal dependency, individual working memory capacity, or preferred learning style might contribute significantly to the variation in group performance effectiveness. Likewise, environmental factors such as task complexity may impact team performance. The research questions for this study examine whether participant performance on a demonstrable problem-solving activity would be affected by: (a) Team composition, and (b) complexity (simple task versus complex task).

Keywords: Collaboration, Decision making, Personality

Effectiveness of Business Accelerator Services in Turkey: From the Perspective of Startups

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Abstract

This study analyses the startup companies attending business accelerator programs in Turkey. Business accelerators are new generations of incubation programs born especially to support technology entrepreneurs and help them reach to the next level. This study makes a research on eight accelerator programs. These accelerators are Kworks, ITU Seed, SuCool, IOT Telco Labs, Pilot, Starter's Hub, Lonca and Albaraka Garaj. Using a survey developed for entrepreneurs attending these accelerator programs, this study provides an inside look into the effectiveness of these programs from the perspective of startup companies. The main goal of the study is analyzing how startups use the services provided by the accelerator program. A total of 125 entrepreneurs who belong to 106 different startup companies attended the survey. According to startup's employee size, average monthly turnover and exportation status, several hypotheses have been identified for measuring the effectiveness of supports provided in these accelerator programs. The data have been analyzed via SPSS and the hypotheses have been tested using Mann-Whitney and Kruskal-Wallis methods. There are studies studying entrepreneurs and companies in government incubators in Turkey but the literature lacks information about entrepreneurs and startups attending accelerator programs in Turkey. Therefore, this study contributes to the literature by filling this gap.

Keywords: Accelerators, Incubators, Startups, Digital Entrepreneurship

1. Introduction

Technology has developed rapidly for the past decade. Due to this advancement, anyone can easily start an internet business (Clarysse et al., 2015). The costs of founding a new technology business is much less now compared to the initial development phase of the internet. Open source software and cloud technology has reduced the costs of developing a new software significantly. Therefore, entrepreneurs need less capital and also, take less risk compared to the Nineties. In the Nineties, the costs of founding a new internet company was higher and required a serious investment (Hochberg, 2015). For that reason, starting a new technology business involved more risk (Dee et

al., 2011). In order to reduce this risk and support new ventures, business incubators started to be established around the world.

Incubators became widespread in the late 1980s as providers of office space and innovative companies gathered together in these centers (Adkins, 2002; Lalkaka and Bishop, 1996). Nevertheless, incubators didn't have an exit policy and this has led to problems for investors (Bruneel et al., 2012). As a result, a new type of program called "accelerator" was born. Accelerators, as the name suggests, accelerate new businesses by offering them specific services for a restricted amount of time usually from three to six months (Cubukcu and Gulsecen, 2018). These services include training, mentoring, office space, advertising, networking and access to different financing options (Cohen and Hochberg, 2014; Ozkasikci, 2013; Miller and Bound, 2011; Marangoz, 2016; Mian, et al., 2016). Technology companies called startups often apply to accelerator programs through an online open application system and they are accepted into the program after a certain selection process.

Miller and Bound (2011) states that an accelerator is defined to have the succeeding six characteristics: seed investment in exchange for equity, time limited support, an application process open to all, cohorts or classes of startups, a focus on small teams rather than individuals and graduation with a demo day (Clarysse, et al., 2015; Pauwels, et al., 2015). In Turkey, there are 28 accelerator programs as of April 2018 and only 10 of them carry these characteristics. Out of these 10 programs, 8 of them agreed to participate in the study and this study performs a research on the startup companies of entrepreneurs who have attended or are currently attending these eight accelerator programs. These programs are ITU Seed, Pilot, SuCool, Kworks, Starter's Hub, IOT Telco Labs, Albaraka Garaj and Lonca.

2. Startup Companies in Accelerator Programs

There are over 213 accelerators in the world according to Seed-DB, a platform that analyses accelerators (Pauwels, et al., 2015). There are only 28 programs that call themselves an accelerator in Turkey. However, there are very few studies in Turkey that analyses these accelerator programs. There are some studies that analyses the characteristics and demographics of entrepreneurs in government incubator centers such as Sungur and Dulupcu's "Survival Performance of Tenant Firms in Business Incubators (ISGEMS) in Turkey" (2013) and "The Role and Importance of KOSGEB in Improving the Entrepreneurship in Turkey" by Oktem, et al. (2007). Nevertheless,

many accelerators have been founded very recently usually within the past five years. For this reason, studies with entrepreneurs and their startups are not sufficient.

This study aims to look at statistics about startups in the 8 accelerator programs mentioned above. The need for support from accelerator programs and the benefits startups receive from these programs will be evaluated. Moreover, the below propositions will be analyzed.

Newly established companies must reach a minimum effective size in order to survive and earn revenues. (Wagner, 1994; Audretsch, 1995; Delmar ve Wennberg, 2010). Therefore, larger startup companies grow much faster and more in size compared to small ones. (Fritsch et al., 2006) Smaller companies also need more support to grow and progress and this support is achieved through accelerator programs.

H1a: As the business grows, the need for support from the accelerator program reduces.
H1b: As the business grows, the benefit it receives from the supports of accelerator program reduces.
H1c: As the financial turnover increases, the need for support from the accelerator program reduces.
 H1d: As the financial turnover increases, the benefit the business receives from the supports of accelerator program reduces.
Startup companies in accelerator programs are in the growth and development phase and for this reason, they usually only do business locally. Since exporting is a complete different process in itself, startup companies often need consulting support to manage this process in the best possible way (Engelman et al., 2015). Startup companies prepare for exportation with the help of services provided by the accelerator programs and the incubator centers. (Engelman et al., 2015). It is obvious that exporting increase the volume of a company. There are studies explaining that exportation have a positive effect on the growth and survival of companies. These studies are described in Sapienza et al. (2006) and by Olivares and Suarez (2007). As the company grows, the need for accelerator programs decreases and the company benefits less from these supports.

H2a: Exporting reduces the need for support from the accelerator program.
H2b: Exporting reduces the benefit the business receives from the supports of accelerator program.
The fact that there is a lot of competition in the industry requires companies to make different breakthroughs in order to take a share from the market and grow. If there is a lot of competition in an industry, companies can get a share of the market by reducing prices, selling a very high quality

product or by offering an innovative product (Schmalensee, 1982, Gans and Stern, 2003). Startup companies often enter the market with an innovative product, but of course the product-price equilibrium must be in a position that the market can accept (Gans and Stern, 2003). Startups need accelerator programs to find out these rates and to prove themselves to the customers.

H3a: If there is not a lot of competition in the market, the need for support from the accelerator program reduces.

H3b: If there is not a lot of competition in the market, the benefit the business receives from the supports of accelerator program reduces.

3. Methods

The data for this study are provided by a survey on accelerator programs. The data collection process of the survey started at the end of September 2017 and completed at the end of December 2017. The methods used to collect data are as follows. First of all, the coordinators of the accelerator programs were called to get an appointment to visit the offices of the programs or their training facilities. Entrepreneurs who were present during the visit were requested to complete the survey at that point in time. The printed version of the survey was used in this phase for collecting data from entrepreneurs. The accelerators visited were ITU Seed, Starter's Hub, SuCool, Kworks, Albaraka Garaj and Lonca. The survey data filled in these programs were transferred to the electronic environment afterwards.

In electronic environment, SurveyMonkey is used to collect and save data. Coordinators of accelerator programs sent the link of the survey to the remaining entrepreneurs who were not present during the visit and also graduated from the programs. The training sessions of IOT Telco Labs and Pilot programs were over so these accelerators were not visited. For this reason, the data for these programs were only collected on the internet via the link sent to the entrepreneurs. Also, the link of the survey was shared in social media through groups of related accelerator programs and through various groups related to entrepreneurship. Thus, more data for the survey were collected.

A total of 162 people participated in the survey, but only 130 of them completed the survey totally. Amongst these 130 people, 5 of them were excluded from the study because they had participated in programs outside of the targeted accelerators, so overall 125 people in our target group filled out the survey. These 125 entrepreneurs belong to 106 different startups. This number is sufficient to move forward with the research considering other studies in the field. Mian (1997) interviewed

87 companies from 1 incubation center while doing a research on incubation centers. Rice (2002) conducted interviews with 32 entrepreneurs who are from different incubators along with 8 incubator coordinators. Ratinho (2011) interviewed 101 companies from 12 different incubation centers for his thesis. Meru and Struwig (2011) collected data from 124 different companies involved in any incubation center. Soetanto and Jack (2013) interviewed 62 entrepreneurs selected from 1 incubation center for their studies. Ebbers (2013) interviewed 101 entrepreneurs from 4 incubators in his study. For his thesis, Jorgensen (2014) worked with 150 entrepreneurs who are in the largest incubator center called Growth Factory in Denmark. Finally, Hallen et al. (2016) interviewed 70 entrepreneurs in 8 accelerator programs.

4. Results

Below you can find the tests of the hypotheses and their results. Descriptive statistical methods (mean, standard deviation, median, first quadrant, third quadrant, frequency, percentage, minimum, maximum) are used when the study data are getting evaluated. Normal distributions of quantitative data are tested with the Shapiro-Wilk test in addition to graphical tests. Mann-Whitney U test is used to compare the two groups of quantitative variables which are not normally distributed. The Kruskal-Wallis test is used to compare more than two groups of quantitative variables which are not normally distributed. If the Kruskal-Wallis test result is significant, then, Dunn-Bonferroni test is used to determine the groups that produced significance.

The hypothesis H1a is tested in Table 4.1. Supports that have a meaningful difference according to the comparison of support utilization levels by the number of employees in the company are given below.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.1:** Comparison of support utilization levels by the number of employees employed in the company.

	Number of Employees				χ^2	p
	0	1-3	4-5	6-20		
Training	4 (3, 5)	4 (3, 5)	4.5 (4, 5)	4 (3, 5)	0.746	0.862
Mentorship	4 (3, 5)	4 (4, 5)	4 (3, 5)	5 (4, 5)	1.515	0.679
Office	4 (3.5, 5)	4 (3, 5)	4 (3, 5)	4 (3, 5)	0.234	0.972
Laboratory	0 (0, 1)	1 (0, 2)	0 (0, 1)	1 (1, 3)	5.693	0.128
Advertising	2 (1, 3)	3 (2, 3)	2 (1, 4)	3 (3, 5)	7.991	0.046*
Networking	4 (3, 4.5)	4 (3, 4)	3.5 (3, 4)	5 (4, 5)	9.318	0.025*

Investment/Finance	3 (1, 4)	3 (2, 4)	2.5 (1, 4)	4 (2, 5)	3.293	0.349
Meeting with Investors	3.5 (2.5, 4)	4 (3, 4)	3.5 (2, 5)	4 (2, 5)	1.125	0.771
Going Abroad	1 (0, 3)	1 (0, 3)	1.5 (0, 3)	2 (1, 3)	1.511	0.680
Trademark registration / Patent application / Legal Counseling	2 (0, 3)	2 (1, 3)	2.5 (1, 5)	2 (1, 4)	2.043	0.564
Collaborating with organizations that support the accelerator	3 (2, 4)	3 (2, 4)	3 (1, 4)	4 (2, 5)	1.178	0.758
Technical Support	2 (1, 3.5)	2 (1, 4)	1 (0, 3)	2 (1, 4)	2.374	0.498

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).
*p<0.05

According to the number of employees employed in the company, there is not a statistically significant difference in terms of the utilization of training, mentoring, office, laboratory, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling services, technical support and cooperation with the supporting organizations (p>0.05). Significant differences are found in using advertising and networking services.

According to the number of employees employed in the company, statistically significant difference is found in terms of the utilization level of advertising services (p: 0.046). As a result of the evaluations made, it is found out that the utilization level of the companies which employs between 6 and 20 employees is higher than the ones with 0 employees (p: 0.041).

According to the number of employees employed in the company, another statistically significant difference is found in terms of utilization levels of networking services (p: 0.025). As a result of these evaluations, it is found out that the utilization level of the companies which employs between 6 and 20 employees is higher than the ones which employs between 1-3 and 4-5 employees (p: 0.037, p: 0.049, respectively).

In Table 4.2, the hypothesis H1c is tested. There is no statistically significant difference between the monthly financial turnover of the companies and the support utilization levels.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.2:** Comparisons of support utilization levels according to the company's monthly average financial turnover.

	Monthly Turnover					χ2	p
	No sales yet.	100-5000 TRY	5000-10000 TRY	10000-20000 TRY	≥ 20000 TRY		
Training	4 (3, 5)	4 (4, 4)	4 (3, 5)	4 (3, 5)	5 (4, 5)	2.830	0.587
Mentorship	4 (4, 5)	4 (3, 5)	5 (4, 5)	4 (3, 5)	5 (4, 5)	7.421	0.115
Office	4 (3, 5)	4 (3, 5)	4.5 (3, 5)	4.5 (3.5, 5)	4 (3, 5)	1.010	0.908
Laboratory	1 (0, 2)	0 (0, 1)	1 (0, 1)	1 (0, 3.5)	0 (0, 2)	1.302	0.861
Advertising	2.5 (1, 3)	2 (2, 4)	3 (1, 4)	2 (1, 3)	3 (2, 5)	1.331	0.856
Networking	4 (3, 4)	4 (3, 5)	4 (3, 5)	4 (2.5, 4)	4 (3, 5)	4.989	0.288
Investment/Finance	3 (2, 4)	3 (3, 4)	2.5 (1, 4)	2.5 (1, 3.5)	3 (3, 4)	3.772	0.438
Meeting with Investors	3 (2, 4)	4 (3, 4)	4 (3, 5)	3 (1.5, 4)	4 (4, 4)	9.432	0.051
Going Abroad	1 (0, 3)	1 (0, 3)	1.5 (1, 3)	1.5 (0, 3)	1 (0, 5)	0.680	0.954
Trademark registration / Patent application / Legal Counseling	2 (0, 3)	1 (0, 3)	2 (1, 3)	2.5 (1, 3.5)	3 (2, 5)	7.120	0.130
Collaborating with organizations that support the accelerator	3 (2, 4)	4 (3, 4)	3 (2, 4)	3 (1.5, 3)	4 (2, 4)	4.198	0.380
Technical Support	2 (1, 4)	2 (1, 4)	2 (1, 3)	2 (1, 3.5)	3 (1, 4)	0.939	0.919

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).

According to the monthly financial turnover of the company, there is not a statistically significant difference in terms of the utilization of training, mentoring, office, laboratory, advertisement, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling services, technical support and cooperation with the supporting organizations ($p>0.05$).

The hypothesis H2a is tested in Table 4.3. The following are the supports that have a significant difference according to the comparison of support utilization levels by the exportation status of the company.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.3:** Comparison of the utilization level of services by the company's exportation status.

	Exportation		z	p
	Doesn't Export	Does Export		
Training	4 (3, 5)	5 (3, 5)	-1.231	0.218
Mentorship	4 (4, 5)	5 (4, 5)	-1.080	0.280
Office	4 (4, 5)	3 (2, 4)	-2.572	0.010*
Laboratory	1 (0, 2)	0 (0, 1)	-1.353	0.176
Advertising	3 (1, 3)	2 (2, 3)	-0.271	0.786
Networking	4 (3, 4)	4 (3, 5)	-1.282	0.200
Investment/Finance	3 (2, 4)	3 (2, 4)	-0.302	0.763
Meeting with Investors	4 (2, 4)	4 (4, 5)	-1.918	0.055
Going Abroad	1 (0, 3)	2 (1, 4)	-0.922	0.357
Trademark registration / Patent application / Legal Counseling	2 (1, 3)	2 (1, 2)	-0.790	0.429
Collaborating with organizations that support the accelerator	3 (2, 4)	3 (1, 4)	-0.806	0.420
Technical Support	2 (1, 4)	2 (1, 3)	-0.389	0.698

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).
*p<0.05

According to the exportation status of the company, there is not a statistically significant difference in terms of the utilization of training, mentoring, laboratory, advertising, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling services, technical support and cooperation with the supporting organizations (p>0.05). The only significant difference found is in using office services.

According to the exportation status of the company, statistically significant difference is found in terms of the utilization level of office services (p: 0.010). As a result of the evaluations made, it is

found out that the office utilization level of the companies which export is lower than the ones which don't export.

In Table 4.4, the hypothesis H3a is tested. There is no statistically significant difference between the competitiveness of the industry that the company is in and the support utilization levels.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.4:** Comparison of the utilization level of services according to the industry competition that the company is in.

	Industry Competition Level					$\chi 2$	p
	Very Low	Low	Medium	High	Very High		
Training	4 (3, 4)	4 (2, 5)	4 (3, 5)	4 (3, 5)	4 (3, 5)	1.264	0.867
Mentorship	4 (3, 5)	5 (2, 5)	5 (3, 5)	4 (4, 5)	4 (4, 5)	0.882	0.927
Office	4 (3, 4)	4 (2, 5)	4 (3, 5)	5 (3, 5)	5 (4, 5)	2.683	0.612
Laboratovary	1 (0, 3)	0 (0, 2)	0.5 (0, 2)	0 (0, 1)	1 (0, 1)	1.485	0.829
Advertising	3 (3, 4)	2 (1, 3)	2 (2, 3)	2 (1, 3)	3 (2, 5)	5.780	0.216
Networking	4 (4, 5)	4 (3, 5)	4 (3, 4)	4 (3, 5)	4 (3, 5)	0.444	0.979
Investment/Finance	4 (3, 5)	3 (2, 4)	3 (2, 4)	3 (1, 3)	2 (2, 5)	3.730	0.444
Meeting with Investors	3 (2, 4)	4 (2, 5)	4 (3, 4)	3 (2, 4)	4 (3, 4)	0.997	0.910
Going Abroad	1 (0, 3)	1 (1, 3)	1 (0, 3)	1 (0, 4)	2 (1, 3)	1.637	0.802
Trademark registration / Patent application / Legal Counseling	2 (1, 2)	1 (0, 4)	2 (1, 3)	2 (1, 4)	2 (1, 3)	1.323	0.858
Collaborating with organizations that support the accelerator	3 (3, 5)	3 (2, 4)	3 (2, 4)	3 (2, 4)	3 (2, 3)	2.742	0.602
Technical Support	2 (1, 3)	3 (1, 4)	2 (1, 4)	2 (1, 3)	2 (1, 4)	1.100	0.894

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).

According to the industry competition that the company is in, there is not a statistically significant difference in terms of the utilization of training, mentoring, office, laboratory, advertisement, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling services, technical support and cooperating with the supporting organizations ($p > 0.05$).

The hypothesis H1b is tested in Table 4.5. There is no statistically significant difference between the number of employees in the company and receiving benefit from the supports of the accelerator program.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.5:** Comparison of receiving benefit from the supports of the accelerator program by the number of employees employed in the company.

	Number of Employees				$\chi2$	p
	0	1-3	4-5	6-20		
Training	3.5 (3, 5)	4 (3, 4)	4 (3, 5)	3 (3, 5)	1.973	0.578
Mentorship	4 (3.5, 4.5)	4 (3, 4)	4 (3, 5)	4 (4, 5)	1.069	0.785
Office	4 (2, 5)	4 (3, 4)	4 (4, 5)	4 (3, 5)	0.713	0.870
Laboratory	0 (0, 1)	0 (0, 2)	0 (0, 1)	1 (0, 3)	2.642	0.450
Advertising	2 (1, 3)	2 (1, 4)	2.5 (2, 5)	3 (1, 5)	2.031	0.566
Networking	4 (3, 5)	4 (2, 4)	3 (3, 5)	4 (3, 5)	3.794	0.285
Investment/Finance	3 (1, 4)	3 (2, 4)	2.5 (1, 5)	4 (2, 5)	1.147	0.766
Meeting with Investors	3 (2, 4)	3 (2, 4)	3.5 (2, 5)	4 (3, 5)	2.153	0.541
Going Abroad	1 (0, 3)	1 (0, 3)	1 (0, 3)	3 (1, 4)	3.644	0.303
Trademark registration / Patent application / Legal Counseling	2 (0, 3)	1 (1, 3)	2.5 (0, 3)	1 (1, 4)	1.521	0.677
Collaborating with organizations that support the accelerator	3 (1.5, 4)	3 (1, 4)	2 (2, 5)	3 (1, 5)	1.170	0.760
Technical Support	1 (0, 3)	1 (1, 3)	0.5 (0, 2)	4 (1, 5)	7.166	0.067

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).

According to the number of employees employed in the company, there is not a statistically significant difference in terms of receiving benefit from the services of training, mentoring, office, laboratory, advertising, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling, technical support and cooperation with the supporting organizations ($p > 0.05$).

The hypothesis H1d is tested in Table 4.6. There is no statistically significant difference between the monthly financial turnover of the companies and receiving benefit from the supports of the accelerator program.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.6:** Comparison of receiving benefit from the supports of the accelerator program according to the company's monthly average financial turnover.

	Monthly Turnover					χ^2	p
	No sales yet.	100-5000 TRY	5000-10000 TRY	10000-20000 TRY	≥ 20000 TRY		
Training	3 (2, 4)	3 (3, 4)	4.5 (3, 5)	4 (3, 5)	4 (3, 5)	8.053	0.090
Mentorship	4 (3, 4)	4 (3, 5)	4 (4, 5)	4 (2.5, 5)	4 (4, 5)	5.479	0.242
Office	4 (2, 5)	4 (3, 4)	4 (1, 4)	4 (3.5, 5)	4 (3, 5)	3.566	0.468
Laboratovary	0.5 (0, 3)	0 (0, 1)	1 (0, 2)	0 (0, 2)	0 (0, 1)	3.575	0.467
Advertising	2 (1, 3)	2 (2, 4)	1.5 (1, 2)	2 (1.5, 4.5)	3 (1, 5)	3.498	0.478
Networking	4 (2, 4)	4 (3, 5)	4 (1, 5)	3.5 (3, 5)	4 (3, 5)	2.159	0.706
Investment/Finance	3 (2, 4)	3 (1, 4)	3 (1, 5)	2 (0, 3.5)	4 (2, 5)	3.858	0.426
Meeting with Investors	3 (2, 4)	3 (2, 4)	3 (1, 5)	3 (1.5, 4)	4 (4, 5)	6.630	0.157
Going Abroad	1.5 (0, 4)	1 (0, 4)	1 (0, 3)	1.5 (0, 3)	2 (0, 4)	2.189	0.701
Trademark registration / Patent application / Legal Counseling	2 (0, 4)	1 (0, 3)	1 (1, 3)	2 (0, 3)	2 (1, 4)	2.684	0.612
Collaborating with organizations that support the accelerator	3 (2, 4)	4 (1, 4)	2.5 (1, 4)	2 (0.5, 3)	3 (1, 4)	2.939	0.568
Technical Support	2 (0, 4)	1 (0, 3)	1.5 (1, 4)	1 (0, 3.5)	2 (1, 3)	2.572	0.632

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).

According to the monthly financial turnover of the company, there is not a statistically significant difference in terms of receiving benefit from the services of training, mentoring, office, laboratory,

advertising, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling, technical support and cooperation with the supporting organizations (p>0.05).

The hypothesis H2b is tested in Table 4.7. Supports that have a significant difference between receiving benefits from the supports of the accelerator program and the exportation status of the company are given below.

Table Hata! Belgede belirtilen stilde metne rastlanmadı.**.7:** Comparison of receiving benefit from the supports of the accelerator program according to the exportation status of the company.

	Exportation Status		z	p
	Doesn't Export	Does Export		
Training	4 (3, 5)	4 (3, 5)	-1.532	0.125
Mentorship	4 (3, 4)	5 (4, 5)	-2.060	0.039*
Office	4 (3, 5)	3 (1, 4)	-1.347	0.178
Laboratovary	0 (0, 2)	0 (0, 0)	-2.120	0.034*
Advertising	2 (1, 4)	2 (1, 3)	-1.335	0.182
Networking	4 (3, 5)	4 (3, 5)	-1.394	0.163
Investment/Finance	3 (1, 4)	4 (2, 5)	-1.115	0.265
Meeting with Investors	3 (2, 4)	4 (4, 5)	-2.665	0.008**
Going Abroad	1 (0, 3)	2 (0, 5)	-1.108	0.268
Trademark registration / Patent application / Legal Counseling	2 (0, 3)	1 (0, 2)	-1.201	0.230
Collaborating with organizations that support the accelerator	3 (1, 4)	3 (1, 4)	-0.827	0.408
Technical Support	1 (0, 4)	2 (0, 3)	-0.031	0.975

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).
*p<0.05   **p<0.01

According to the exportation status of the company, there is not a statistically significant difference in terms of receiving benefit from the services of training, office, advertising, networking, investment / finance, going abroad, trademark registration / patent application / legal counseling, technical support and cooperation with the supporting organizations (p>0.05). Significant

differences are found in benefiting from the services of mentorship, laboratory and meeting with investors.

According to the exportation status of the company, statistically significant difference is found in terms of benefiting from mentorship services (p: 0.039). As a result of the evaluations made, it is found out that the benefit level of the companies which export is higher than the ones which don't export.

According to the exportation status of the company, statistically significant difference is found in terms of benefiting from laboratory services (p: 0.039). As a result of the evaluations made, it is found out that the benefit level of the companies which export is lower than the ones which don't export.

According to the exportation status of the company, statistically significant difference is found in terms of benefiting from meeting with investors (p: 0.008). As a result of the evaluations made, it is found out that the benefit level of the companies which export is higher than the ones which don't export.

In Table 4.8, the hypothesis H3b is tested. There is no statistically significant difference between the competitiveness of the industry that the company is in and receiving benefits from the supports of the accelerator program.

Table Hata! Belgede belirtilen stilde metne rastlanmadı**.8:** Comparison of receiving benefit from the supports of the accelerator program according to the industry competition that the company is in.

	Industry Competition Level					χ2	p
	Very Low	Low	Medium	High	Very High		
Training	3 (2, 5)	3 (3, 4)	3 (3, 5)	4 (3, 5)	4 (4, 5)	1.921	0.750
Mentorship	4 (3, 4)	5 (4, 5)	4 (4, 5)	4 (3, 4)	4 (4, 5)	4.303	0.367
Office	4 (3, 5)	3 (2, 4)	4 (2, 4)	4 (3, 5)	4 (3, 4)	5.418	0.247
Laboratory	1 (0, 3)	0 (0, 2)	0 (0, 1)	0 (0, 1)	1 (0, 1)	2.063	0.724
Advertising	3 (2, 4)	2 (1, 4)	2 (1, 4)	3 (1, 4)	2 (1, 3)	3.651	0.455
Networking	4 (3, 4)	4 (2, 5)	4 (2, 4)	4 (3, 5)	4 (3, 5)	1.500	0.827

Investment/Finance	4 (3, 4)	3 (2, 4)	3 (2, 4)	2 (1, 4)	2 (1, 4)	3.325	0.505
Meeting with Investors	4 (3, 4)	4 (3, 4)	3.5 (2, 4)	3 (3, 4)	3 (2, 5)	1.337	0.855
Going Abroad	2 (1, 4)	2 (0, 4)	1 (0, 3)	1 (0, 3)	2 (1, 3)	2.535	0.638
Trademark registration / Patent application / Legal Counseling	3 (1, 4)	1 (0, 3)	1 (0, 3)	1 (0, 3)	2 (1, 2)	1.063	0.900
Collaborating with organizations that support the accelerator	4 (3, 5)	4 (2, 4)	3 (1, 4)	2 (1, 4)	2 (2, 4)	7.067	0.132
Technical Support	3 (1, 4)	1 (0, 4)	1 (0, 3)	2 (0, 3)	1 (1, 3)	0.665	0.956

Kruskal Wallis test, median (Q1: first quarter, Q3: third quarter).

According to the industry competition that the company is in, there is not a statistically significant difference in terms of receiving benefit from the services of training, mentoring, office, laboratory, advertisement, networking, investment / finance, meeting with investors, going abroad, trademark registration / patent application / legal counseling services, technical support and cooperation with the supporting organizations ($p > 0.05$).

5. Conclusion

This study makes a statistical analysis on how startups use the services provided by the accelerator program. According to startup's employee size, average monthly turnover and exportation status, it tries to identify which startup uses and benefits from which services the most. This study is applied to the startups in chosen accelerator programs located in Turkey. A key finding from this study is that companies who have more employees utilizes advertising and networking services more compared to companies with fewer employees. Also, companies which export benefit more from mentoring and meeting with investors services compared to ones which don't export. The reason of this is that exporting is a complicated process and so startups need guidance during exportation along with capital in order to grow their operations more.

This study has limitations. One of them is that literature about accelerator programs is very scarce. There are almost no studies about startups attending accelerator programs in Turkey. Also, it was very difficult to connect with startups who graduated from the accelerator and therefore, mainly startups who were present in the accelerator during the study were represented. Future studies can study entrepreneurs who are attending accelerator programs and can look at how their

demographics affect the utilization of supports provided by the programs. Moreover, further comparative analysis on startups can be done to find out firm survival after the accelerator program.

6. References

Adkins, D., 2002, *A brief history of business incubation in the United States*, National Business Incubation Association.

Audretsch, David B., 1995, *Innovation and Industry Evolution*, Cambridge:MIT Press, 77-80.

Bruneel, J., Ratinho, T., Clarysse, B., and Groen, A., 2012, The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations, *Technovation*, 32(2), 110-121.

Clarysse, B., Wright, M. and Van Hove, J., 2015. A look inside accelerators. London, Nesta.

Cohen, S. and Hochberg, Y.V., 2014. Accelerating startups: The seed accelerator phenomenon.

Cubukcu C. and Gulsecen S., "Accelerator Programs in Turkey: Who Benefits the Most from These Programs?", in Proc. 14th International Conference on Social Sciences, 2-3 March 2018, Frankfurt, Germany, 563-573

Dee, N., Gill, D. E., Livesey, T. F., and Minshall, T. H. W., 2011, Incubation for growth: A review of the impact of business incubation on new ventures with high growth potential.

Delmar, F. and Wennberg, K., 2010, *Knowledge intensive entrepreneurship*, Edward Elgar Publishing.

Ebbers, J. J., 2014, Networking behavior and contracting relationships among entrepreneurs in business incubators, *Entrepreneurship Theory and Practice*, 38(5), 1159-1181.

Engelman, R., Carneiro Zen, A. and Fracasso, E., 2015, The impact of the incubator on the internationalization of firms, *Journal of technology management and innovation*, 10(1), 29-39.

Fritsch, M., Brixy, U. and Falck, O., 2006, The effect of industry, region, and time on new business survival – A multi-dimensional analysis, *Review of Industrial Organization*, 28(3), 285-306.

Gans, J. S. and Stern, S., 2003, The product market and the market for "ideas": commercialization strategies for technology entrepreneurs, *Research policy*, 32(2), 333-350.

Hallen, B., Bingham, C. and Cohen, S., 2016, Do Accelerators Accelerate? If So, How? The Impact of Intensive Learning from Others on New Venture Development.

Hochberg, Y., "Accelerating Entrepreneurs and Ecosystems: The Seed Accelerator Model," in Proc. National Bureau of Economic Research–16th Innovation Policy and the Economy Conference, April 14, 2015.

Jorgensen, S., 2014, *Business Incubators and Incubatees,* Thesis (PhD), Roskilde University.

Lalkaka, R. and Bishop, J., 1996, *Business incubators in economic development: an initial assessment in industrializing countries,* New York, NY: United Nations Development Programme.

Marangoz, M., 2016, *Girisimcilikte guncel konular ve uygulamalar [Current topics and applications in entrepreneurship],* 1st edition, Inkilap Publishing, Istanbul, ISBN: 978-605-333-567-2.

Meru, A. K. and Struwig, M., 2011, An evaluation of the entrepreneurs' perception of business-incubation services in Kenya, *International Journal of Business Administration*, 2(4), 112.

Mian, S. A., 1997, Assessing and managing the university technology business incubator: an integrative framework, *Journal of Business Venturing*, 12(4), 251-285.

Mian, S., Lamine, W. and Fayolle, A., 2016, Technology business incubation: An overview of the state of knowledge, *Technovation*, 50, 1-12.

Miller, P. and Bound, K., 2011, The startup factories: The rise of accelerator programmes to support new ventures. Nesta.

Oktem, M. K., Aydin, M. D., and Ekinci, S., 2007, The role and importance of KOSGEB in improving the entrepreneurship in Turkey, *Sosyoekonomi*, 5(5).

Olivares, A. and Suárez, S., 2007, The export development process of Spanish manufacturing firms: An application of survival analysis, *Revista Europea de Dirección y Economía de la Empresa*, 16(1), 89–98.

Ozkasikci, I., 2013, *Dijital cagda girişimcilik ekosistemi [Entrepreneurship ecosystem in digital age],* 1st edition, Butik Publishing, Istanbul, ISBN: 978-605-5154-30-1.

Pauwels, C., Clarysse, B., Wright, M., and Van Hove, J., 2016, Understanding a new generation incubation model: The accelerator, *Technovation*, 50, 13-24.

Ratinho, T, 2011, *Are They Helping? An Examination of Business Incubators' Impact on Tenant Firms,* Thesis (PhD), University of Twente.

Rice, M. P., 2002, Co-production of business assistance in business incubators: an exploratory study, *Journal of Business Venturing*, 17(2), 163-187.

Sapienza, H. J., Autio, E., George, G. and Zahra, S. A., 2006, Capabilities perspective on the effects of early internationalization on firm survival and growth, *Academy of Management Review*, 31(4), 914–933.

Schmalensee, R., 1982, Product differentiation advantages of pioneering brands, *The American Economic Review*, 72(3), 349-365.

Soetanto, D. P. and Jack, S. L., 2013, Business incubators and the networks of technology-based firms, *The Journal of Technology Transfer*, 38(4), 432-453.

Sungur, O., and Dulupcu, M. A., 2013, Survival Performance of Tenant Firms in Business Incubators (ISGEMS) in Turkey, *Mehmet Akif Ersoy University Journal of Institute of Social Sciences*, 5(8), 1-25.

Wagner, J., 1994, The post-entry performance of new small firms in german manufacturing industries, *Journal of Industrial Economics*, 42, 141-154.

Literature Review on Problem Solving and Decision Making

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ABSTRACT

Regardless of the position, employees experience problems in routine work and try to find alternative ways to solve these problems. As the management level goes up, problems tend to become more complicated. Should ways of handling these problems be coincidental? Or, should decisions be made with a problem-solving focused approach in a rationalist system? These two questions received attention from researchers and provided an area of focus for research. Based on the results of studies conducted, several rational decision making processes were created.

Administrative assistants should be considered as representatives and consultants of their administrators as well as an important part of management. Thus, it is highly important how they will solve problems they encounter, what kind of alternative solutions they will create and which alternatives they will choose to solve problems. Administrative assistants should manage these processes in a certain systematic way rather than in a coincidental way.

In today's world, sometimes change takes place at an unforeseen extent such that changes in technology changes all the environmental conditions unexpectedly. This brings along intuitive decision making. Due to all these reasons, this paper addresses the concepts of problem solving and decision making, rational decision making process and the concept of intuitive decision making.

Problem Solving

Technological changes occurring today and the rapid change they bring along create problems for employees within the routine process of organizational life. These problems need to be handled and solved without damaging the organization. In general, organizations have a management structure in which all employees take part in decision making. It is vital for organizations to have their employees at all levels act with a focus on problem-solving.

Indeed problem is the difference between the existing or current situation and the desired situation.

This difference stems from the internal and external obstacles encountered while trying to achieve the desired result (D'Zurilla, 1971;408). According to Turkish Language Institution, problem is also called an issue. While we are not aware of these issues sometimes, we constantly come across

these issues in our routine lives. If your car on the way to work breaks down, this is a problem. In this situation, you need to make a decision to solve the problem. Unfortuantely, not all issues we encounter are that obvious (Robbins ve Judge, 2012;175). To be able to make right decisions is closely related to being aware of the issue.

When considered from an organizational perspective, all kinds of obstacles whether temporary or permanent, that are encountered in trying to achieve organizational goals are called problems. An organization should solve these problems to reach its goals. There is almost no goal that can be achieved without problems. Therefore, organizations should learn how to overcome issues. This topic which is vital for organizations can not be addressed by chance and decisions need to be made with certain methods. If the solutions of the problems encountered are known, then solving problems according to standard information is easy. However, if solutions are not known, then certain alternative ways need to be identified and the most beneficial one of these ways should be chosen rationally. Particularly in solving problems whose solutions are not known, if organizations only consider their own experiences they may end up with making the wrong decision. Today, organizations benefit from computer technologies in solving programs.

When administrative assistants encounter a problemm they need to be motivated by focusing on the solution of the problem. This effort would increase individual's resistance to solving the problem. Solving a problem is closely related to an individual's efforts, self-confidence, skills, will, emotions and values. Additionally, finding answers to questions, eliminating uncertainties, explaining incomprehensible situations, and closing the gap between what occurred and what needs to occur provide rational solutions in solving problems (Dağlı, 2004;47). In fact, addressing the issue as a whole can be incomprehensible and complicated. Therefore, the issue should be dividied into comprehensible pieces to develop strategies. In relation to this, researchers developed several models over the years. While classic models included trial and error method, contemporary methods include computer-enhanced rational decision making methods.

As identified problems have different importance levels, first the identity of the problem should be identified. Imperfections in the system should be addressed and grouped based on the level of importance. This would allow problems to be sorted based on their sources, and the importance levels to be grouped. Then the problem needs to be measured. The deviation that the problem is causing should be revealed according to the identified criteria. Then, data and ways to

solve the problem should be identified based on the importance. The choice should be made according to the urgency and importance of the situation. In fact, this choice process is called a decision. That is why, it would be appropriate to address what needs to be implemented rationally and approaches under the decision making section.

Decision Making

Decision is a concept underlying the core of the planning function and it is the process of making a choice between two or more alternatives. This process is one of the main responsibilities of managers (Ertürk, 2012;236). Then, a choice made by a manager or an administrative assistant on a subject is decision. However, decision making is not a simple concept that can be explained by the term choosing. Within an organization's routine work, managers make decisions on how, when, why, where, and with whom activities will be facilitated. It is only with managers' decisions on these topic that employees know what to do and that necessary activities can be facilitated to reach organization's goals.

A decision involves certain characteristics in its nature. Making a choice is obligatory in making a decision and this means giving up on other alternatives. Therefore, decision makers experience a psychological stress. Decision making involves a technical process. Gathering information on the topic which requires a decision is a time consuming, costly, and difficult process. Making a decision involves predictions about future which is both risky and requires developing intuitions. Also, timing is very important in decisions. Late decisions are decisions that are never made. It should be noted that a decision should center around solving the problem, not creating bigger problems.

In today's modern organizations, it is not sufficient for managers to use only their own experiences and intuitions while making a decision. Decentralized structures in which there is involvement in making decisions allow organizations to work effectively. Within this effective work, the most important position after managers is the administrative assistantship. Administrative assistants should improve their decision making skills as representatives of managers particularly when managers are not present. It is obvious that being indecisive creates problems. Therefore, administrative assistants should prevent this problem by learning scientific methods of decision making.

Decisions are the most fundamental tool for organizations to be sustainable. Mistakes can lead organizations into irreparable situations. To prevent mistakes, decision makers in an organizations should receive training on both decision making and organization's activities. Additionally, it was found that an organizations' members who are part of the decision making process are more willing to carry out the decision. Thus, administrative assistants should have skills such as working in a team, or making decisions as a group.

Decision making constitutes the most fundamental foundation of the management process. When managers execute managerial activities, they use management functions that are; planning, organizing, implementation, coordination and controlling. Decisions that are generally made by management related to these functions are listed in table 1.

Table 1. Decisions that Managers Make

PLANNING
. What are organization's long term goals?
. What are the strategies that will help to reach these goals?
. What should be the short-term goals of the organization?
. How hard should individual's goals be?
ORGANIZING
. How many employees that report directly to me should I have?
. What should be the level of centralization of the organization?
. How should tasks be designed?
. When should the organization implement a different structure?
GUIDING
. How should I handle employees with low motivation?
. What is the most effective leadership style in this situation?
. How would a special change process affect employee productivity?
. What is the right time to encourage conflict?
CONTROLLING
. Which activities should be controlled within the organization?
. How should these activities be controlled?
. When do deviations in perfromance create a problem?
.What is the management informatics system that the organization should have?

Source: Robbins, Decenzo, Coulter, 2013, Fundamentals of Management, Nobel Yayın, translated from 8th edition., p.77.

As presented in table 1, managers make decisions based on their positions. While decisions on strategic planning are made by executive directors, other directors make decisions on other

functions and execute them. Administrative assistants, due to their positions as representatives of their units, can sometimes be involved in this process and sometimes they can make decisions themselves directly. Decisions are also categorized among themselves (Koçel, 2011;111).

- *Routine and non-routine decisions:* Routine decisions are the decisions made to achieve normal daily activities in organizations trying to achieve their goals. On the other hand, non-routine decisions emerge as a result of the reaction an organization gives to issues due to sudden environmental changes.

- *Strategic and operational decisions:* These are the decisions made by the organization to achieve long-term competitive advantage and to be sustainable. These decisions are typically made by executive managers. Operational decisions are functional decisions for an organization to sustain its activities.

- *Individual and group decisions:* Individuals decisions are made by individuals themselves while group decisions are made as a group by using certain methods. The most important group decision making methods will be addressed in the following sections.

- *Lower and upper level decisions:* Decisions made by lower level managers are generally related to execution of activities. Mid-level managers make tactical decisions while upper level managers make strategic decisions related to competitive advantage.

- *Decision made in certainty and uncertainty:* Decisions made in certainty are a type of decision that is experienced previously in routine situations in which tasks are performed. Decisions in uncertainty is a type of decision that is made in situations in which the number of unknown and the risk factor are high which requires intuitionism and creativity.

Decision Making Process

What constitutes the foundation of decision making? Is the word "choice" sufficient to explain decision or to solve a problem? In fact, the answers to these questions lead us to define the decision making process. As discussed previously, decision has complicated characteristics and choice is the final step of the decision making process which is presented in figure 1. This process is similar in all decisions in organizations from the simplest decision to highest level strategic decisions.
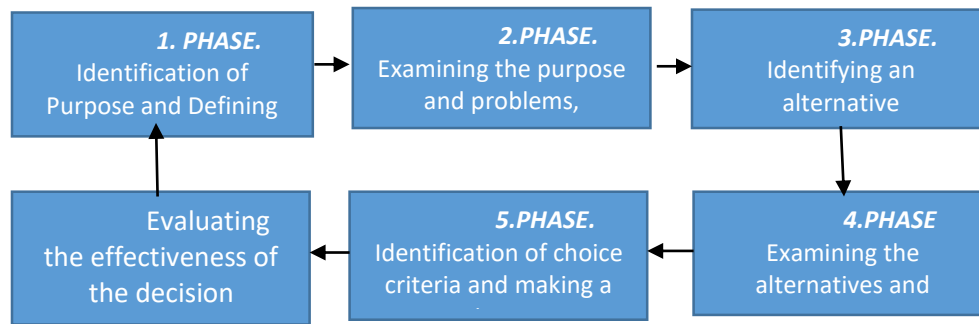
Figure 1. Decision Making Process

Source: Adapted from Koçel, 2011, İşletme Yöneticiliği, Beta Yayınları, p. 113

Managers or administrative assistants implement the phases shown in figure 1 while making a decision. Decision makers become aware of the goal or the issue based on information, data, warning or observation they make and the decision making process begins.

The first phase involves identifying the problem. As defined previously, a problem is the difference between the current situation and the desired situation. Decision maker identifies the problem either to achieve a goal or to solve the problem. Sometimes managers may not be aware of the problem or define the problem incorrect because problems are not always easy to identify. This may cause failure on the manager's end. Thus, data and information obtained from the environment should be updated continuously, should be shared with other members, performances should be evaluated, certain standards should be places and monitored.

The second phase involves examining the goal or the problem with rational ways. Therefore, the priorities of the problem should be revealed. While some problems may be highly important for cetain organizations, the same problems may not be as important for others. Thus, managers place some measures when making decisions. These measures are put in order according to their importance and affect the decision significantly. In this case, a decision can be made based on scores assigned to the weight of each criterion. This way, the criteria with more weight would influence the decision more.

In the third phase, decision maker identifies alternative ways to reach the desired goal or to solve the problem. This is not the phase to evaluate alternatives but to list all possible alternatives.

The listed alternatives are evaluated in the fourth phase. Strengths and weaknesses of each alternative should be determined. In these evaluations, the criterion scores identified in the second phase should be taken into consideration. Elimination of personal judgements in evaluating the alternatives would make the decision smoother. Additionally, it would be beneficial to gather information from employees on their fields of expertise.

The fifth phase of the process involves implementation of the decision. In this phase, alternatives are compared based on the criteria identified previously and the alternative with most strengths is chosen and executed to reach the desired goal or to solve the problem.

The last phase of the process is the phase in which feedback is collected to determine if the desired goal is achieved or the problem is solved. This phase is closely related to the control function presented in table 1.

Behavioral scientists revealed that if decision makers are involved in these 5 phases, they would be more willing to carry out the decision (Robbins & Judge, 2012;176). Involvement of executors of decisions by managers and administrative assistants within the decision making process would increase effectiveness and productivity.

Rational Decision Making

Rational decision making is the process of making rational choices to achieve the desired at the highest level (Simon, 1986;209). This can be achieved by doing comprehensive research on the consequences of each option. For maximization, all the options are objectively evaluated based on their possibility of being executed to achieve the desired goal. A rational decision maker is always objective.

The problem encountered or the desired outcome should be clearly explained. It is fundamental for the manager to know all the options and consequences. Among these alternatives, the alternative with the highest potential to achieve the goal is chosen. Feedback should be received constantly (Heracleous, 1994;16). Managers make decisions with the purpose of increasing productivity.

According to Berridge (2002), rational decision making is to balance uncertainties related to consequneces and the preferences of the decision maker. Thus, it is closely related to the realiability of the decision. Decision making process is closely related to the values and preferences of the decision maker and it depends on the information available.

When we evaluate the real world, we see that individuals tend to prefer alternatives that are close to them. There are not many individuals who consider all the alternatves by evaluating the optimum conditions. In fact, the decision making process presented above shows the steps of making a rational decision. In reality, the situation can be different. Acting on the information at hand may not reveal the right decision on its own. Therefore, the concept of bounded rationality should be understood.

Bounded Rationality

It is assumed that managers or administrative assistants think rationally when making decisions. Simon, who received a Nobel prize for his work on decision making, states that individuals' skills of predicting the future are bounded both in individual and organizational decisions such that individuals can't make optimum decisions. Rational thinking is not sufficient in identifying and evaluating problems, in finding alternatives and choosing one because while performing these, a manager's current information on the issue is bounded and may not reveal all the alternatives as assumed (See, 1992; 343). As all the situations in the future can't be calculated, managers make decisions within a bounded rationality.

Considering that truth is complicated, individuals' decision making within a bounded rationality can be accepted as a more realistic approach. In organizations, after decisions are made, several unforeseen variables can be encountered. Therefore, an individual would accept a satisfactory solution through memory or experience. Departing from this point, according to bounded rationality, there is no optimized decision. Rather, there are satisfactory decisions. Additionally, managers can make mistakers while making decisions. This negates the perfect rationality concept and strengthens the phenomenon of rational decision making.

Intuitive Decision Making

Intuitive decision making involves emotions, judgements, and other abstract concepts. Individuals use their intuitions when making decisions (Scott ve Bruce, 1995;820). This does not mean that managers who make intuitive decisions would make unconscious decisions. In this model, managers observe and make inferences to draw a conclusion. According to Slovic (1972), individuals use intuitive methods when making decisions. Also, possibilities influence their decisions but do not change what they believe is right. Scientific research has shown that individuals use short-cuts in making decisions.

Managers use three types of intuitions when making decisions. The first one is descriptive intuition which is used to identify problems. The second one is interpretive intuition used to interpret issues in the environment. We draw from our experiences. The third intuition is the predictive intuition used to make inferences on future (Peterson & Beach, 1967). In figure 2, five different types of intuitions are presented.
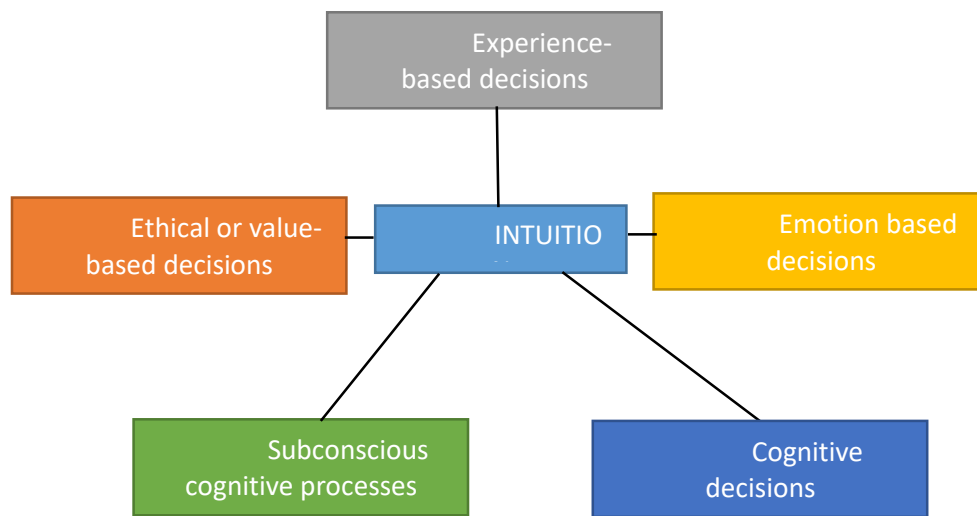

Figure 2. Intuition types

Source: Robbins, Decenzo, Coulter, 2013, Fundamentals of Management, Nobel Yayın, translated from 8th edition, p.80.

As it is seen in figure 2, managers can make decisions based on their previous experiences, ethical values or organizational culture, subconscious data, their information-skills-education, and their emotions. Research revealed that using emotions in making decisions would have positive results. Wilson (1995) revealed strengths and weaknesses of making decisions intuitively.

- Applicability

- Adaptation ability and flexibility

- Fast

- Open for communication

  are among the strengths. And the weaknesses include;

- Low rational consistency

- Requirement of cognitive (information, skills, education) capacity

- Being too abstract in terms of communication

Overall, administrative assistants should improve their intuitive skills i addition to rational processes. The accumulation of knowledge should be increased through training (Naktiyok ve İşcan, 2014) and experiences gained through organizational learning processes should be transferred to administrative assistants.

Common Decision Making Mistakes

Although decision makers try to make decisions by following the rules previously discussed, sometimes they make mistakes. People tend to prefer shorter ways. Therefore, instead of thinking over certain problems, they trust their experiences, intuitions and judgements. This may lead decision makers to make certain mistakes. The most common mistakes will be adressed in the following paragraphs.

Overconfidence bias leads decision makers to consider themselves having more knowledge that they actually do. A study has shown that 78% of people think of their performance as very good while the actual rate of good performance is significantly lower (Merkle & Weber, 2009). This finding shows how people have positive judgements about themselves.

Individuals who have little social relationship skills tend to consider their performances high. As the level of knowledge of individuals increases, their level of showing overconfidence decreases. Additionally, the more optimistic people are when making decisions, the less successful they are (Robbins & Judge, 2012; 179). Therefore, administrative assistants should not make the mistake of overconfidence.

Anchoring stems from focusing on the first obtained information and ignoring the information received later. Managers, particularly, anchor on the information they gathered first and do not use the information they receive later in decision making. This leads decision makers to make decisions with lacking information.

Confirmation bias results from not being able to objectively obtain the information gathered during decision making process. Managers search for the information that confirm their previous decisions and try to ignore the information that proves otherwise. This information is not objective and may lead managers to make the wrong decisions.

"I told so" bias is the mistake related to the belief of knowing the result all along after the result is revealed. This is a situation that can convince managers that they can do better intuitive predictions.

Randomness bias leads managers to draw meanings from incidents that occur randomly and this leads to a perception that every time a particular incident happens, it will result the same way.

Self-serving tendency bias is one of the important biases. Decision makers blame the failures on external factors completely.

Besides the above-presented common decision making mistakes, there are mistakes with different characteristics, however, these are beyond the scope of this paper. It is important for administrative assistants to avoid these mistakes to make the right decisions.

Group Decision Techniques

Today's modern organizations use group decision methods due to these decisions being more rational, having different experiences and experts together, and acceptance of a solution by the majority. Although group decisions are time-consuming, they would be more accurate. In this section, the most common group decision methods will be addressed.

Brainstorming is one of the common methods in group decisions that stands out with its creative aspect in problem solving. Departing from creating a safe environment where every opinion can be articulated freely, this process involves forming new and creative ideas from ideas that are shared previously. During this process, criticism is not allowed as it may kill creativity. Reporter records all the opinions shared by group members in a free environment. An ideal group consists of 5-7 members.

Nominal group method involves bringing experts together. These groups ideally include 7-10 members. Participants are responsible for sharing their opinions and they are not required to come to a census (Ülgen & Mirze, 2010;163). Although the meeting is in a formal setting, participants can share their opinions freely. Each participant's opinions are recorded and then these opinions are discussed. At the end of the discussion, the opinions are scored. Alternatives are put in order according to the score they received.

Delphi method is a modern method that features creativity. In this method, group members do not meet in person. This method brings the ideas and decisions of group members that are in different geographical locations in big organizations. This method is implemented with the

participation of 30 experts in their fields (Can Mutlu, 2008;73). Structured questions are presented to participants along with alternative scenarios. Participants share their opinions and they try to make the best decision. This method in today's world is enhanced with computer technology and implemented in electronic platform.

Overall, organizations need both individual and group decisions depending on the context. Therefore, administrative assistants should have the skills to use both decision making methods.

References

Berridge, K. C. (2002). "Irrationalpursuit: Hyper-incentivesfrom a visceralbrain" I. Brocas ve Carrillo J. D. (eds.), Thepsychology of economicdecisions (17–40). Oxford, Oxford University Press.

Can E. (2008). Uluslararası İşletmecilik, 3. Baskı, Beta Yayıncılık.

Chen, C. ve Chien, C. (2009), "Whatconstitutes a qualitydecision?", Journal of Quality, 16(2): 87-94.

D'Zurilla, T. J., Goldfriend, M. R. (1971). "Problem Solving and Behavoir Modification", *Journal of Abnormal Psychology*, 18.

Dağlı, A., (2004). "Problem Çözme ve Karar Verme", Elektronik Sosyal Bilimler Dergisi, 3(7), s.40.

Dızman Ş.,(2015). İktisadi Ve İdari Bilimler Fakültelerinde Öğrencilerin Muhasebe Dersinde Başarısızlık Nedenleri Ve Çözüm Önerileri, Necmettin Erbakan Üniversitesi Sosyal Bilimler Dergisi, 1-1.

Ertürk, M. (2012). İşletmelerde Yönetim ve Organizasyon, 6. Baskı, Beta Yayıncılık.

Heracleous, L. Th. (1994) "Rational Decision Making: Mythor Reality?", Management Development Review, 7(4): 16-23.

Koçel, T. (2011). İşletme Yöneticiliği, 13. Baskı, Beta Yayıncılık.

Merkle C. Ve Weber M. (2009). "True Overconfidence The Inability of Rational Information Processing to Account for Apparent Overconfidence".

Naktiyok S. ve İşcan Ö.F. (2014). "Çalışanların Örgüte Olan Bağlılıklarında Bir Öncül Olarak Örgütsel Öğrenmenin Rolü". Kafkas Üniversitesi İİBF Dergisi, 5-7.

Peterson, T.O. ve Lunsford, D.A. (1998). Parallel thinking: a technique for group interaction and problem solving, Journal of Management Education, 24(4), 537-554.

Robbins, S.P. ve Timothy, A.J. (2012). Örgütsel Davranış, 14. Basımdan Çeviri (İnci Erdem), Nobel Yayın Dağıtım.

Robbins, S.P., Decenzo D.A., Coulter M. (2013). Yönetimin Esasları, 8. Basımdan Çeviri (Adem Öğüt), Nobel Yayın Dağıtım.

Scott, G. S., Bruce, A. R. (1995). "Decision Making Style: The Development and Assessment of a New Measure", *Educational and Psychological Measurement, Vol: 55, No: 5, s. 818-31.*

See D.R.A. Skidd (1992). "Revisiting Bounded Rationality", Journal of Management Inquirty , s.343.

Simon H.A., (1986). "Rationality in Psychology and Economics ". Journal of Business, s.209.

Slovic, P. (1972). Psychological study of human judgment: Implications for investment decision making. Journal of Finance, 27(4), 779-799.

Ülgen, H. ve Kadri, M. (2010). İşletmelerde Stratejik Yönetim, 5. Baskı, Beta Yayıncılık.

Wilson, D.C. (1995). "Highest and best use analysis: Appraisal heuristics versus economic theory". Appraisal Journal. 63(1), 11-26.

Effect of Culture on Online Shopping: Comparison Between Iran And Turkey

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ABSTRACT

In this study we have scrutinize 2 main subjects: First, how the consumption trend of a society is related to the culture, second, how online shopping can be affected by this possible relation. For this purpose, we compare 2 neighbor countries, Iran and Turkey, which have many similarities in terms of cultural aspects. Despite of the mentioned cultural similarities we found some profound differences. Hence, that is important to examine both differences and similarities in terms of consumer preferences between those countries.

Keywords: E-shopping, Consumer behavior, Culture and consumption.

Introduction

Nowadays, due to the wide range of logistical issues such as transportation and parking availability and etc., the time that people spend for a classic shopping has become a serious challenge in some cases. On the other hand, presenting a wide range of goods and services without dealing with the above mentioned issues brings more advantages and easiness to consumers so this is why online shopping has become more popular these days (Kircova,2005:67). One of the main advantages of the internet is the great potential that for fast, effective, integrated and mutual information exchange. Due to this fact, the information exchange about subjects like consumer's needs, regional markets trends, competition movements, jointly developed of products between organizations has become convenient (Avlonitis and Karayann,2000;441). Using internet, also gives the businesses a great opportunity to take their costumers feedbacks in a more easier way. Consequently, they can find out their weaknesses and strengths more efficiently and faster so they have the chance to developed themselves accordingly. In short, internet has made the new era of trade, businesses more simpler which so they take part in global markets and they can adapt themselves under today's competitive conditions, in a more advance level (Shankar, 2012: 1).

Consumption and consumer:

Consumer, consumer behavior and consumption have been emerged as different concepts in marketing literature. According to Wells & Prensky'e (1996: 4), consumers recognize their needs first and then they search for products that will meet their needs. Finally, they remove

products from their list once they meet their needs. Consumer behavior however, includes all the behavior which consumers conduct to obtain, consume and dispose a good or service. That is why consumer behavior covers three different processes in the literature: Obtaining, Consuming, Disposing (Blackwell et al., 2001:6). In addition, all the researches in the international consumer behavior field are generally concentrated in two main areas: First one is to understand the differences among consumers in terms of economic, cultural, social and other marketing factors. The second one mainly is focused to determine the homogenous consumer groups in different countries in order to classify the different segments in international marketing section. Demographic and psychographic attributes, purchasing and consumption behaviors, geographic attributes and situational factors are the key variables that determine the market segment with similar behavior of the potential customers (Blackwell et al., 2001: 41). People's consumption habits will be impacted by the economic, cultural and political dynamics of the country they live in. The discussions of Veblen and Bourdieu about the consumption can be considered as the starting point of the social discussions in regard to the consumer models (Dimaggio, 2000: 458). Veblen, defines the wealth as the important basis of the social status. According to him, the financial power of the individuals is the main basis of the society's reputation. Also, in the economic sense, consumption is the usage of good and services to meet the customer's demand. All in all, consumption is not barely an economical process. Because, that also is impacted by the human anthropological, sociological, psychological and biological qualities also have a decisive influence on people's consumption behavior. Therefore, under today's circumstances, consumption is defined not only as an economic process but also it is a broad and participatory cultural process, which requires its signs and symbols (Bocock, 1997:13).

Nowadays, in the modern communities, consumption is an expression which figure the area of the activates that depicts the social status and identities, as appose to the older definition which only considers meeting of the human needs. Consumption in this sense; "includes a series of practices that enable the people to show their identity, show their participation in social groups and social activities, accumulate resources, social differences, and more" (Warde, 1991:304). Due to this fact, Thus, the general consumption habits of the society have been considered as a whole, defined as "consumption culture". Consumption culture is a culture in which the majority of consumers are looking for goods and services with enthusiasm which may be in the direction of

non utilitarian status seeking, (some cases like looking for new styles or brands, considering those as a point of special classes in social categories and etc. (Belk, 1998:105).

Due to the strong influence of internet, social media and internet, our societies are under the huge influence of them. This culture encourages the human to be as a product of rapid and discontinuity consumption and, a product of social and economic transformation of non-permanent products which human relations have been based on it. (Postman, 2004:162). Today, due to the high diversity and abundance of the goods, better financing facilities, wide range of radio and television broadcasting along with the improvement in communication technologies and advertising companies, consumption culture is getting more common in Turkey (Aydoğan, 2004:134).

Culture and Consumption

Culture affects people's lifestyles and lifestyles affect consumption habits. Thus, in different countries goods and services can be designed according to cultural changes (Koç, 2007: 208). Pierre Bourdieu (1984) & Michèle Lamont (1992), have demonstrated that cultural differences and consumption experiences are reinforced and shaped between groups of people in terms of morality and form, country to country and regionally between classes (Peterson ve Kern, 1996: 905). According to Taylor, Culture, is the total talents and habits that a person acquired over the time as a member of knowledge, belief, art, ethics, government, tradition and society. Cultural influences are important reality when it is thought that a person who is a member of society is also a consumption mechanism. Culture acquires an important place in the human mind over time, and cultural influences affect human behavior. These behaviors enable the acceptance of generally accepted behavior patterns in social classes over a period of time. Cultural products play an important role in reminding our culture. American bar-type cupboard, Turkish coffee, sushi, clothing style of different cultures can be considered as interesting cultural products. These products, which are reflecting the cultural characteristics, are connected and carry the cultural concepts (Manrai ve Manrai, 2011: 12; Wells ve Foxall, 2012: 47).

Cultural product as a symbol of learnable and shared cultural symbol, makes the sharing and communication stronger among consumers. The influences created by the distinct differences between the past, the societies, the organizations and the groups, on the individual show that the cult has a distinctive design for each individual and social class. Consumers show these differences with consumption behavior. The curiosity of cultural experience leads to the overcoming of social

class boundaries and the formation of popular culture concept. (Levy, 1999: 361). Cultural products are becoming more important with the virtual transferring of communication. Consumption is an important cultural communication tool (Kaufmann, 2015: 375). The realization of communication and interaction in real and virtual life has been made possible by the sharing of the cultural items. Thus, individuals who want to have information about a culture can have some information by the consumption of cultural products.

Comparison:

S.ve Javidani, M. (2010) has deducted a research which aims to analyses the possible relation between the E-commerce convenience and intention of Iranian users. Aws the results of this research, turns out that the more convenient e-commerce atmosphere is, the stronger is the user's opinion towards ecommerce and it has been shown that the absence of this convenience, can cause the lack of passion towards ecommerce.

According to another study conducted by (Vahid randy vd.2015:109-118), which has targeted 500 people, Iranian users who are not willing to do online shopping have two main concerns on their minds: First, they are not risk seeker, second, they are not willing to share their private information. www.dijikala.com was the first website that stablished (2007) the online shopping in Iran and played an undeniable role in creation of the trust between Iranian users. This website, operates as marketplace and e-commerce as amazon right now. According to Alexa in 2018 August, it is one of the most visited website in Iran. (https://www.alexa.com/topsites/countries/IR).

According to the Ministry of Information and Communications Technology of Iran, 45% of Iranian population in 2015 and 50% in 2017 have the access to Internet. Nowadays, there is a wide range of the new startups that emerging in the different sections of Iranian market, mainly aiming to fulfill the less competitive sections. Tehran, as the technological center of the country, has the 46% of the nationwide share in terms of online operations. Among 27,000 recorded of reliance symbols, we had service industries and shopping industries, as the 20% and 80% of the recorded symbols respectively. These sectors accelerate the transportation, programming, marketing, financial operations and at the same time covers the food, consumer goods and clothing industry. (http://ecommerce.gov.ir/uploads/tfo_r&d_ecommercereport_iran_9296_ver1.pdf).

Dijikala is considered the biggest site of its kind in the Middle East and third most visited in Iran. It is estimated to be worth $150m (£120m). Last year its co-founder Hamid Mohammadi

said it had 760 employees and shipped more than 4,000 orders a day, with same-day delivery services in Tehran.(https://www.theguardian.com/world/2016/nov/24/iranian-online-shopping-site-launches-its-own-version-of-black-friday). According to Ministry of Industry, Mine and Trade of Iran, Dijikala was the first website that owned the reliance symbols in the country. Even though there are more than 2000 of the websites that owns these symbols but still Dijikala is the most preferred website among Iranians. (http://dolat.ir/detail/259262). After Dijikala, bamilo.com, modiseh.com and zanbil.ir are the most preferred website for Iranian to do online shopping. (http://hyperseo.ir/five-top-online-stores-in-iran.html). According to TÜBİSAD and ETİD' study, given the huge improvement in Internet infrastructures and the increase in smartphone utilization, Turkey has recorded a 30.8 billion TL in online shopping at 2016. According to the same report, the retail section of the market has been experienced an increase, as 34% per year since 2013 has reached to 17.5 billion TL in 2016. Among this 17.5 billion TL, online shopping plays an important role (almost 70%), which includes the different sections, along with the private websites which have been developed recently. According to them, 34% of the Turkish users in internet are online customers while the other 66% are mainly using internet for online Entertainments. (http://www.eticaretraporu.org/wp-content/uploads/2017/04/TUSIAD_E. Ticaret_Raporu_2017.pdf). In Turkey, Hepsiburada, Gittigidiyor, N11 and sahibinden.com were the most successful websites in the E-commerce industry. (http://www.hurriyet.com.tr/ekonomi/kobi/turkiyedeki-en-basarili-10-e-ticaret-sitesi-40271110).

At 2017, Gittigidiyor has become the leader by having an increase by 56%. This website had a record of 33 Million visitors per month and over 12 million members. According to the company CEO, Öget Kantarcı, this website has been experienced a consistent increase in clothing and electronic sectors in ecommerce section. More recently, this website has recorded even a better enhancement by adding pet supplies section. According to this website construction, cell phones and accessories, pet supplies, Auto and the related accessories and stationery market had the largest increase in 2017, respectively. http://www.turkishtimedergi.com/e-ticaret/e-ticarette-2018in-en-cok-satan-urunleri/.

Between Iran and turkey there are some similar business facts due to the similar lifestyle and cultural similarities. Both countries are shifting rapidly through online shopping from classic shopping methods. Because of the long and historical cultural background in both countries, majority of the people still would rather to use classical retailers instead of online and modern

shopping stores. Most of the customer still would like to see the physical item during the purchasing process. Plus having more trust to the conventional shopping methods are the other reasons which makes a big portion of people more reluctant toward online shopping in Iran and Turkey. It worth to mention electronic devices are the most preferred category among Turkish and Iranian customers in online shopping. http://www.turkishtimedergi.com/e-ticaret/e-ticarette-2018in-en-cok-satan-urunleri/ . Despite all the similarities, the popular dates for online shopping are different in Iran and turkey Turkish people are more interested to buy in some special occasions such as Kurban, March 8th ,Valentine and new year Eve, while in Iran most of the events are based on Persian Calendar such as Nowruz and Persian mother day. According to the following paper, existence of fascinating deals compared to the classic and physical markets are the main incentive for Turkish people to use the online shopping. https://www.pwc.nl/nl/assets/documents/pwc-annual-report-2016-2017.pdf . While in Iran the fact that people can have an easier access to the western brands in the online markets is the biggest incentive for Iranian for using the online shopping.

As a result nowadays, although the new generation is under the influence of the social media from different countries and different cultures, political and religious differences along with economical situations in different countries (even with cultural similarities in the same geographical region) reveal the different consumption cultures.

References
1. Kırcova, İ. (2005). İnternette pazarlama. Beta Basım Yayın Dağıtım.

2. Avlonitis G., Karayanni D (2000). The Impact of Internet Use On Business-toBusiness Marketing. Industrial Marketing Management, (29), 441–459

3. Shankar, M (2012). A Harbinger of Change: Internet Marketing and E-commerce. Indian Streams Research Journal, 2(4), 1-3.

4. Wells, William D., and David Prensky. "An introduction to consumer behavior." Consumer Behavior (1996): 1-33.

5. Blackwell, R. D., Miniard, P. W., & Engel, J. F. (2001). Consumer behavior 9th. South-Western Thomas Learning. Mason, OH.

6. Dimaggio, Paul, 2000, Social Stratification, Lifestyle, Social Cognition and Social Participation, Pp. 458 - 465. in D. Grusky(ed). Westview Press, San Francisco.

7. Ruling, Charles- Chemens, 2000, Theories if Fashen, The Contributions of Veblen, Simmil, Blumer & Bourdieu, www.hes.unige.ch/research_publications/cahier

8. BOCOCK, R. (1997). Tüketim, (Çev: İ. Kutluk), Ankara: Dost Kitabevi Yayınları.

9. Warde, A. (1991). Gentrification and Consumption: Issues of Class and Gender, Environment and Planning. Dr, Society and Space :304.

10. Belk, Russell W. (1998). "Third Word Consumer Culture". Research in Marketing, Supplement 4 Marketing and Development: Toward Broader Dimensions, Erdoğan Kumcu ve A. Fuat Fırat (Ed.), Greenwich: JAI Press Inc., 103-126.

11. Postman, N. (2004). The information age: a blessing or a curse?. Harvard International Journal of Press/Politics, 9(2), 3-10.

12. Aydoğan, F. (2004). Medya ve Popüler Kültür. MediaCat Akademi Yay. İstanbul.

13. Koç, Erdogan, Tüketici Davranısı Ve Pazarlama Stratejileri: Global Ve Yerel Yaklasım, Seçkin Kitabevi, Ankara, 2007

14. Bourdieu, Pierre (1984). "Distinction: A Social Critique of the Judqement of Taste", Translated by Richard Nice, Routled & Keagan Poul.

15. Lamont, M. (1992). Money, Morals and Manners: The culture of the French and the American Upper-Middle Class, University of Chicago Press, Chicago

16. Peterson, R. A., ve Kern, R. M. (1996). Changing Highbrow Taste: from Snob to Omnivore. American Sociological Review, 61: 900– 907.

17. Tylor, E. B. (1871). Primitive Culture: Researches Into the Development of Mythology, Philosophy, Religion, Art, and Custom, 1 (1), London.

18. Manrai, L. A., Manrai, A. K. (2011). Global Perspectives in Cross- Cultural and Cross-National Consumer Research, Routledge, New York.

19. Levy, S. J. (1999). Brands, Consumers, Symbols, and Research, Sage Publications.

20. Kaufmann, H. R. (2015). Handbook of Research on Managing and Influencing Consumer Behavior, Business Science Reference, IGI Global, Lithuania.

21. ÖZSUNGUR, F., & GÜVEN, S.(2016). TÜKETİCİ DAVRANIŞLARINI ETKİLEYEN SOSYAL FAKTÖRLER VE AİLE. *International Journal of Eurasian Education and Culture*, *2*(3), 127-142.

22. Azizi, S., & Javidani, M. (2010). Measuring e-shopping intention: An Iranian perspective. African Journal of Business Management, 4(13), 2668-2675.

23. Vahid Randy, mohsen khoon Siavash, , & Behrooz Masoumi(2015). Factors affecting Internet shopping behavior among Irannian customers according to the technology acceptance model (TAM), 109-118 http://www.jdem.ir/article_483.html

24. https://www.alexa.com/topsites/countries/IR

25. http://ecommerce.gov.ir/uploads/tfo_r&d_ecommercereport_iran_9296_ver1.pdf

26. https://www.theguardian.com/world/2016/nov/24/iranian-online-shopping-site-launches-its-own-version-of-black-friday

27. http://dolat.ir/detail/259262

28. http://hyperseo.ir/five-top-online-stores-in-iran.html

29. http://www.eticaretraporu.org/wp-content/uploads/2017/04/TUSIAD_E Ticaret_Raporu_2017.pdf

30. http://www.hurriyet.com.tr/ekonomi/kobi/turkiyedeki-en-basarili-10-e-ticaret-sitesi-40271110

31. http://www.turkishtimedergi.com/e-ticaret/e-ticarette-2018in-en-cok-satan-urunleri/

32. http://www.turkishtimedergi.com/e-ticaret/e-ticarette-2018in-en-cok-satan-urunleri/

33. https://www.pwc.nl/nl/assets/documents/pwc-annual-report-2016-2017.pdf