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Critical Success Factors in ERP Implementation: A Review

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Abstract: ***The fundamental motivation behind the paper is to complete a survey of ERP Papers to discover what are the basic achievement factors in ERP usage. In this manner, the goal of the paper is to contemplate the survey papers and discover the basic achievement factors in ERP execution. Research discoveries of the paper: While executing this ERP in an enterprise(s), it is discovered that there are clearly some of the factors which should be addressed.5 papers were evaluated for CSF's and concentrated top to bottom. These CSF's are specified as Table. While executing ERP a portion of the basic issues are there which influences the effective ERP usage which have been examined underneath through some examination papers and closed beneath.***

Keywords: Critical Success Factors, Enterprise Resource Planning.

I. INTRODUCTION

ERP is incorporated arrangements of programming created to share information over the association for diminishing excess business forms. These frameworks are conveyed in an association to streamline the its capacities .Present day ERP arrangements are created by joining the finest business practices and forms and are conveyed by ERP sellers SAP, Prophet, Microsoft Progression and Baan, they are Bunks (Business off-the-rack) arrangements .These off-the-rack arrangements are sent by associations as per their requirements; Beds arrangements cover all the business forms inside the associations. ERP framework does not transform anything, however the association needs to change the method for working". ERP framework execution is an exceptionally entangled processes as it requires long investment with a significant measure of arranging and counsel, ERP is executed in stages "It is hence contended that stages of ERP usage can be portrayed as an adventure with six phases". Post usage is the last phase of ERP undertaking and it begins after Go-live date of ERP execution venture. ERP framework usage is an exceptionally muddled undertaking and wide in scope for some bigger associations and it could be hugely unpredictable. It takes long time to implement ERP framework and years to get essential advantages from the framework. However these advantages are difficult to assert as associations confront various issues amid and after the execution of the framework. ERP frameworks are difficult to actualize with high rates of disappointments "75% of ERP ventures finished disastrously". Along these lines, have made ready for a pursuit from the two academicians and specialists to comprehend and pinpoint the basic achievement factors that decidedly affect this kind of activities' prosperity. Research is been improving the situation. The current paper is a part of an examination exertion that plans to add the factors or the things which are essential to be looked after for effective ERP implementation in the organizations. So in this paper five research papers are being reviewed and we will get to know which are the CSF's which must be taken care of in organizations leading to fruitful results by implementing ERP.

II. OBJECTIVE OF THE STUDY

The Execution of new advancements and assembling methods of insight in different divisions with prevalent achievement rates is fundamental in a country's monetary progress and flourishing. ERP is one such framework for which a considerable measure of protection is offered in associations for execution because of higher ventures and more disappointments related with it. The investigation of ERP execution issues and difficulties is important to elevate and impact businesses to go for ERP framework usage as it is essential in their future expansion. The reason for this paper is to give a solidified rundown of fundamental issues and difficulties to guarantee fruitful execution of ERP frameworks in enterprises. This paper is an descriptive research to recognize the basic achievement factors in ERP execution what's more, comprehend the criticality level of each factor from points of view of accompanying survey of the exploration papers. By doing this, organizations can judge and distribute their assets viably to make the progress of ERP execution.

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III. DATA COLLECTION

This section of the paper describes how the authors collected data for their research and based on what they did all. In this study Leopoldo Colmenares (2004) determined to ask the observations and familiarities of companies using ERP systems in Venezuela and used this information as basis of Data collection. The key informant method used for accumulating the information was on a social setting by surveying (or interviewing) a selected number of participants. Also questionnaires were designed for the project managers information.

Parijat Upadhyay et.al(2010) collected the data from literature review which has been done by thorough research of many of prime Management Information System (MIS) journals including that the researchers could access, but not restricted to those that include: IEEE Journals, Information Systems Management journal, Business Process Management journal, Communications of ACM, International Journal of Computer Applications, Journal of Information Technology, International Journal of Production Research, Journal of Management Innovation System, International Journal of Computer Science and Information Security, Journal of Enterprise Information Management. In addition to preceding journals, some conference papers, articles, are also retrieved as well as databases are searched like Emerald, Science Direct, Proquest, Ebscohost, Springer, J Stor etc.

Poonam Garg(2010)first collected data from the literature review to identify what parameters to be considered in research. It outlined the earlier study and critical success factors for ERP implementation in retail industry were studied. Second, questionnaire have been constructed and then it is been piloted. And lastly in depth interviews are held with firm which has implemented ERP to establish the evaluation criteria and factors were identified which stemmed in Critical factors for ERP implementation in retail industry.

In order to study and analyze the project, Veena Bansal (2013) had a broad interaction with CMD, one of managing director, the consultant, the implementation partner and his team. Notes were also made during communications. There are very rare documents to be studied as most of the processes are described to author. The documents that were examined consisted of Sales Order, Purchase Order, Price List etc. The author also looked at their records that mainly consisted of spreadsheets.

Mohmed Y. Mohmed Al-Sabaawi(2015) made questionnaire for data collection which contained scales to measure the various factors which influenced the success of ERP systems in Cihan university.After a preliminary observation on the practice and reviewing the available literature the questionnaire was designed. The researchers circulated the research questionnaire among the parties that had the ability and knowledge to answer it. The survey instrument asked the experts to rate impact of 8 identified factors of ERP success using associated expressions. A set of a questionnaire was created which contained a whole of 24 questions categorized under the following dimensions according to their functions and goals:

A. Commitment and support of top management (question 1-3)
B. Project management (question 4-6)
C. User training and education (question 7-9)
D. Business Plan and Vision (question 10-12)
E. Technological infrastructure (question 13-15)
F. Departments (Stakeholder) participation (question 16-18)
G. Change Management (question 19-21) and Communication (question 22-24).

The questionnaire used for data collection contained scales to measure ERP success using items such as (1 = disagree, 2 = Neither agree nor disagree, 3 = agree).

IV. RESEARCH APPROACH

Leopoldo Colmenares (2004) analyzed and permitted the identification of CSFs of ERP systems implementation in Venezuelan companies. Seven firms were identified from the list which was provided by ERP vendors. ERP project managers of every company were contacted in responsibility of ERP implementation. Approximately 100 questionnaires were sent to each ERP project manager of each firm. Then they forwarded them to his/her project team members in the charge of individual process. Only 69 were effective out of the total 72 questionnaires returned. The questionnaire designed in the study consisted of two main parts first is background of company and second is CSFs. The first part was designed to determine vital issues, comprising of size of company, type of industry, location of company, etc. The second part of the questionnaire was about the success factors of ERP systems implementation consisting of twenty statements, consequent to previously stated literature review. The language was Spanish. The participants used Likert scale to rank the factors, where a score of 5 indicated “extremely critical” and a score of 1 indicated “neither

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critical". This method was employed on the ground that a rating method avoiding the glitches of having to consider twenty CSFs simultaneously in order to rank them. The data collected was then analyzed by using the SPSS software. Based on the responses from both of the industries, descriptive statistics, factor analysis (FA) and reliability test were carried out to identify the CSFs for the successful implementation of ERP systems and data validity respectively. Likert scale is used to rank the factors for measuring an item's importance which indicates higher the value, the more important the factor. The most of the items are rated above the3.0 scale midpoint. The three most important factors, in order of decreasing importance, are: Top management support, presence of a champion and project management, with a mean value ranging from 4.80 to 4.64. These items concerned ERP implementation management and on the other hand use of steering committee, business process reengineering and use of vendors development tools, constitute the three items located at the bottom of the list with a mean value ranging from 2.95 to2.06.Then after ranking of CSF's factor analysis (FA) was completed to reduce the number of items (CSFs) and to understand the original structure of them. In this study FA was performed on all twenty variables using principal components extraction. The goal of this method is to eradicate maximum variance from the data set within each factor. It is basically used to reduce a large number of variables down to a smaller number of components. The measure of sampling adequacy for the twenty items was 0.87 signifying that the items were suitable for factoring. To attain a stable factor structure, a three-stage factor analysis was conducted with an orthogonal (varimax) rotation. The varimax rotation was employed for easily interpretable factors. Under these three round factor analysis the items were mislaid according to the following two criteria i.e. first is no loading greater than0.35 or1 and other is loading larger than 0.35 on two or more factors. A first factor analysis was conducted and produced five factors and according to the two criteria three items were dropped. A second factor analysis on remaining 17 items resulted in four factors and dropping of three items. Finally, a three- factor structure was derived which kept a total of 14 items after three iterations. The minimum eigenvalue from a varimax rotation for which a factor was to be reserved was set at 1.0 in order to satisfy the minimum eigenvalue criterion. Among these factors, factor one contains six items that deal with items related to implementation management, i.e. Top management support, presence of a champion, project management, management of expectations, implementation approach and clear goals, focus and scope. Thus, factor one was named as "ERP implementation management". Factor two holds four items that refer to factors related to users participation such as effective communication, Interdepartmental and communication, User participations and User training. Thus factor two can be labeled as "users aptitudes and communication". Factor three includes four items that focuses on the knowledge of business and ERP. They are best people full time, technical and business knowledge, use of consultants and discipline and standardization. Therefore, factor three is titled "technical knowledge". Then Cronbach alpha coefficients was calculated to test the reliability of these CSFs and listed them. The reliability of coefficients obtained ranged from 0.56 (factor three) to 0.88 (factor one). Thus the acceptability of these reliability coefficients in this study is deemed. Strength of factor analysis is that it provides a basis for data reduction. Rather than looking at all twenty items, now can be examined the ranking of three factors. This simplifies the rankings and clarifies the set of most important items. From this study through the respondents it is stated that six top CFSs for ERP systems implementation in Venezuelans firms are: Top management support, presence of a champion, project management, best people full time, effective communications and management of expectations. In this research three composite CSFs (factors) have been resulted in ERP systems implementation in Venezuela, they are ERP Implementation Management, Users aptitudes and Communications and technical knowledge. Out of the six items four of them load principally upon the "ERP Implementation Management".

Parijat Upadhyay & Rana Basu (2010) identified 28 issues by doing literature review of certain issues and factors leading to successful ERP implementation and on basis of frequency of citations made by several authors in context to both Large and small scale enterprises of similar developing countries like India. And for identifying the crucial issues for both large and small scale enterprises Pareto analysis has been applied i.e. how many times the issues are mentioned by authors in the literature and arranged them in descending manner. And hence these crucial issues have been extracted by applying Pareto analysis. For this purpose, each issues mentioned by authors at least once in the literature is listed down with the occurrence of each issues. From the occurrence calculated for each issue the percentage contribution of each issue is computed, hence the cumulative percentage contribution of issues is calculated. It has been found that only 16 issues out of 28 are contributing80% of the total percentage contribution. Hence, those 16 issues are regarded as the key issues being extracted from the review section in context to large scale enterprise in developing countries like India. From the literature review and by applying Pareto analysis it has been found that 16 issues were identified as the critical issues responsible for ERP implementation success for large organizations and 15 issues for SMEs for developing countries in Indian context as those are contributing more than 80% of the total percentage contribution of issues. Clearly defined the goal and scope of implementation, proper project planning, proper implementation strategy and Minimal customization are the issues which are found to be more critical for SMEs.

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Poonam Garg(2010) reviewed the literature in ERP, and found out that 51 success factors have been recognized and studied. Further investigation revealed that 22 success factors were more frequently mentioned and studied in the previous research. The questionnaire which was developed for this research was based on these 22 CSF and the scale used was a 5 Level Likert Scale. To ensure data validity and reliability of the survey instrument, an iterative process of personal interview with eight knowledgeable individuals of two IS faculty, two ERP supplier, two ERP consultants and two managerial level users were conducted to modify the questionnaire before data was captured in a spread sheet software package. The spread sheet was then transported to software statistical package (SPSS).Exploratory factor analysis(EFA) was used to review 22 variables into smaller sets of linear composites that conserved most of the information in the original data set. A five factor solution best defined the data. The resulting five factors namely, top management, product selection, product management, team composition, training and education. The component co variance matrix further showed that the three factors are not related to each further confirming the results of factor analysis. From this study it has been identified that the critical success factor (CSF) of ERP implementation in retail sector of India are classified into the following five dimensions: Top management, product selection, project management, team composition, training & education.

Veena Bansal (2013) objective was to study an ERP project of a small company in the national capital region of India. RetailS started the project in Oct 2009 and finally abandoned it in early 2010. In order to study and analyze the project, author had an extensive interaction with the CMD, one of the managing director, the consultant, the implementation partner and his team. Notes were taken during interactions. There were very few documents to be examined as most of the processes were described to the author. The documents that were examined consisted of Sales Order, Purchase Order, Price List etc. and records were looked into spreadsheets. The ERP implementation at RetailS was started by forming a high level team consisting of CMD, one managing director and an external consultant. There were some of the activities which were undertaken. First is the budget and time line activity in which the data was collected from different sources indicated that an ERP implementation would costs around 1% of the turnover of the company. For RetailS, this figure turns out to be INR. 50,000,00. RetailS was good with the proprietary software used for their financial accounting and didn't wanted it to be included in the ERP system. They wanted to move to a stage of development. RetailS expected the entire project to take about 6 months including requirements gathering and documentation, customization by the vendor of his product, deployment and testing and data migration. The second activity was vendor selection for which the consultant started looking for a vendor and an ERP solution. After spending about a month two companies were selected, located in NCR region RetailS team decided to work with them named KN and CMD. Everything was finalized and all were given their roles to do further work. After about 10 months of no progress from the team and lack of skill both the companies and RetailS coordination was not up to the mark leading to stoppage of the implementation work.

From this case study the root grounds of failure are or we can say that these are the factors which are very critical and if these factors would have been taken proper care then the ERP implementation in this case study would not have been failed. These are project Management, Project Team and Top Competence Management Support. Mohmed Y. Mohmed Al-Sabaawi(2015) presented the paper which is a part of a research effort that aims to contribute the understanding of the phenomenon of ERP implementations and evaluations in HEIs (Cihan university) in the Iraq ; The main objective of this paper is to examine critical success factors of ERP implementation projects in Cihan university at Iraq. In this paper, the author explored the factors that influence the success and failure of ERP systems in Cihan university, an instrument was developed and used to measure perceptions of sample at Cihan university in relation to the major success factors. The data analysis was done by using three analysis such as analysis of descriptive statistics, rank of CSF's and factor analysis. It was found out that the respondents about Commitment and support of top management indicated that general mean is 4.0 which is equal than arithmetic mean that is 4. Variables of this factor achieved mean between 3.53 and 4.333.Top management support initiative of ERP project variable was on top rank with mean 4.333 and standard division 1.230. Whereas Existence of communicating IT strategy for all employees in the organization from top Management to ERP project variable was with smaller mean 3.53 and with standard division 1.073. Thus support and Commitment of Top management will have a positive effect to ERP implementation success. For Project management, it was indicated that general mean(Average) is 4.750 which is higher than arithmetic mean that is 4. Variables of this factor achieved mean between 4.833 and 4.834.The management allocation of a budget of ERP implementation variable was on top rank with mean 4.834 and standard division 0.577. Whereas Our organization determines the starting and finishing dates of ERP implementation variable was with smaller mean 4.583 and with standard division 0.996.Thus project management practices will have a positive effect to ERP implementation. For User training and education, indicated that general mean is 3.888 which is less than arithmetic mean that is 4. Variables of this factor achieved mean between 2.833 & 3.166.Existence of clear strategy for education and training variable was at the top rank with mean 3.166 and standard division 1.403. Whereas Existence of training program for ERP implementation project

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team variable was with smaller mean 2.833 and with standard division 1.337. In general, Training and education will have not have an positive effect to ERP implementation success. Business Plan and Vision, indicated that general mean is 4.166 which is higher than arithmetic mean that is 4. Variables of this factor achieved mean between 3.250 and 4.833.Existence Our organization aims to achieve strategic advantage through the work plan variable was on the top rank with mean 4.833 and standard division 0.577. Whereas Our organization pays attention to initiatives and proposals submitted by project users variable was with smaller mean 3.250 and with standard division 1.356. Based on the above, Business Plan and Vision will have a positive effect on ERP implementation success. Technological infrastructure, indicated that general mean is 4.027 which is higher than arithmetic mean that is 4. Variables of this factor achieved mean between 3.750 and 4.583. The security issues are interest of our organization variable was at the top rank with mean 4.583 and standard division 0.996. Whereas Existence of adequate resources of IT infrastructure variable was with the smaller mean 3.750 and with standard division 1.138. Based on that, Existence of adequate resources Technological infrastructure will give a positive effect to ERP implementation success. Change Management, indicated that general mean is 4.222 which is higher than arithmetic mean that is 4. Variables of this factor achieved mean between 4.166 and 4.253. The possibility to change policies and instructions to suit PR titeteglnl mg variable is on top rank with mean 4.253 and standard division 1.350. Whereas Existence of required flexibility in the administration system to apply ERP system variable is with smaller mean 4.166 and with standard division 1.267.Based on this, Change Management will have an optimistic effect on ERP implementation success. Communication, indicated that general mean is 4.497 which is higher than arithmetic mean that is 4. Variables of this factor achieved mean between 4.166 and 4.833. Existence plan of Communications for ERP project implementation variable is on the top rank with mean 4.833 and standard division 1.477.Existence flow of information between the team and end user variable is with smaller mean 4.0 and with standard division 1.358. Based on this, Communication practices will have an optimistic effect on ERP implementation success. In the analysis of Rank of critical success factor the means of the 8 CSFs are ranked from largest to least. And in the last analysis which is the factor analysis in which the study attempts to understand the underlying dimensions of critical success factors contributing to ERP implementation success. Factor analysis is chosen to help categorize the identified CSF into a set of uncorrelated dimensions with a minimum loss of information. shown contained 6 factors with eigenvalues of above 1.0.After six dimensional factors are extracted from factor analysis, the six dimensional CSF are named based on the area of the variables within each dimension. The six dimensional CSF are categorized as: The inferred value of the all data of Commitment and support of top management is 23.453. This factor contains three variables X1, X2, X3. The X3 variable has loading 0.935 and it is the one contributing the most in increasing this factor, Project management incorporates three variables X4, X5, X6 that explains 21.907 of the variance. X4 variable has loading 0.811 and it is this which improved this factor, User training and education inferred 17.962 of the all data and its Eigenvalues are 4.311, Technological infrastructure interpreted 8.761 of the all data and its Eigenvalues are 2.103. X15 variable has loading 0.941 which contributed to improve the factor, Commitment and support of top management inferred 8.508 of all the data and its Eigenvalues is 2.042. This factor includes three variables X18, X19, X20. The X20 variable has loading 0.975 and it is one contributing the most in increasing this factor. Commitment and support of top management, project management, user training and education, business Plan and Vision, technological infrastructure, departments(Stakeholder) participation, change Management and communication are the eights critical factors which have been identified for ERP implementation in Cihan University in Iraq.

V. CONCLUSION

Following are the critical factors of ERP implementation in industries which if managed properly and taken proper care of will bring success to the industries practicing ERP implementation and will be profitable to industries in whatever way they can. The factors have been listed by in depth review of literature of the papers. They are top management support, presence of a champion, project management, finest people, Effective and appropriate communications, Management of expectations, proper project planning, suitable implementation strategy, least customization, product selection, team conformation, user training and education, business plan and vision, technological infrastructure, departments contribution and change management.

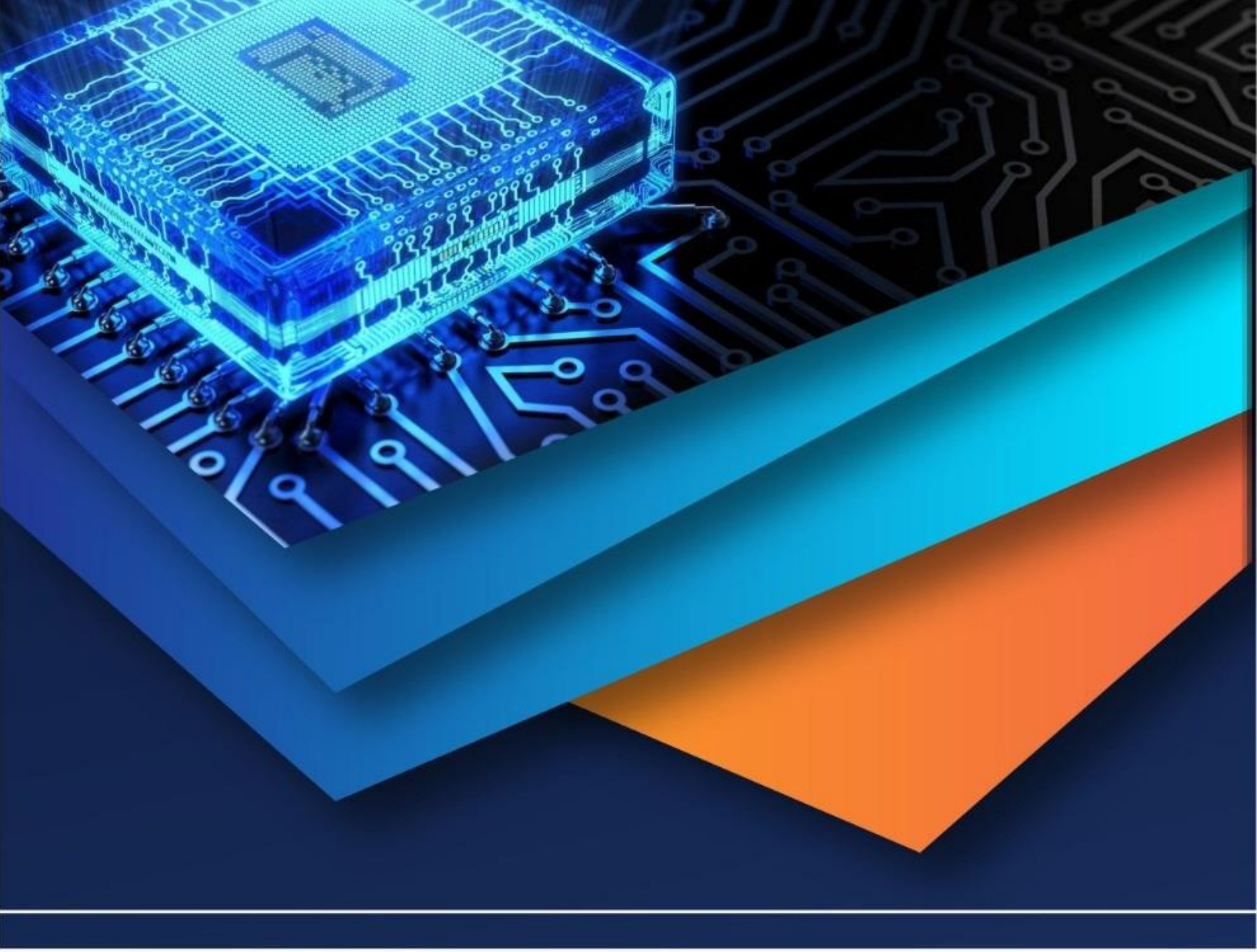
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