RESEARCH ARTICLE

AN INVESTIGATION INTO FACTORS AFFECTING SUCCESSFUL COMPLETION OF DEVELOPMENT PROJECTS IN PUNJAB, PAKISTAN.

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Manuscript Info	Abstract
……………………. ***Manuscript History*** Received: 02 February 2017 Final Accepted: 01 March 2017 Published: April 2017 ***Key words:-*** Automatic Linear Modeling Development Projects Project Management Punjab, Pakistan.	………………………………………………………………… Development projects are considered essential for progress of a country as they provide necessary infrastructure and initial resources to begin economic activities in various sectors of society and economy. Pakistan suffered from severe scarcity of infrastructure right after its formation in 1947; subsequent government plans and actions in this regard have not been able to deliver desired results. A large number of cities are still lacking basic structure of transportation, healthcare, education and telecommunication that are necessary to drive economic activities. Second to shortage of resources to deliver these facilities there is a big reason of failure in managing these projects to deliver desired quality and value. This paper is an attempt to use proven statistics techniques to analyze project data obtained from relevant research and evaluation reports on previous development projects to provide a model into what are the significant factors that need to be taken care of to ensure better value from these projects.

Development projects are considered essential for progress of a country as they provide necessary infrastructure and initial resources to begin economic activities in various sectors of society and economy. Pakistan suffered from severe scarcity of infrastructure right after its formation in 1947; subsequent government plans and actions in this regard have not been able to deliver desired results. A large number of cities are still lacking basic structure of transportation, healthcare, education and telecommunication that are necessary to drive economic activities. Second to shortage of resources to deliver these facilities there is a big reason of failure in managing these projects to deliver desired quality and value. This paper is an attempt to use proven statistics techniques to analyze project data obtained from relevant research and evaluation reports on previous development projects to provide a model into what are the significant factors that need to be taken care of to ensure better value from these projects.

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Introduction:-

Statistic techniques are important to analyze available data for important trends and find significant relations between variables. Statistical modeling techniques offer essential insight into data to derive reliable information for decision making, when applied correctly, these models can produce results of higher accuracy and trust. Focus of this study is to establish a model of various factors that may affect outcomes and value from a development project with the help of statistical modeling techniques. The choice of these methods was made for being useful in subjecting uncertain situations to the rigors of a pre-defined and proven mathematical model. With the help of historical data about what went wrong with the projects of past, these techniques can help embody prior experience to a greater extent and therefore a model thus developed is believed to be less biased than human thought processes alone.

According to Wai et al., 2013 the projects for development of infrastructure are crucial for achieving sustainable development and these developments to be considered sustainable, must ensure that an area's inhabitants have their vital needs met in a way that can be sustained in the future (Naess, 2001). Development projects consist of activities undertaken to create a unique product or service for overall benefit of masses and in less educated and developing societies like Pakistan, these projects are often politically motivated and conceived by an individual without much thought and experience. Very little time is allocated for necessary planning and feasibility analysis resultantly during the execution of these projects, the project manager has to work with higher degree of probability causing

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rise of risk and uncertainty. To mitigate this risk project planners have to allocate more resources which ultimately raise cost and time for completion. This leads to the reason why cost of similar activities are perceived higher in a development project when compared to private sector projects.

Projects being unique and one time activities with presence of uncertainty are managed with attitudes different from other activities and operations. Essential operations of project management are based on probabilities as neither cost nor time could be accurately estimated. Hence, completion times are also based on probabilities. Historically developed models in project management provide time estimates based on optimistic, pessimistic and most likely. These three time scenarios are mathematically assessed to determine the probable completion dates which further impose doubts over all other aspects of project and the final outcome in terms of quality and value.

According to Shieh and Chich-Jen, 2012 having a strategy to learn from the previous mistakes is necessary; a strategy to complement available knowledge from everyday interactions and inculcating it into standard operating procedures makes a basis of improvement by ensuring availability of applicable knowledge for improved performance in future. Better training of management and team is known to have greater impact on project efficiency. Previous studies prove that having advanced knowledge of situations improves chances of success in project management.

It should be noted that such statistical models have been produced in other sectors and have proven successful (Xuan et al., 2015; Zakria et al., 2013), but their implementation on development projects is not giving desired results. One reason of it is the different nature and operations of development projects, and second is the difference in social and political scenario of Pakistan. The purpose of the study is to explore the factors that impacted the success of past development projects in the province of Punjab and then use statistics techniques to provide a model for better planning and execution in future.

This study will focus on all the core areas of development projects as discovered in the preliminary analysis to be responsible for successful completion of a project, right from the initiation of a project till the closing and handing over to the stake holders. Further the flow of all the activities will be considered and assessed for their contribution towards success of a development project, based on current and historical data these results will be presented as a statistical model. This research is likely to produce useful implications, not just for policy formulation and decision making but also to make the development projects more credible and neutral in respect of better management. Contributing to existing literature, this research will form a basis for further research towards increasing productivity and transparency of development projects.

Literature Review:-
The focus of our research is application of the statistical modeling techniques to measure the success of development projects in Punjab, Pakistan. After the 18th amendment and the 7th National Finance Commission (NFC) awards, provinces are autonomous bodies to set up infrastructure, healthcare and energy projects from their resources as per needs of local public (Jaffery et al., 2013). Punjab government is highly proactive assessing needs of its people and allocating funds for development projects, there are numerous infrastructure, healthcare, energy, transport and information technology projects being run in the province. Planning and development (P&D) department of Punjab government along-with various departmental project monitoring units (PMUs) are working on these projects. Directorate Monitoring and Evaluation (DG-M&E) working under P&D department is responsible for monitoring and evaluation of various phases of projects for successful and in-time completion of development projects initiated by various departments. The Punjab Procurement Regulatory Authority (PPRA) is an important entity of province that ensures rules based and transparent functioning of tendering and procurement process which enhances credibility of development projects.

Approaching to the first quarter of 21st century, project management has evolved into a more scientific rather than conceptual subject, the concept of iron triangle lately replaced by the value based agile triangle needs to develop further to include more complex metaphors to tackle the challenges of stake holder satisfaction and customer value delivery based on benefits they get from a well managed project. Punjab government has been vigilant in changing itself for creating better value in every aspect of good governance and project management is an exception in no mean, creation of PMUs in departments and equipping them with the best working conditions, human resource and technology has made possible for its projects to complete successfully within time and resources and deliver maximum value to the people of Punjab.

The base of literature for this research and subsequent statistic model of project success includes a meta analysis report conducted by Directorate General Monitoring and Evaluation (DGM&E, 2015) which is an assessment of 300 development projects of Punjab government from the year 2011 to 2015. This report highlights pertinent lessons, issues, and findings of evaluation studies for facilitating government departments, researchers and academic institutes to draw practical lessons about project design, implementation and development. From these 300 projects that were evaluated by DGM&E, only 45 (15%) projects were termed as "good" in performance whereas 201 (67%) displayed "average" and remaining 54 (18%) termed "poor" in terms of overall value and performance. There is a big concern for government and departments that despite participation at highest level, dedication and determination of staff, still a huge number of projects could not deliver desired results. The report pointed out various factors included in this model that can increase the performance of a development project and make it able to deliver the value intended from it at the time of its inception.

Rockart, 1982 was first to present this idea that by focusing a few areas of project management better results can be obtained. Following the idea many such factor matrixes have been identified in different project categories. Identification and prioritizing these critical success factors can increase the likelihood of achieving success in a project (Garbharran et al. 2012).

A large number of researchers have discussed about success criteria of projects however we can find very little shared ground about it (Al-Tmeemy et al. 2010; Yong and Mustaffa 2012, 2013). One thing that the researchers are frequently found to agree upon is that the success of a project is affected by the performance of each individual activity of the project. An approach often followed by the researchers in numerous studies is focusing on factors that lead to success (Neringa et al., 2014). A number of lists and models have been presented in the literature regarding critical success factors.

Factors contributing to success of development projects:-
Table no. 1 presents the summary of literature review of various critical success factors. Local project review reports supplemented the literature from international researchers and five distinct areas were identified, consulted and included into the factor matrix as critical for success in local context when applied to development projects of government of Punjab, Pakistan.

Project Related Factors:-
Project related factors deal with the scope of the project. Five project related factors were identified from the previous literature including *(1) Project type, (2) Project nature, (3)* Project complexity level, (4) Project size and (5) project location.

Management Related Factors:-
Choice of management techniques and management information system with a plan to carryout operation is important aspect of success of a project. Preparation of detailed plan and execution of these plans with efficient communication, feedback and control, coordination and monitoring makes the decision making process smooth and effective. Further it makes easier for management to follow schedules and deliver within time, cost and quality to ensure full value of every development project.

Table No. 1:- Summary of Project Success Factors from Literature.

Table No. 1 Summary of Project Success Factors from Literature

Authors (columns 1–34): (1) The Gartner Group (2004), (2) Alzahrani & Emsley (2013), (3) Rockart (1979), (4) Tan & Ghazali (2011), (5) Yee & Noor (2013), (6) Cleland & King (1983), (7) Adams & Hughes (1987), (8) Ugwu et al. (2007), (9) Pinto & Kharbanda (1995), (10) The Standish Group (2009), (11) Yeo (2003), (12) Xia & Lee (2004), (13) Mullaly (2004), (14) Boyer et al. (2008), (15) Cooke-davie (2002), (16) Ann et al. (2006), (17) Kun-Shan (2012), (18) Neimat (2005), (19) Brocke et al. (2009), (20) Jugdev & Muller (2005), (21) Belassi & Tukei (1996), (22) Arain (2007), (23) Hemanta (2009), (24) Scot (2011), (25) Blindenbach-Driessen (2006), (26) Chan & Chan (2004), (27) Hwang et al. (2013), (28) Toor & Ogunlana (2008), (29) Bryde & Brown (2005), (30) Savindo et al. (1992), (31) Ahmed et al. (2013), (32) Ibrahim et al. (2013), (33) Yang et al. (2011), (34) Nixon et al. (2012).

Category	S/No	Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Project Related	1	Project Type	X		X	X	X																													
	2	Project Nature	X		X	X	X	X																												
	3	Project Complexity Level				X	X		X	X	X	X	X	X		X																				
	4	Project Size				X	X						X	X	X																					
	5	Project Location	X		X	X	X																													
Management Related	1	No. of depts. involved				X	X																													
	2	Control mechanism	X		X	X	X	X		X					X	X	X	X																		
	3	Feedback capabilities				X	X									X																				
	4	Proper planning of activities	X		X	X	X	X		X						X	X	X	X																	
	5	Defined project hierarchy				X	X						X	X	X	X				X	X															
	6	Quality Assurance				X	X	X	X											X																
	7	Management Function	X		X	X	X		X	X					X		X					X	X	X	X											
	8	Communication strength				X	X	X		X			X		X			X					X	X	X	X										
	9	Coordination capabilities				X	X						X		X								X	X	X	X										
	10	Emphasis on Quality				X	X																				X	X								
	11	Emphasis on Time				X	X																			X	X	X								
	12	Funds availability				X	X	X	X	X						X																				
External Environment	1	Economic environment			X	X	X		X							X	X						X													
	2	Social environment			X	X	X		X							X							X				X	X								
	3	Political environment			X	X	X		X														X													
	4	Industry relations environment			X	X	X		X														X							X						
	5	Technological advances			X	X	X		X						X								X													
	6	Inter-dept. environment			X	X	X		X								X						X	X												
Procedure Related	1	Tendering Process		X		X	X																							X						
	2	HR Hiring Process	X			X	X	X		X																			X							
	3	Vendor Selection		X	X	X	X	X											X				X							X						
	4	Procurement Processes		X		X	X																							X						
Stakeholder Related	1	Team Experience				X	X																								X	X	X	X		
	2	Team Technical Skills				X	X						X		X								X	X							X	X	X	X		
	3	Contractor Experience		X		X	X																						X	X	X					
	4	Contractor Financial Status		X		X	X																						X	X						
	5	Contractor Reputation		X		X	X																						X	X						
	6	PM Experience				X	X																						X		X	X	X		X	X
	7	PM Skill relevance				X	X																						X		X	X	X	X	X	X
	8	PM Communication skills				X	X																						X	X						
	9	PM Leadership quality				X	X						X	X	X				X	X	X										X	X			X	X
	10	PM-Departmental Relations				X	X								X														X		X	X	X	X		
	11	PM-PMIS-Skills				X	X																						X		X	X	X	X	X	

(1). The Gartner Group (2004), (2). Alzahrani & Emsley (2013), (3). Rockart (1979), (4). Tan & Ghazali (2011), (5). Yee & Noor (2013), (6). Cleland & King (1983), (7). Adams & Hughes (1987), (8). Ugwu et al. (2007), (9). Pinto & Kharbanda (1995), (10). The Standish Group (2009), (11). Yeo (2003), (12). Xia & Lee (2004), (13). Mullaly (2004), (14). Boyer et al. (2008), (15). Cooke-davie (2002), (16). Ann et al. (2006), (17). Kun-Shan (2012), (18). Neimat (2005), (19). Brocke et al. (2009), (20). Jugdev & Muller (2005), (21). Belassi & Tukei (1996), (22). Arain (2007), (23). Hemanta (2009), (24). Scot (2011), (25). Blindenbach-Driessen (2006), (26). Chan & Chan (2004), (27). Hwang et al. (2013), (28). Toor & Ogunlana (2008), (29). Bryde & Brown (2005), (30). Savindo et al. (1992), (31). Ahmed et al. (2013), (32). Ibrahim et al. (2013), (33). Yang et al. (2011), (34). Nixon et al. (2012)

Research work by previous researchers and evaluation reports of different departments about projects being carried out presented twelve management related factors important for successful completion of development projects including (*1*) *Number of departments involved, (2) Control mechanism, (3) Feedback capabilities, (4) Proper activity planning, (5) Defined project hierarchy, (6) Quality assurance, (7) Management function, (8) Communication strength, (9) Coordination capabilities, (10) Emphasis on quality, (11) Emphasis on time and (12) Funds availability.*

Procedure Related Factors:-
The efficiency and integrity of framework of carrying out a project is necessary for its success, procedures like tendering for goods or services and clarity of selection criteria of project contractors and suppliers. Analysis of research work revealed four major procedures responsible for successful completion of development projects including *(1) Tendering process, (2) Team Hiring process, (3) Vendor selection and (4) Procurement process*

External Environmental Factors:-
Researchers have recognized environment as a major factor towards success of a project, environment is defined as a set of specific external influencers that impact a project in any way like social, political and technical. The six important external environmental factors found to be critical for successful completion of development projects are *(1) Economic environment, (2) Social environment, (3) Political environment, (4) Industry relations environment, (5) Technological advances and (6) Inter-department environment.*

Stakeholders Related Factors:-
As defined by Thomas et al., 2008 the project management, consultants, client, supplier, contractor and sub-contractor and all the persons and processes that have tied their success with that of the project are project participants. Researchers have expressed that the dimensions related to the stakeholders of a project like behavior, character, attitude, authority, experience, leadership and motivation of a stake holder are among major determinants of success of a project. From the work of these researchers a total of eleven stakeholders related factors were pointed out namely *(1) Team experience (2) Team technical skills, (3) Contractor experience (4) Contractor financial status (5) Contractor reputation (6) Project Manager experience (7) PM skill relevance (8) PM communication skills (9) PM leadership qualities (10) PM departmental relations (11) PM Project Management Information Software skills.*
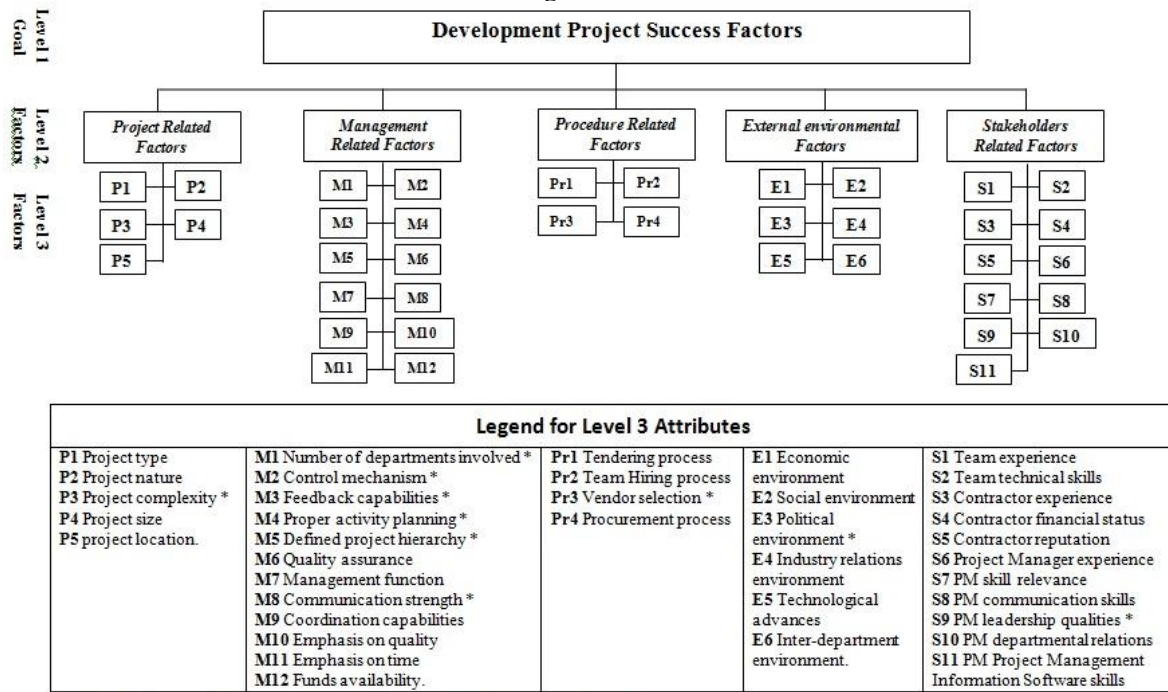
Methodology:-
Measure: Historic work by researchers and documents of project monitoring and evaluation directorate were used to construct this research framework based on qualitative methodology, responses on specifically designed questionnaire were gathered from perceptions of people who had detailed knowhow about the function of project management and had experienced development projects in their areas. The questionnaire contained 38 dimensions presenting five variables as presented in figure no. 1 above; each dimension was an inquiry about respondent's perception of the role of each factor towards success of a development project. Responses were collected about these statements on lickert's scale from 1, "strongly disagree" to 5, "strongly agree" (Likert-Rensis, 1932)

Data Collection: Primary data 229 responses was collected from three types of respondents firstly government employees working on development projects, secondly the private employees working for contractors assigned to the same development projects and thirdly the project professionals from society who had knowledge about these projects and function of government departments. A demographic analysis and profiles of respondents is as shown in table no.2.

Data Validity and Sample Adequacy: Reliability analysis of the instrument used in the model for data collection was performed using SPSS-21 and results are as summarized into table no. 3, all the factor variables were found reliable for this exploratory study with Cronbach's alpha value of 0.71 and above (Black and Porter, 1996).

The adequacy of the sample size was assessed from the value of Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy value of 0.851 (p<0.05) as shown in the table no. 4, indicated that the size of current sample was adequate to build a model (Child, 1990).

Figure No. 1:-

<table>
<tr><th colspan="5">Legend for Level 3 Attributes</th></tr>
</table>

P1 Project type
P2 Project nature
P3 Project complexity *
P4 Project size
P5 project location.

M1 Number of departments involved *
M2 Control mechanism *
M3 Feedback capabilities *
M4 Proper activity planning *
M5 Defined project hierarchy *
M6 Quality assurance
M7 Management function
M8 Communication strength *
M9 Coordination capabilities
M10 Emphasis on quality
M11 Emphasis on time
M12 Funds availability.

Pr1 Tendering process
Pr2 Team Hiring process
Pr3 Vendor selection *
Pr4 Procurement process

E1 Economic environment
E2 Social environment
E3 Political environment *
E4 Industry relations environment
E5 Technological advances
E6 Inter-department environment.

S1 Team experience
S2 Team technical skills
S3 Contractor experience
S4 Contractor financial status
S5 Contractor reputation
S6 Project Manager experience
S7 PM skill relevance
S8 PM communication skills
S9 PM leadership qualities *
S10 PM departmental relations
S11 PM Project Management Information Software skills

*Factors perceived insignificant for development projects' success in Punjab.

Factor Reduction: Automatic linear modeling process from SPSS-21 was first run to check the significance and importance of each dimension table no. 5 presents the results of first phase, a total of 28 dimensions from 38 were selected based on significance and importance scores obtained from automatic linear modeling.

Model Building: In second phase of analysis all the five variables were computed based on 28 significant dimensions now automatic linear modeling process was employed using SPSS-21 to construct the project success model. Output of the model is briefly explained and presented in form of easily interpretable graphs as shown in section 5 of this paper from figure no. 2 to figure no. 5.

Table No. 2:- Respondent Profiles.

	No.	Percent	Cumulative Percent
Gender of Respondents (N=329)			
Female	82	24.9	24.9
Male	247	75.1	100.0
Profession of Respondents (N = 329)			
Government employees working on projects	120	36.5	36.5
Private employees working on Projects	85	25.8	62.3
Professionals having project knowledge and experience	124	37.7	100.0
Education of Respondents (N=329)			
Masters Degree	44	13.4	13.4
Bachelors Degree	268	81.5	94.9
Technical Skill Certificate	17	5.2	100.0
Years of Working Experience (N=329)			
1~5 Years	190	57.8	57.8
5~10 Years	92	28.0	85.7
10~20 Years	47	14.3	100.0

Types of Projects(N=329)			
Infrastructure Projects (Road, Building, Bridge, Underpass)	67	20.4	20.4
Education/Skill/Capacity Development/Healthcare Projects	49	14.9	35.3
IT/MIS Projects	89	27.1	62.3
Other experience	124	37.7	100.0

Table No. 3:- Reliability Analysis of Model Instrument.

Success Factor	Reliability (Cronbach Alpha)	No of Items
Project Related Factors	0.790	5
Management Related Factors	0.906	12
Environment Related Factors	0.711	6
Procedure Related Factors	0.877	4
Stakeholders Related Factors	0.868	11

Table No. 4:- KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.851
Bartlett's Test of Sphericity	Approx. Chi-Square	874.988
	df	10
	Sig.	.000

Table No. 5:- Significant Level 4 Factors, prioritized as per importance score Target: Project_Success

Source	Sum of Squares	df	Mean Square	F	Sig.	Importance
Corrected Model	72.920	62	1.176	11,963.20	.000	
Project_type	0.082	3	0.027	277.548	.000	0.113
Coordination_Capabilities	0.073	3	0.024	246.955	.000	0.100
PM_experience	0.062	3	0.021	209.348	.000	0.085
Project_size	0.060	3	0.030	305.466	.000	0.083
HR_hiring_process	0.057	3	0.029	290.234	.000	0.078
Funds_availability	0.046	3	0.015	156.837	.000	0.064
Tendering_process	0.046	3	0.015	155.785	.000	0.063
Contractor_experience	0.043	2	0.022	219.477	.000	0.059
PM_communication_skills	0.035	2	0.018	180.450	.000	0.049
Technological_advances	0.034	2	0.017	173.281	.000	0.047
Economic_environment	0.031	3	0.010	105.512	.000	0.043
Contractor_financial_status	0.023	2	0.011	114.605	.000	0.031
PM_skill_relevance	0.022	2	0.011	109.819	.000	0.030
Social_environment	0.014	2	0.007	72.532	.000	0.020
Inter_department_environment	0.012	3	0.004	39.095	.000	0.016
PM_department_relations	0.011	3	0.004	38.399	.000	0.016
Management_function	0.011	2	0.005	55.472	.000	0.015
PM_PMIS_skills	0.010	2	0.005	53.066	.000	0.014
Team_technical_skills	0.010	2	0.005	49.366	.000	0.013
Project_nature	0.007	2	0.004	36.691	.000	0.010
Precurement_processes	0.006	2	0.003	31.118	.000	0.008
Emphasis_on_quality	0.006	3	0.002	20.456	.000	0.008
Industry_relations_environment	0.006	2	0.003	28.991	.000	0.008
Project_location	0.005	1	0.005	53.659	.000	0.007
Team_experience	0.005	1	0.005	53.521	.000	0.007
Contractor_reputation	0.004	1	0.004	40.826	.000	0.006
Emphasis_on_time	0.004	2	0.002	19.901	.000	0.005
Quality_assurance	0.002	1	0.002	16.722	.000	0.002
Residual	**0.026**	**266**	**0.000**			
Corrected Total	**72.947**	**328**				

Automatic Linear Modeling:-
Automatic linear modeling was used to present results of the model due to the reason that the output is available in form of easily interpretable graphs which can be studied and explained to people without requiring in-depth knowledge of statistics. Output figures, graphs and tables obtained after running the model on SPSS-21 is briefly explained below.

Figure No. 2:-

Model Summary

Target	Project_Success
Automatic Data Preparation	On
Model Selection Method	None (All Predictors Entered)
Information Criterion	-1,414.091

The information criterion is used to compare to models. Models with smaller information criterion values fit better.

Worse   Better

72.9%

0%   25%   50%   75%   100%

Accuracy
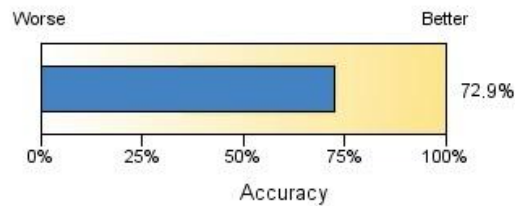
The model summary shown in Figure No.2 presents how the model was constructed using available data, it also provides information about the target variable, data preparation and number of predictors selected from available predictors to build the model, in this case all the available predictor variables were included into the model. The Accuracy bar shown in the graph at the bottom of the figure is the value of adjusted R square as 0.729 which tells how much the predictor variable predicted on dependent variable's functioning, or the percentage of goodness or accuracy of the model, which in this case is 72.9% and is fairly good enough to declare the model an accurate and fit model.

Figure No. 3:-

Residuals

Target: Project_Success

The P-P plot of Studentized residuals compares the distribution of the residuals to a normal distribution.The diagonal line represents the normal distribution.The closer the observed cumulative probabilities of the residuals are to this line, the closer the distribution of the residuals is to the normal distribution.
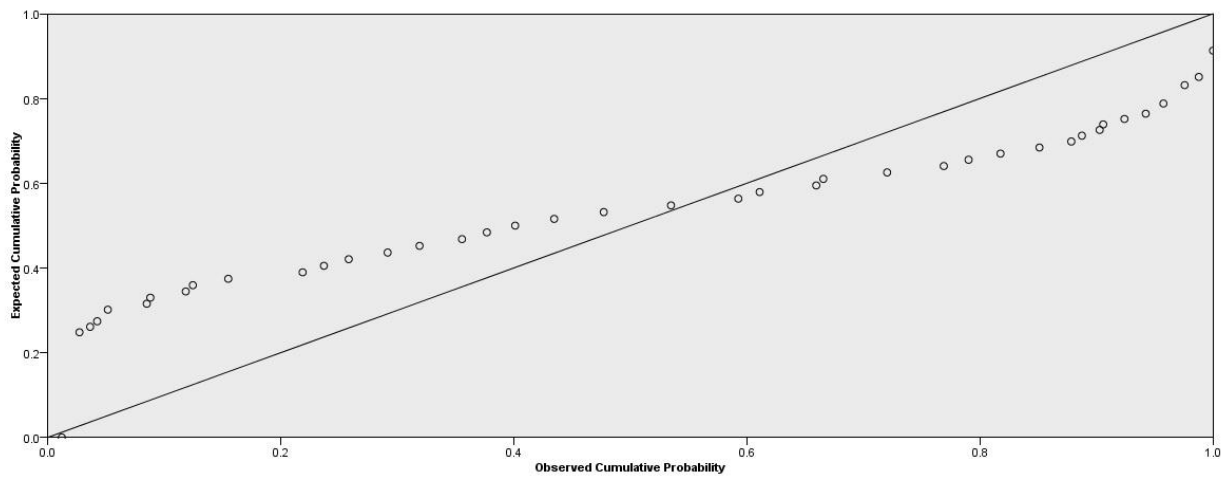
Figure No. 3 presents the graphical model of spread of residuals on a probability plot and all the predictions are spread evenly on the line which presents that the most of the time data points are on or close to the line and evenly distributed around the line.

Figure No. 4:-

Coefficients

Target: Project_Success

Model Term	Coefficient ▼	Std.Error	t	Sig.	95% Confidence Interval		Importance
					Lower	Upper	
Intercept	-0.574	0.069	-8.384	.000	-0.709	-0.440	
Stakeholders_Related_Factors_ transformed	0.250	0.015	16.571	.000	0.220	0.280	0.294
Procedure_Related_Factors_ transformed	0.225	0.016	14.236	.000	0.194	0.256	0.217
Environment_Related_Factors_ transformed	0.211	0.016	13.338	.000	0.180	0.242	0.190
Project_Related_Factors_ transformed	0.246	0.019	12.952	.000	0.209	0.283	0.180
Management_Related_Factors_ transformed	0.200	0.019	10.551	.000	0.163	0.237	0.119

Management_Related_Factors_transformed   Stakeholders_Related_Factors_transformed

Least Important   Most Important

Display coefficients with sig. values less than...

.0001   .0005   .001   .005   .01   .05   .10   .20   1.00

The coefficients table in figure no. 4 above presents the coefficient values with t statistics and significance of each predictor variable with 95 percent confidence interval. The importance of each predictor gives an idea on how each

factor is responsible for success of project. The same information is plotted into a graph where length and thickness of lines presents the importance of every independent variable towards dependent or predicted variable. Low value of significance shows that the factors are all significantly recommended to be included into the model as the predictor with low p-value will be a meaningful addition to our project success model because any change in the value of this predictor is related to subsequent change in the response variable of the model which in this case is development project's success.

Discussion on Results:-

As the model is prepared using only the factors that were found significant during the first phase of analysis, importance scores were the next important figure towards finding contribution of each factor. Factors with importance scores lower than 0.001 were ignored, thus a total of 28 factors were finalized to be included into the model. The higher the importance figure of a factor the higher is the contribution of the factor towards the success of development projects.

Stakeholder related factors round up about 29.4% (t = 16.571, $p<0.001$), among the stakeholders related factors the experience of project manager contributed the highest 8.5% (f = 209.348, p<0.000), followed by contractor experience 5.9%(f = 219.477, p<0.000), communication skills of project manager were found to be contributing 4.9%(f = 180.45, p<0.000), financial status of the contractor amounted to 3.1%(f = 114.605, p<0.000) and relevant skills of a project manager followed with 3%(f = 109.819, p<0.000) of contribution towards success. Relations of a project manager with various departments related to the project success contributed to 1.6% (f = 38.399, p<0.000) and project manager's skills related to use of project management information systems were accounted to contribute 1.4%(f = 53.066, p<0.000). Technical skills and experience of the project team contributed 1.3%(f = 49.366, p<0.000) and 0.7%(f = 53.521, p<0.000) respectively and contractor's reputation was found to contribute 0.6%(f = 40.826, p<0.000) towards success of a development project.

Project related factors have been found to contribute 18% (t = 14.236, $p<0.001$), where factors like project type contributed 11.3%(f = 277.548, p<0.000), project size 8.3%(f = 305.466, p<0.000), project nature 1%(f = 36.691, p<0.000) and project location shared its contribution of 0.7%(f = 53.659, p<0.000) towards success.

Management related factors 11.9%(t = 10.551, $p<0.001$), among these factors the co-ordination capabilities of the management were found to contribute 10%(f = 246.955, p<0.000), making funds available in time contributed to 6.4%(f = 156.837, p<0.000), overall management of issues contributed to 1.5%(f = 55.472, p<0.000), management's emphasis on quality amounted to 0.8%(f = 20.456, p<0.000), emphasis on time to 0.5%(f = 19.901, p<0.000) and emphasis on quality accounted 0.2%(f = 16.722, p<0.000) towards success of a development project.

Procedure related factors subsequently score to, 21.7 % (t = 14.236, p<0.001), among these factors major contributors included the hiring of staff accounted for 7.8%(f = 290.234, p<0.000), tendering process 6.3%(f = 155.785, p<0.000) and procurement process 0.8%(f = 31.118, p<0.000) towards success.

External environment related factors contributed 19% (t = 13.338, p<0.001), where technological advancement in the field of project contributed to 4.7%(f = 173.281, p<0.00), Economic conditions of the market 4.3%(f = 105.512, p<0.00), Social environment factor shared 2%(f = 72.532, p<0.00), Interdepartmental environment 1.6%(f = 39.095, p<0.00) and Industry relations environment contributed 0.8%(f = 28.991, p<0.00) towards success.

Figure No. 5:-
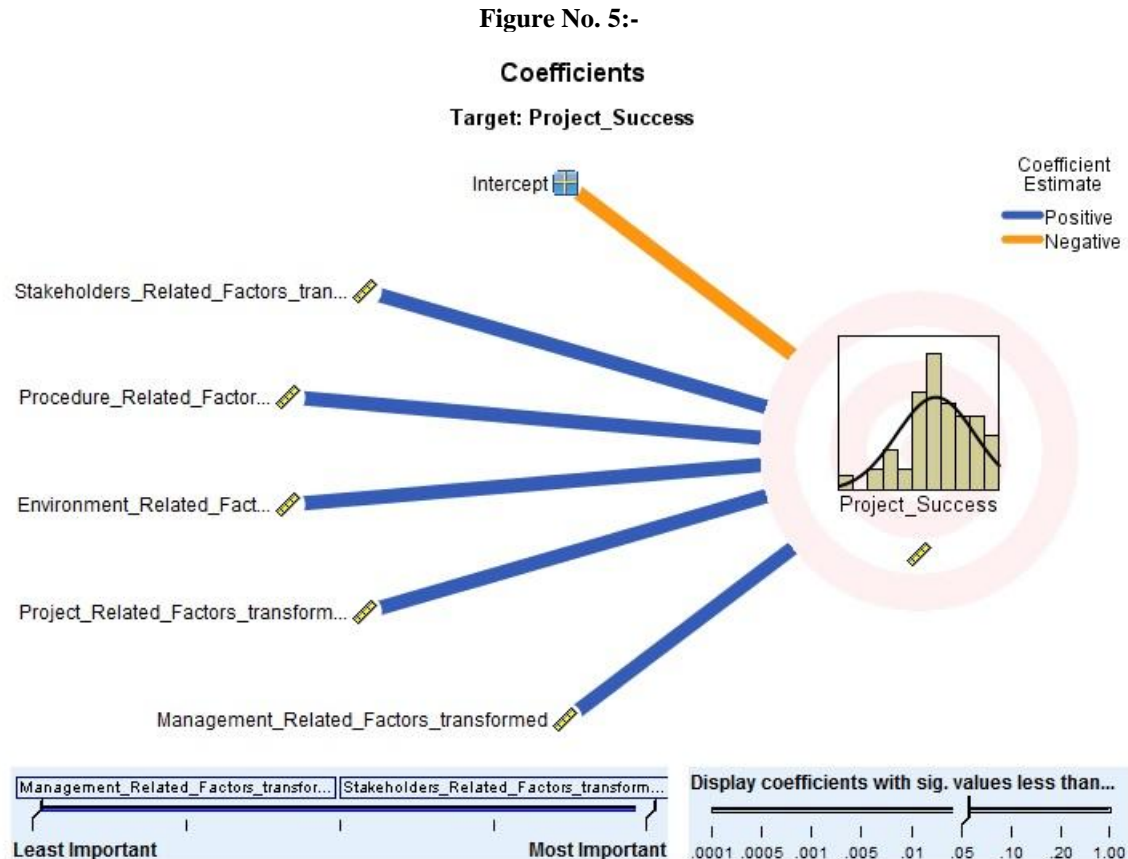
Application and Significance:-
In addition to providing a functional importance, various success factors depicting percentage of contribution by each significant factor towards success of a project, the model can be a viable tool to point out different factors at planning phase of a project and allocate management resources as per importance scores.

When project priorities will be communicated according to the importance scores, the project manager as well as the project stakeholders like contractors, suppliers and others can join resources to make sure the project goals are aligned with actions at each and every level of project execution. The model also provides an evaluation tool that evaluate and indentifies the management risks if subjective and objective factors identified in this model are not followed due to certain reasons.

Results of this model can be incorporated into various operations of development projects like planning, execution, monitoring and evaluation. The model is also a useful tool for selection of type, nature and location of development projects to get better overall credibility for value to the society, as concentration on a few types of projects like roads and transport can come under criticism, the project selected using such a model will become more credible and are easy to win public support. Similarly, adopting a model for longer time and incorporating lessons can act as a source of feedback on project success which will be beyond the framework of objective metrics alone. The relative scores of importance of various activities in this model can be contributors to the available knowledge base of the departments involved in development projects across the province, this can help to balance priorities and optimal allocation of resources in future development projects.

Limitations and Suggestions for Future Research:-
The model presented in this article has provided significant evidence and suggested that proper management of identified success factors can enhance the chances of success of a development project and increase its value. In this study, a total of 329 respondents that include the staff of various departments of government of the Punjab who had experience of working on development projects and project management professionals having experience of

working of provincial government departments. This study can further be expanded to increase the data size and diversity of participants. Further, the model should be used in various projects in different provinces of Pakistan to validate and confirm these results. Additionally, the leadership and adoption of available technology roles could be different based on the disposition of project characteristics and the nature of the project. Likewise, management roles could be project nature specific due to differing types of work cultures and competitive environments. Future research efforts should consider this model for longitudinal research running parallel on projects of different type, scale, nature and complexity in various locations to further refine the model and make is into comprehensive and acceptable measure of project success.

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