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# Prerequisites for and impediments to success in logistics reengineering projects

Kenneth J. Preissler

To the Graduate Council:

I am submitting herewith a dissertation written by Kenneth J. Preissler entitled "Prerequisites for and impediments to success in logistics reengineering projects." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Frank W. Davis Jr., Major Professor

We have read this dissertation and recommend its acceptance:

Joseph Rentz

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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# PREREQUISITES FOR AND IMPEDIMENTS TO SUCCESS IN LOGISTICS REENGINEERING PROJECTS

A Dissertation Presented for the Doctor of Philosophy Degree

The University of Tennessee - Knoxville

Kenneth J. Preissler

August 2000

## DEDICATION

To my wife, Dianne Preissler for her love and understanding. I am grateful to be her husband and friend.

AND

To my parents, Charles and Vivian Preissler for their love and early guidance that really made a difference. I am grateful to have been their son.

**ACKNOWLEDGEMENT**

Completing the work for my dissertation has been a long and difficult road. Perhaps the journey was longer than it should have been. At times, the task seemed insurmountable.

I sincerely acknowledge the tremendous contribution of my major advisor, Dr. Frank Davis. His patience and support were steadfast and he has provided a wonderful example of professionalism. Dr. Davis is a man of diverse interest and abilities. But, he is first and foremost a teacher. I consider myself fortunate to have been his student.

I would also like to thank Dr. Joseph Rentz for his able guidance when the statistics created an insurmountable task.

Finally, I wish to thank my wife, Dianne Preissler. Without her style of alternating encouragement and nudging over the years, it is entirely possible that I might never have reached the end of this long road. I have tried her patience, particularly over the last year, when I have attempted to turn my dissertation from a hodgepodge of disconnected work into a coherent thesis.

## ABSTRACT

The purpose of this research was to determine the most important prerequisites for success and the most important impediments to success in logistics reengineering projects.

The research design was based on a hypothesized relationships between the independent variables (the prerequisites for success and the impediments to success) and the dependent variable, the outcome (success or failure) of reengineering projects. It was further hypothesized that some of the independent variables help the outcome of reengineering projects, while others have little or no impact.

In order to fulfill this objective, a three-part research questionnaire was developed to measure logistics practitioner's reengineering project experiences. This instrument was designed to capture measurements of success in reengineering projects and the determinants of success, prerequisites and impediments, in these projects. This instrument was also designed to collect data regarding the firms. The firms selected for this survey were firms where logistics would play a major role in the firm, such as manufacturers, transportation providers, warehousing, and distribution companies. The information regarding the firms was used to classify the firms to determine if there were any differences in the success or failure of reengineering projects within any given classification of firms. The practitioners to be surveyed were selected from three sources. The first two sources of survey practitioners were the membership roles of the American Production and Inventory Control Society (APICS) and the Council of Logistics Management (CLM). The third source of survey practitioners was the Standards and Poor's database.

This research found that there was a relationship between project success in reengineering projects and prerequisites for success and impediments to success. This research further found that there was also a relationship between project schedule performance and project budget performance in reengineering projects and prerequisites for success and impediments for success. Further analysis of these relationships resulted in the development of a short list of the most important prerequisites and impediments.

Managers now have an opportunity to field test and verify the findings of this research. The list of 34 prerequisites to success and impediments to success developed mainly from the work of consultants has now been shortened to a manageable list. The scope of this research was the determination of the most important prerequisites for success and impediments to success in reengineering projects at firms classically categorized as logistics firms. Beyond this limited scope of reengineering projects initiated at logistically sensitive firms, an examination of other types of projects and other type of firms would be warranted.

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"You don't have to reengineer if you manage properly"[1]

[1] Survey quote from the CEO of a well-known multi-billion dollar global corporation.

## CHAPTER I

## INTRODUCTION

Logistics processes, developed gradually over the past decades, continue to undergo necessary radical change in this era of increasing global competition. Advances in information technology such as the internet, data base management systems, data warehousing, bar code scanning, RF communications, telecommunications, and image processing have enabled logistics and information managers with vision to plan, guide, and lead the implementation of these changes. One name given to this process of change in the way firms conduct their business is reengineering. What could have more appeal to top management than the order of magnitude improvements attributed to reengineering, described in business journals, and proposed by consultants? Their scope and magnitude further define reengineering projects. If a reengineering project affects only a single business process and is being implemented to streamline for efficiency, it is considered process redesign. If a project affects one of the core business processes and is being implemented to match the best practice of another company, it is considered business reengineering. If a project affects the total system and is being implemented to create the best practice in the industry, it is considered business invention (See Figure 1.1).

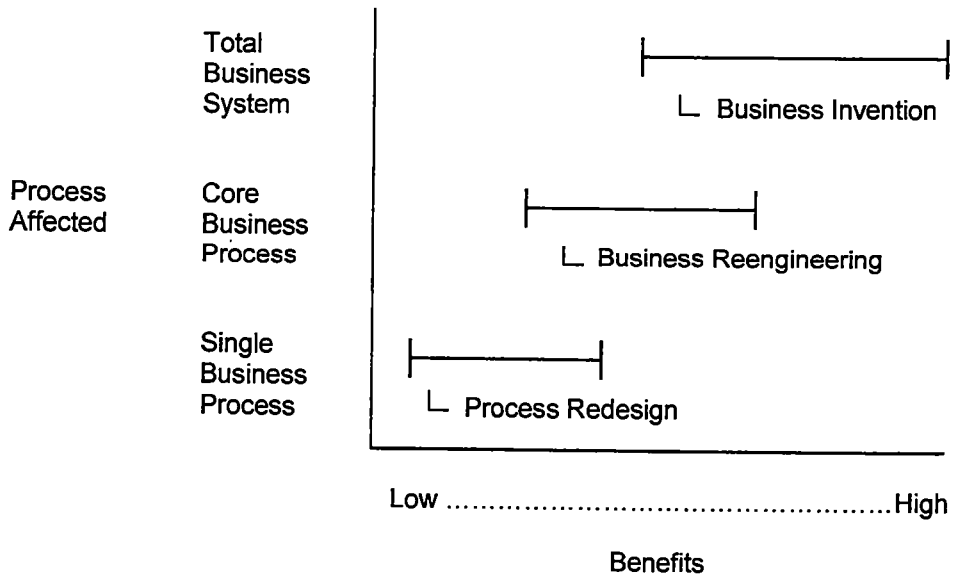


**Figure 1.1 Scope of Reengineering Projects**

The preceeding diagram is based on models used by Cleveland Consulting Associates[2] and Andersen Consulting[3] to describe the reengineering process.

**Reengineering Defined**

(Business) reengineering is the rethinking and **radical** redesign of an entire "**business system**" - the business **processes**, jobs, organizational structures, management systems and values and beliefs - to achieve **dramatic** improvements in performances. There are four terms in the definition that require a closer look.

**Radical:** Reengineering is not automating or reautomating existing business procedures, the paving or repaving of the cowpaths that have characterized the computerization of business for the last 40 years. It is discarding the conventional ways of working and replacing them with entirely new ones, "paving the cowpaths" – refer to Michael Hammer 1990 landmark article in the Harvard Business Review, Reengineering Work: Don't Automate, Obliterate. Michael Hammer's most familiar reply to persons asking him what he did for a living was telling them that he is reversing the Industrial Revolution."[4] Schumpter defined the process of destruction whereby society is continuously advanced by waves of innovation in which old technologies and products are replaced by new ones.[5] Reengineering is the name given to this modern form of creative destruction by Michael Hammer.

**Business System:** Reengineering begins with process redesign, but it does not end there. To be successful, it inevitably changes the definition of jobs, organization structures, hiring, training, measurement, and compensation.

**Processes:** Reengineering focuses on the redesign of business processes. A process is a sequence of activities that creates something of value for customers. An

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[2] Wilkinson, Richard, Reengineering: Industrial Engineering in Action, Industrial Engineering, August, 1991, pp. 47-49.

[3] Cafasso, Rosemary, Rethinking Re-engineering, Computerworld, March 15, 1993, pp. 102-105.

[4] Ravikumar, Ravi, Business Process Reengineering: The Competitive Advantage, 36th International Conference Proceedings, The American Production and Inventory Control Society, Falls Church, Virginia, 1993, pp. 70-73.

[5] Schumpter, J., Capitalism, Socialism and Democracy, Harper and Row, New York, 1942.

example is order fulfillment, which begins with the receipt of an order and ends when the customer has received and paid for the product. Processes transcend functional areas such as sales, marketing, accounting, etc. This makes reengineering extremely difficult - organizations think functionally and are parochial about their turf.

**Dramatic:** Reengineering produces order-of-magnitude breakthroughs, quantum leaps in operating and financial performance. It does not lead to incremental improvements of the type usually associated with traditional quality improvement programs.

Reengineering is not the migration of legacy systems computing from mainframes to smaller platforms such as a client-server, although many individuals consider this to be included in the scope of reengineering. George Colony, President of Forrester Research, is amazed at this use of the term reengineering in this situation. Most of the applications being built by client-server software vendors are mundane fundamental applications such as inventory, human resources, and accounting. What is really happening is that companies are taking the old ways they did things and just "client-servering" them.[6] This study does not include these occurrences. Additionally, some individuals consider the conversion of legacy systems that use outdated teleprocessing monitors and databases and originally written in COBOL to up-to-date technology using a Computer Aided Systems Engineering (CASE) tool as reengineering. It is better classified as reverse engineering but often referred to as re(verse)engineering.

## Research Purpose

The purpose of this research was to determine, using a survey, the most important prerequisites for success and the most important impediments to success in logistics reengineering projects. The lists of prerequisites and impediments were drawn from numerous articles on reengineering offering advice to the project executive, project manager, and the implementation teams. Some were written by consultants. Information systems personnel wrote some. Some were written by practitioners. Professional writers or

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[6] Interview with George Colony, Forecasting Technology Trends, Platforms, Bachman Information Systems, Burlington, Massachusetts, Summer/Fall 1993.

academics drawing on the expertise of consultants, information systems professionals, and practitioners wrote many.

Even with the great interest in reengineering and the deluge of articles written regarding reengineering, there has been little academic research performed to date. Further, the academic research to date has been based on the experiences of consultants, not on those of practitioners. Bashein, Markus, and Riley noted in their study that their findings represent the observations of expert consultants and that some of their experiences may not be borne out in subsequent academic research.

The research is organized around two broad research questions and one secondary question. The first research question examines the presence or absence of prerequisites for success as they relate to the outcome, success (or failure) of reengineering projects. The second research question examines the presence or absence of impediments to success as they relate to the outcome, success (or failure) of reengineering projects. Before we can attempt to answer these questions, we must first define success. For the purpose of this study, the success of reengineering projects will be based on the level of user satisfaction with the results of the reengineering effort and the perceived contribution of the reengineering effort to the firm's success. The secondary question examines the costs and benefits associated with completed reengineering projects? It was fully understood that collection of data for the secondary question, cost and benefit information would be very difficult to obtain.

## Research Scope and Terms Defined

The scope of the research project and the definition of what comprises a successful project are important.

### Research Scope

The research was exploratory. Surveys were sent to members of the American Production and Inventory Control Society (APICS) and the Council of Logistics Management (CLM). Consultants and educators were eliminated from the survey population. Only one survey was sent per company. APICS is a 70,000 member international organization

dedicated to increase manufacturing and service industry competitiveness and global prosperity. CLM is a not-for-profit professional organization of individuals who are interested in improving their logistics and distribution management skills. CLM provides leadership in defining and understanding the logistics process. In addition to surveys sent to APICS and CLM members, surveys were sent to CEOs at industrial companies selected from the Standard and Poor's on-line database.

**Successful Projects**

Without criteria for measurement of the performance of reengineered processes, it is difficult to contend that an organization's reengineering projects are successful and contribute to the organization's performance. Benefits of systems projects are sometimes difficult to measure and require arbitrary judgments to quantify benefits such as increased productivity, increased quality, and reduced costs. Reengineering systems are not significantly different from any other system. Benefits from reengineering systems projects will also be difficult to predict and measure. Some of the benefits may be intangible. However, measurements are necessary for the justification of the large investment required. The development of objective measures to gauge success have been extremely difficult. Therefore, indirect measurements are used. If a reengineered system is perceived as providing benefits to the system user, then those benefits can be claimed as a perceived benefit of the reengineering project.

Correspondingly, a failed (unsuccessful) project is a completed reengineering project that is not providing benefits to the user organization and/or is not perceived to be a high quality viable system. It also includes projects that have been canceled/never implemented, although organization's resources were appropriated and used on the reengineering project.

**Conceptual Model**

The research design was based on a hypothesized relationships between the independent variables (the prerequisites for success and the impediments to success) and the dependent variable, the outcome (success or failure) of reengineering projects. It was further hypothesized that some of the independent variables help the outcome of reengineering projects, while others have little or no impact.

## Research Justification

This section provides a framework for the research. The increasing use of information technology in logistics is discussed. Evidence that the huge investments in information technology have not always provided increased productivity or profitability is also discussed. The need for reengineering logistics systems is presented. The need for more successful reengineered logistics systems is also presented.

### The Increasing Use of Information Technology in Logistics

Logistics systems have undergone continuous changes in response to advancing information technology and customer requirements. This is demonstrated clearly by the evolution from facility based physical distribution to information-driven customer-based logistics. Evidence of this evolution is apparent from the distinct eras as described in the generally accepted definitions of logistics (previously physical distribution).

**The movement of goods era:** "The field of physical distribution, therefore, revolves around the selection of the number of plants and their locations, the determination of the number, size, and geographic arrangement of warehouse facilities and the choice of transportation methods employed."[7]

**The logistics era:** "The process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements."[8]

**The services era:** "The process of planning, implementing and controlling the efficient effective flow and storage of raw materials, in-process inventory, finished goods, services, and related information from point of origin to point of consumption (including

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[7] Smykay, Edward W., Bowersox, Donald J., and Frank Mossman, Physical Distribution Management. The Macmillan Co., New York, 1961, p. 4.

[8] Definition provided by the Council of Logistics Management, OakBrook, IL, 1984.

inbound, outbound, internal, and external movements) for the purpose of conforming to customer requirements."[9]

Driving this evolution were systems such as Material Requirements Planning (MRP), MRPII, Just-in-Time (JIT), Quick Response, and Electronic Data Interchange (EDI). These logistics systems were enabled through advances in technology such as lower cost computing, lower cost telecommunications, the internet, advances in data base storage and retrieval, data warehousing, CASE tools, image processing, bar coding, and RF technology.

The huge Information Technology investment has not always provided Increased productivity or profitability. Lester Thurow, in a forward to a major MIT study on the business impact of information technology states,

> "Specific cases in which the new technology have permitted huge increases in output or decreases in costs can be cited, but when it comes to the bottom line there is no clear evidence that these new technologies have raised productivity (the ultimate determinant of our standard of living) or profitability. In fact, precisely the opposite is true. There is evidence, in the United States at least, that the investment in the new technologies has coincided with lowered overall productivity and profitability."[10]

Steve Roach is even more pessimistic. Using United States Government data on productivity, Roach argues that the massive amounts spent on Information Technology (IT) have generated negligible gains in productivity. The biggest abuser is the service sector, with 85% of the installed base of IT and anemic productivity increases of 0.8% since 1982.[11] Senior management, in many firms, is frustrated with IT. Senior managers complain about costs of information systems, the time it takes to get results, and the continuing gap between promised benefits and the visible contribution to the bottom line.[12] In spite of the millions of dollars Canadian firms have spent on information technology, office productivity has risen less

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[9] Definition provided by the Council of Logistics Management, OakBrook, IL, 1991.

[10] Thurow, Lester C., "Foreword" in Michael S. Scott Morton, ed., The Corporation of the 1990s: Information Technology and Organizational Transformation, Oxford University Press, New York, 1991.

[11] Davenport, Thomas H., Process Innovation: Reengineering Work through Information Technology, Harvard Business School Press, 1993.

[12] Keen, Peter G. W., Shaping the Future: Business Design through Information Technology, Harvard Business School Press, 1991.

than 1% annually in the past 10 years. In most cases, the problems are related to doing things the same way, only faster with the help of computers. Instead of automating the existing process, businesses need to either improve it or replace it entirely.[13] Automation has saturated outdated inefficient work processes with little return. Paul Strassman, formally the chief information officer at two Fortune 50 companies and the Department of Defense, opens his book The Business Value of Computers with the observation that "there is no relationship between expenses for computers and business profitability."[14]

**The "Value " of Information**

The view that the benefits received from information technology are not seen on the bottom line as stated by Thurow, Roach, and Strassman is contrary to a study conducted by Hayes and Erickson.[15] Their research, covering two time periods, studied the results of 50 manufacturing firms and 51 industries. Hayes and Erickson applied a Cobb-Douglas model to value added as a function of labor, capital, purchases of information services, and purchases of other services. Their results showed that there is a demonstrable relationship between increased added value (and therefore profitability) and investment in information resources. Evidence suggests that the manufacturing industry is using far less than the optimal amount of information resources. Japanese firms have observed the recent successes of United States auto firms and feel that their revival and their initiation of information technology driven reengineering projects have a high correlation. The use of information technology to dramatically improve business processes is a new addition to the idea of process improvement, a bedrock of Japan's economic success. These are two of the reasons that Japanese firms are very interested in initiating reengineering programs.[16] In a survey conducted by Price Waterhouse, over 200 CEOs expressed high hopes for benefits from

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[13] Marsden, Ross, Paving the Cow Paths, Computing Canada, 18 (6), Mar. 16, 1992, p. 11.

[14] Strassman, Paul, The Business Value of Computers, The Information Economics Press, New Canaan, Conn., 1990.

[15] Hayes, Robert M., and Timothy Erickson, Added Value as a Function of Purchases of Information Services, The Information Society, 1 (4), 1982.

[16] Alter, Allan, Japan, Inc. Embraces Change, Computerworld, March 7, 1994.

reengineering projects. They expected increases in productivity, quality, profits, and customer satisfaction. They also expected reductions in costs, inventory, cycle times, and response times.[17]

Butler W. Lampson is a recipient of the A. M. Turing Award, the highest honor given annually by the Association of Computing Machinery. Lampson's response to an interviewer's question about studies indicating that the investment in information systems are only marginal was that it assumes it wouldn't matter if we took away all of the computers. Based on his reflection, Lampson feels the studies are not valid and that the people who generated these numbers should answer why it would not matter if we took away all of the computers.[18]

**The Need for Reengineering**

The problem is not with the technology or with the systems developed and implemented. The problem was the automating or reautomating existing business procedures, the paving or repaving of the cowpaths that have characterized the computerization of business for the last 40 years. The problem was not using Information Technology to discard the conventional ways of working and replacing them with entirely new ones. The scenario that created the need for reengineering is best described by Michael Hammer and James Champy in their seminal work Reengineering the Corporation: A Manifesto for Business Revolution. Most companies, whether a manufacturer or a service company, can trace their division of labor work style back to Adam Smith's pin factory in The Wealth of Nations, published in 1776. Henry Ford improved the process by the idea of the assembly line. However, shortages and overproduction were commonplace until Alfred Sloan of GM applied the same division of labor techniques to management creating the pyramid structures of plants, divisions, and corporate organizations and the specialization of tasks (accounting, engineering, manufacturing and marketing).[19]

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[17] McPartlin, John P., High Hopes for Reengineering, Information Week, May 17, 1993.

[18] Booker, Ellis, Information Technology Patriot, Computerworld, February 15, 1993.

[19] Hammer, Michael and James Champy, Reengineering The Corporation: A Manifesto for Business Revolution, Harper Business, New York, 1993.

This management style proved adequate for many decades. In the United States, marketing was the dominant force and manufacturing was expected to follow marketing's lead and get the goods out the door by whatever means necessary, including expansion of capacity and additions to staff. Logistics systems, at this time, could be best described as those supporting the movement of goods. Where was the best location(s) to build a plant(s)? Where was the best location(s) to establish a warehouse(s)? How can we transport goods to and from these facilities? During this same period, several Japanese companies, notably Toyota Motor Company and Honda, were moving towards process improvements in an effort to obtain quality enhancements and cost reductions. During the 1970s, United States firms remained marketing oriented while Japanese firms were making inroads into Western markets.[20] United States companies turned to the application of quality control techniques, long used in the manufacturing environment, to all processes. This included logistics, as well as product design and supplier relationships. This broad view of quality was called total quality management (TQM). The basic premise was to minimize variation in existing processes and make continuous improvement, with the emphasis on existing processes and continuous improvement. Logistics systems in use at this time could best be described as entering The Logistics Era. There was greater emphasis placed on planning, implementing and controlling. There was general acknowledgment that information (technology) was critical to these tasks. Information Technology was generally mainframe or large mini-computer based and well suited for the tasks of collecting and presenting the massive amounts of data required for making plans, implementation of tasks, and the control of priorities. However, United States managers have often been blamed as being obsessed with the quick fix. Another way to state this is that United States managers are better suited for the radical changes brought about by reengineering rather than the continuous improvement of TQM.

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[20] Johansson, H. J., P. McHugh, A. J. Pendlebury, and W. A. Wheeler, Business Process Reengineering, John Wiley & Sons Ltd., West Sussex, England, 1993, pp. 3-4.

TQM may be more suited to the German and Japanese managers.[21] Paul O'Neill, Chairman of ALCOA describes the situation as follows:

> "I believe we have made a major mistake in our advocacy of the idea of continuous improvement....Continuous improvement is exactly the right idea if you are the world leader in everything you do. It is a terrible idea if you are lagging in the world leadership benchmark. It is probably a disastrous idea if you are far behind the world standard...we need rapid quantum leap improvement."[22]

Logistics systems at leading edge firms are now into or entering The Services Era. The key is to provide goods and services to conform to customer's requirements. This is being accomplished today using technology to capture data at the source and making it available not as data but as information by user-driven systems.

Most business firms have recognized the need for reengineering. In the 1994 edition of CSC Consulting Group's annual survey of critical information issues, reengineering headed the list. In fact, reengineering has placed first in five of the past six years in the CSC survey. High profile successes in reengineering efforts at such companies as IBM, Xerox, Kodak and Ford Motor have motivated scores of other companies to begin their own reengineering initiatives. These companies repeatedly place reengineering at the top of management's issues list. Ron Brzezenski of Transformation Associates feels this repetition at the top of the list is a warning for executives.[23] Chief Information Officers (CIOs) are relaying to Brzezenski that they are doing total quality management and business process redesign and are not getting good payback. However, it is important to note that some results have been less than "not getting good payback" with more failures than successes reported. Frank Hazeltine of Coopers & Lybrand reported at the 1993 American Production & Inventory Control Society (APICS) International Conference that reengineering is not for everyone as 7 out of 10 end in

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[21] Davenport, Thomas H., Process Innovation: Reengineering Work through Information Technology, Harvard Business School Press, 1993.

[22] Johansson, H. J., P. McHugh, A. J. Pendlebury, and W. A. Wheeler, Business Process Reengineering, John Wiley & Sons Ltd., West Sussex, England, 1993, pp. 1.

[23] Alter, Allan E., Re-engineering Tops List Again, Computerworld, February 6, 1994.

failure.[24] Why are some organizations reengineering efforts successful while others are not? Hazeltine states that most failures are caused by the lack of project leadership at the top or are caused by the difficulty associated with looking at the world in a radically different way. What other factors are important to success?

**Reengineering Loses Some of the Appeal**

The instant popularity of reengineering in the early 1990's reflected the challenge that organizations faced -- reinvent to compete or be left behind. Because of the great promise of reengineering and the highly publicized failure rate, reengineering advocates faced a growing credibility problem. Tom Davenport, Director of the Information Management Program, interviewed Peter F. Drucker, one of the world's most noted authority on corporate management, at the University of Texas at Austin.[25] Their discussion centered on reengineering, technology, and information management. Drucker suggested that there were two reasons why reengineering went astray. First, the father of the term, Michael Hammer, realized that one could make a great deal of money by asserting that you could learn to reengineer your company in a three-day seminar, if you paid enough. In 1993, more than 3200 people paid $2000 ($6,400,000) to attend Hammer's popular seminar on business process redesign.[26] The other problem is that reengineering became associated with wholesale firing. Hammer and James Champy, his co-author on the manifesto on reengineering, implied that you would need fewer people if you reengineered. Drucker feels that reengineering creates the need to reallocate people because you change the process. Drucker also contends that reengineering became the bandwagon, everybody jumped on it, and now many have jumped off. Predictably, there are many companies that will quietly keep on doing it and in six years will know how to do it. It also appears that even Michael Hammer, the man who coined the phrase "reengineering" and co-authored the groundbreaking book

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[24] Hazeltine, Frank W., Why Reengineer Business Processes?, 36th International Conference Proceedings, The American Production and Inventory Control Society, Falls Church, Virginia, 1993, pp. 368-372.

[25] Davenport, Thomas H., A Meeting of the Minds, CIO, September, 15, 1997.

[26] Maglitta, Joseph., One on One with Michael Hammer, Computerworld, January 24, 1994.

Reengineering the Corporation is adding some spin to his previous teaching. Hammer now states that reengineering is not so much getting rid of people. It is getting more out of people. Hammer feels that many companies missed this point. Hammer states that he may have relied too heavily on his engineering background when creating the model, causing him to be "insufficiently appreciative of the human dimension." [27] This is an understatement and may be much of the reason for the animosity towards reengineering and Hammer. Paul Strassman, a critic of reengineering and Hammer pointed out that Hammer's unique contribution to managerial theory was in the insertion of organized violence into recommended business practices. Strassman points to Hammer's remarks in a *Forbes Magazine ASAP*, 1993 article that the answer to the question "How do managers contemplating a big reengineering effort get everyone inside their company to join up?" "On this journey we...shoot the dissenters". Strassman further points to Hammer's remarks in an *Across the Board*, 1993 article, "The way you deal with resistance [to reengineering] is ... a bloody ax. Al Capone once said, you get further with a gun and a kind word than with a kind word alone". Strassman, stating that the above citations are only a sample of his pronouncements, feels that the anxiety of the survivors of reengineering projects is perhaps the principle reason why companies do not realize the gains they originally planned for.[28]

**Reengineering is Still Relevant**

Obviously, the need for the benefits obtained from reengineering projects outweighs the lack of credibility. Top financial executives are sold on the benefits of reengineering, and they say increasing revenue, rather than just reducing costs, will be the new thrust for the next five years of reengineering. This is the result of a survey of 80 top financial officers at major U.S. corporations by Ernst & Young in New York.[29] The survey also found that financial

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[27] Hein, Kenneth, Reengineering undergoes reconstruction, Incentive, 17 (2), Feb 1997, p. 5.

[28] Strassman, Paul, Letters to the Editor, Computerworld, March 7, 1994.

[29] Anonymous, Is The Re-engineering ERA Over? No Way, Say CFOs, Computerworld, May 8, 1995

executives are convinced their companies are seeing significant gains from reengineering efforts and they expect reengineering activities to remain high in the second half of the 1990s. Gartner Group, Inc projects the reengineering services market to grow by 20% per year until the end of the century.[30] The main product of SAP, Baan, PeopleSoft, and their many competitors is software that supports major changes (reinvention) in the firm's current supply chain process. These firms have grown dramatically over the last six years developing, implementing, and supporting their supply chain software. Ernst & Young LLP found that reengineering is still strong in the consumer good sector. In the third annual Consumer Goods Technology Study, reengineering business processes through information technology has remained the consistent number two priority for the last three years, second only to the critically important integration of systems.[31] Reengineering business processes through information technology was deemed the most important activity in two important consumer goods categories, food & beverage and packaged goods. In these two important consumer goods categories, reengineering gained momentum, moving from a lower priority to number one. Approximately 60% of the firms in these two categories cited reengineering as their top priority. Although the study does not comment on the reasons why reengineering is now higher on the priority list, the first paragraph in the study may lend some insight. The report comments that 1998 has not been a stellar year in terms of economic performance and consumer confidence for consumer goods.

[30] Korchinsky, Mike., Is Re-engineering Still Relevant, Computerworld, April 21, 1997.

[31] Anonymous, Realizing Technology's Strategic Potential, Consumer Goods, Fall, 1998.

## CHAPTER II

## LITERATURE REVIEW

Chapter II reviews the relevant literature and synthesizes the research issues. It is divided into two sections. The first section is a brief review and discussion of the reengineering literature. The second section explains the rationale used in the selection of the variables used in the conceptual model.

The following sections present an overview of the reengineering literature. Beginning with the business environment that created the need for reengineering, the origins of reengineering are traced. The link between information technology and reengineering are examined. Finally, the downsides of reengineering are considered.

### The Need for Reengineering

Roger Kallock, chairman of Cleveland Consulting Associates, and recipient of the Council of Logistics Management's 1990 Distinguished Service Award urges transportation and distribution managers to focus on the use of technology, user requirements, and functional redesign. The logistics professional must reach beyond the needs of the transportation department and think in terms of distribution channels. Referred to by Kallock as logistics reengineering, the organization must take the system apart to find the real mission.[31] Kallock in his reference to reengineering was referring to concepts and techniques outlined by Michael Hammer in his seminal article on reengineering.[32] Does reengineering introduce complexity of simplify? Kallock and Robinson propose that reengineering simplifies, but does not oversimplify. Reengineering substitutes relatively cheap low asset based information technology for things that are not cheap, such as physical products and people. Long before the term reengineering was coined, MRP technology, a radical change to the existing methods for managing inventories and priorities was first implemented. At the time, MRP looked unmanageably complex. Initially, only the leading edge firms dared to implement

[31] Trunick, Perry A., On the Edge of Excellence, Transportation & Distribution, 31 (13), Dec. 1990, pp. 12-14.

[32] Hammer, Michael, Reengineering Work: Don't Automate, Obliterate, Harvard Business Review 68 (4) 1990, pp. 104-112.

MRP. It is now saving many companies incredible amounts of time and effort. Initially, MRP required large mainframe computer systems. Now, MRP runs on a PC. The problems that MRP solves are still complex, but the technology simplifies the process.[33]

Deloitte & Touche reported in their fourth annual survey of 430 chief information officers (CIOs), that their departments were involved in an average of 1.6 reengineering projects.[34] Reengineering has enabled the information systems organization to push computer power out to users, breaking down the barriers that once segregated the information systems function from the rest of the organization. The challenge to information systems management is to ensure users play a strong role in IS efforts without abdicating responsibility for keeping IS cost-effective and in line with corporate strategy.[35] Firms are discovering that computer investments integrating business and technology factors are paying off. Management is paying more attention than ever before.[36] Technology often drives reengineering projects. Nevertheless, technology should not overshadow the people and their skills. No single technology will reengineer the process. Reengineering relies on firm management support and an open creative atmosphere.[37]

**The Origins of Reengineering**

Reengineering, deriving many basic concepts from the systems analysis and operations analysis disciplines popular in the 1960s has emerged as the much-touted remedy.[38] Reengineering of business processes is achieved by borrowing from the

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[33] Kallock, Roger W. and David G. Robinson, Reengineering Business Logistics, Council of Logistics Management Annual Proceedings, 1991, pp. 171-185.

[34] Hayley, Kathryn, Fordonski, Jennifer and Bob Puckett, What CIOs Need to do Now, Datamation, 38 (15), Jul. 15, 1992, pp. 83-85.

[35] Freedman, David, Reengineering the Turf, CIO, 6 (4), November 15, 1992, pp. 74-80.

[36] Carlson, Walter and Barnara McNurlin, Basic Principles for Measuring IT Value, I/S Analyzer, 30 (10), Oct. 1992, pp. 1-16.

[37] Rassmus, Dan, 'Reengineering,' or Evolution through Violent Overthrow, Manufacturing Systems, 10 (9), Sept. 1992, pp. 52-58.

[38] Wilde, William T., Process Progress: Why Automation Hasn't Paid Off, and What to Do About IT, Inform, 6 (2), Feb. 1992, pp. 22-26.

information technology and industrial engineering disciplines and by defining the common non-value-added activities across functional hierarchies.[39] The logistics function must be the driving force behind a company's reengineering efforts. New approaches to business partnerships, innovations in technology, and reinvented supply chain strategies have resulted in new logistical expectations, none of which are attainable through minor, incremental alterations to existing processes.[40] Reengineering projects are often technology based. Davenport and Short believe that the industrial engineers of the future will focus on the redesign of business process enabled by information technology.[41] In a letter to the editor, an information systems consultant, felt compelled to mention the work of Juran. In his book, *Managerial Breakthrough*, J. J. Juran describes the concepts of breakthrough gains in performance and productivity all the way from theory to organizational implications.[42]

**Information Technology and Reengineering**

In most successful reengineering projects, the technology is viewed not as a solution, but as an enabler, and the information systems staff plays the role of a catalyst. The central challenge of the process is to conceive how the business should be conducted in light of the capabilities of current and near-term future information technology. Some technologies that are especially powerful when reengineering a business are: EDI, image processing, computer-based communications, and database management systems.[43] Both information systems and user (logistics) managers are working on the same goals - how to do more with less while increasing competitiveness and how to cut costs while offering extraordinary

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[39] Knorr, Robert O., Business Process Redesign: Key to Competitiveness, Journal of Business Strategy, 12 (6), 1991, pp. 48-51.

[40] deRoulet, David G. and Roger W. Kallock. Logistics Drives Dramatic Innovations. Transportation & Distribution, November, 1992.

[41] Davenport, Thomas H., and James E. Short, The New Industrial Engineering: Information Technology and Business Process Redesign, Sloan Management Review, Summer, 1990, pp. 11-27.

[42] Hay, Jim, Letters to the Editor, Information Week, June 14, 1993.

[43] Huff, Sid L., Reengineering the Business, Business Quarterly, 56 (3), 1992, pp. 38.42.

customer service. Reengineering presents an opportunity for both to respond to these challenges.[44]

Technologies most often mentioned are EDI, bar coding, RF technology, and Imaging.[45,46,47] Designing and implementing systems using these new technologies requires a new breed of information systems professional. Michael Hammer and James Champy, long before their best selling book on reengineering and also before Hammer's seminal article on reengineering in the Harvard Business Review, proposed some titles and job descriptions for the individuals required to implement systems using the newly available technologies.[48]

> "Title: Witch Doctor.
> Role: Leader in business process redesign via information technology.
>
> Title: Magician.
> Role: Leader in building sophisticated systems rapidly and iteratively using only semi-defined specifications and methodologies.
>
> Title: Wizard.
> Role: Technical expert who leads efforts to identify, introduce, and deploy leading edge technologies with potential for the business."

Reengineering has consistently been the top priority for information systems executives based on surveys conducted by CSC/Index.[49] After being ranked as the 11th priority in 1989, Reengineering Business Processes has been the top priority in 1990, 1991, 1992, and 1993 topping the Alignment of IS and Corporate Goals, Cutting IS Costs, and Developing an IS Strategic Plan. After a repeat performance as the top priority in 1994, reengineering slipped to the number four priority in 1995 and to the number 10 priority in

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[44] Delligatta, Ann, Systems Reengineering and the User, Information Systems Management, 9 (1), 1992, pp. 76-77.

[45] Watson, Stephen E., Technology in Retail's Business Strategies of the Future, Retail Control, Oct. 1991, pp. 13-17.

[46] Isaacson, Portia, Frontline, CIO, Feb. 1993, pp. 68-72.

[47] Waller, David G., EDI is Reengineering the Warehouse, P&IM Review, May 1991, p. 32.

[48] Champy, James A. and Michael Hammer, Help Wanted: Heroes and Visionaries Preferred, Computerworld, March 20, 1989, pp. 69-78.

[49] Champy, James A., Grand Designs, CIO, Jan. 1993, p. 26.

1996. Reengineering no longer appeared as a top ten priority in the 1997 survey.[50] CSC's 1997 survey also revealed that interest in enterprise or enterprise requirements planning (ERP) solutions, such as those provided by SAP and BaaN remain high. Over 36% of the firms were either implementing or would be implementing enterprise systems. Additionally, over 77% of the respondents were making initiatives to use the internet/world wide web. In previous surveys, both enterprise/ERP solutions and the Internet may not have been considered as separate priorities but under the umbrella of reengineering. ERP may not be called reengineering, but ERP provides dramatic improvements in performance and demands the rethinking and radical redesign of the firm's business processes. Additionally, the internet/world wide web may not be called reengineering, but the web provides the infrastructure that will allow for the radical redesign of how logistics firms communicate with their customers, suppliers, investors, and even employees.

**The Negatives of Reengineering**

Although most of what is written regarding reengineering is positive, some is not. The open creative atmosphere that existed when information technology was used to "pave the cowpaths" gave office staffs little to fear. Information technology improved the working conditions. In most cases, technology made the job of the office staff easier. Generally, there were no wholesale staffing reductions. However, with frequent corporate staff downsizing facilitated by business process redesign/reengineering, workers are now fearful that the new system would either "de-skill" them, minimizing their importance to the organization, or eliminate their positions. Because of their fear, relations with the reengineering team is strained and cooperation is minimal. A consultant assisting KLM Royal Dutch Airlines with a business process redesign project in Chicago interviewed seven people in the same position and received seven different descriptions of what they did.[51] Paul Strassman, information systems consultant and former top information executive at Kraft, Xerox, General Foods, and

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[50] Anonymous, Aligning Technology and Corporate Goals is Top I/S Issue Worldwide in Tenth Annual CSC Study, CSC Website.

[51] Radosevich, Lynda, Evasive Action, Computerworld, October 14, 1993, pp. 83-85.

the Department of Defense called reengineering an emetic (a medicine or other substance that causes vomiting) in a perfume bottle.[52] Strassman contends that early attempts at layoffs reducing white-collar labor were botched. Across the board cuts created disorientation and demoralization. Reengineering packages wholesale labor cuts in a manner palatable to management.

High profile reengineering efforts at corporations experiencing other problems can be fatal to the CEO. James D. Robinson, CEO at American Express for 16 years, resigned at the request of the board of directors. Major problems cited at the time of his resignation was the lowest stock price in 6 years, a $342 million write-off, and the credit card division mired in a reengineering program grossly over budget.[53] Eventually, the credit card division solved their internal problems and moved on. By then, they had a new president. Corporate dogma had hindered the reengineering process. In 1990, American Express had embarked on a course to embrace quality concepts. By 1992, total quality management (TQM) was fully entrenched at the company. That same year, American Express undertook a reengineering project to reduce costs. Heated debates raged. How were TQM and reengineering related? Did the adoption of reengineering mean that TQM was abandoned? The debates continued. Books were published describing the internal dissent. MasterCard and Visa took advantage of the problems at American Express and introduced corporate procurement cards a full year before the embattled company. American Express eventuallymerged the TQM and reengineering groups, and issued its own procurement card.[54]

Rather than reengineer a business process, it may have been a better choice not to automate the process initially. Anyone flying a major airline knows about the difficulties that can occur with seat assignments and boarding passes. This process is further complicated by an upgrade. Flying Southwest Airlines is different with no upgrades or boarding passes.

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[52] Strassman, Paul A., Re-engineering: An Emetic in a Perfume Bottle, Computerworld, August 16, 1993, pp. 33..

[53] Saporito, Bill, The Toppling of King James III, Fortune, January 11, 1993. pp. 42-43.

[54] Caldwell, Bruce, Missteps, Miscues, Information Week, June 20, 1994. pp. 50-60.

The passenger receives a reusable numbered plastic token as a boarding pass. Southwest has not just eliminated the paperwork; they have eliminated the need for the paperwork. The design priority of southwest is to create and manage simplicity. Contrary to Southwest, the major airlines' design priority is to manage the complexity they have already designed into their operations.[55]

Although reengineering is a top priority in the United States, there is little interest in the concept overseas. Vernon Ellis, managing partner of Andersen Consulting for Europe, Middle East, Africa, and India confirms that reengineering is clearly not a hot term in his region.[56]

### Reengineering is Confusing

There have been thousands of articles on reengineering and business process reengineering. The only consistent theme across all the literature is that business process reengineering (BPR) is process oriented rather than a functionally oriented. The breadth of the process can range from an individual work task to activities cutting across organizational boundaries. Authors, claiming to write about BPR, argue all of the following: IT is integral to BPR. IT is complementary to BPR. Everyone needs BPR. Not everyone needs BPR. BPR cannot fail. BPR fails 50 to 70% of the time. BPR is completely new. Only the label BPR is new. BPR is radical. BPR is incremental. BPR is led by IT. BPR is process led. BPR is about inspiration. BPR is the application of engineering systematization. BPR is top down. BPR is bottom up. BPR is an extension of just-in-time (JIT). BPR is an extension of TQM. BPR is completely different.

### Factors Affecting Projects

There have been two major research studies of information systems success suggesting a classification of determinants and developing a variety of possible

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[55] Schrage, Michael, No Frills, Fewer Tangles, Compuworld, Sept. 27, 1993, p. 37.

[56] Bulkeley, Debra, Andersen Reengineers Big Business, Systems Integration Business, August 1992, pp. 22-27.

determinants.[57,58] Zahedi separated determinants of information systems success into two groups: internal factors and external factors. Internal factors, those within the information systems organization, include the availability and utilization of resources and the organization structure of the information systems organization. External factors, those outside of the information system department, include the department's link with the CEO and the coordination of departmental plans with the corporate plan.[59] Ein-Dor and Sagev separated determinants of information systems success into three similar groups: those controllable by the information systems department, those partially controllable by the information systems department, and those uncontrollable by the information systems department. Controllable factors included organizational structure and the existence of a steering body. Partially controllable factors included organizational resources and organizational maturity. Uncontrollable factors included the size of the firm and the organization structure such as centralization or decentralization.[60] Empirical studies of information systems success suggest a broad list of possible factors. Rather than grouping these factors as internal or external as suggested by Zahedi, or as controllable, partially controllable, or uncontrollable as suggested by Ein-Dor and Sagev, they are grouped as factors of success: those considered prerequisites for success and those considered impediments to success.

**Prerequisites for Success and Impediments to Success**

Beginning with Hammer's seminal article in 1990, the volume of articles on reengineering has gone from a trickle to a flood. However, the majority of articles in newspapers, trade magazines, and journals have concentrated on reengineering methodologies, reengineering projects, and reengineering experts. Bashein, Markus, and

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[57] Ein-Dor, P., and Segev, E., Organizational Context and the Success of Management Information Systems, Management Science, 24, 1978, pp. 1064-1077.

[58] Zahedi, F., Reliability of Information Systems based on Critical Success Factors -- Formulation, MIS Quarterly, 11, 1987, pp. 187-203.

[59] Zahedi, MIS Quarterly, pp. 187-203

[60] Ein-Dor and Sagev, Management Science, pp. 1064-1077

Riley point to the dearth of systematic academic research on reengineering.[61] However, they felt that it was possible to identify some key themes in the business reports to identify the biggest obstacles that reengineering projects faced. With these key obstacles identified, and based on interviews with consultants, they identified additional positive preconditions and negative preconditions to business process reengineering success.

**Prerequisites for Success**

The following sections discuss the prerequisites for success variables used in the conceptual model.

**The Most Common Prerequisite for Success** The most common prerequisite for success in the literature is extensive user involvement in the design of systems. Park found that successful information systems have distinctive characteristics that differ from less successful information systems. These characteristics include the extent of user input in the systems design process.[62] Lees also suggested that user involvement in systems design was a possible determinant of information systems success.[63] Clement and Van den Besselaar found that most information systems methodologies specify that designers of systems should involve users in the systems design process, as designers sense that this involvement will yield better systems requirements and increase acceptance.[64] In their comparison of Joint Application Design (JAD) and Participatory Design (PD), both well-known methodologies to facilitate increased user participation in the design process, Carmel, Whitaker, and George

[61] Bashein, Barbara J., Markus, M. Lynne, and Patricia Riley, Preconditions for BPR Success and How to Prevent Failures, Information Systems Management, 11 (2), Spring, 1994, pp. 7-13.

[62] Park, Seong Whoe, The Characteristics and Usage of Computerized Information Systems in Small Apparel and Textile Companies, Ph.D. Dissertation, Georgia State University, 1990.

[63] Lees, J. D., Successful Development of Small Business Information Systems, American Journal of Small Business, 38, 1987, pp. 32-39.

[64] Clement, Andrew, and Peter Van den Besselaar, A Retrospective Look at PD (Participatory Design) Projects, Communication of the ACM, 36 (4), Jun. 1993, pp. 29-37.

found the goals of the methodologies differ significantly.[65] While JAD is intended to speed the design of information systems and produce high quality results, PD seeks to emphasize the social context of the workplace and promote worker's control over their work and their lives. However, both JAD and PD focus on the interaction between users and designers to extract and refine ideas. There are many reasons why the information systems staff should seek out and involve the user community in the design of information systems. The active participation of key users early in the design of the system produces better systems requirements. The resultant high quality systems requirements decrease the time required to produce the software design. Because the user was involved in the design process, there is an increased acceptance of the systems by the user community. If early involvement of users in the design of information systems creates these superior results, then why are users so often excluded from the design? The difference may lie in the project teams definition of user involvement. Many systems design methodologies consider user involvement to consist primarily of availability for interviews and the approval of project team deliverables, such as the user requirements document and the systems design document. User interviews are very difficult. There can be many interruptions. Many users cannot describe what processes they perform in a clear concise manner. If a user department is large, this may prevent an interview with all the employees. Who decides who to include and who to exclude? When the users reviews the systems design, can the user decipher from a maze of input screens, databases, reports, and queries whether the design will result in a better user process?

**Other Prerequisites for Success:** In a research study covering more than 50 consultants from 26 top reengineering consulting firms in the United States, Bashein, Markus, and Riley compiled a list of positive and negative preconditions to business process reengineering projects.[66] Based on their experience, consultants Hall, Rosenthal, and Wade

[65] Carmel, Erran, Randall D. Whitaker and Joey F. George, PD (Participatory Design) and Joint Application Design: A TransAtlantic Comparison, Communication of the ACM, 36 (4), Jun. 1993, pp. 40- 48.

[66] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

compiled keys to successful redesign and ways to fail.[67] Raymond Manganelli, president and CEO of a New York based reengineering consulting firm has prepared a list of reasons why the majority of reengineering projects fail.[68] In a research project on business process reengineering sponsored by Boston University's Manufacturing Roundtable, Dixon, Arnold, Heineke, Kim, and Mulligan compiled a list of factors that contribute to a vision that enables reengineering.[69]

**Leading Prerequisites for Success:** Bashein, Markus, and Riley found that the probabilities for success in reengineering projects are significantly higher when all executives in the organization are totally and visibly committed to the effort.[70] This visible commitment must be sustained throughout the duration of the project. This can be difficult in organizations where the executive's tour of duty is shorter than the duration of the project. The project sponsor should be a senior level executive, preferably the CEO or the executive responsible for the process being reengineered. Dixon, Arnold, Heineke, Kim, and Mulligan found in their study that managers were unanimous in their agreement that top management sponsorship, involvement and commitment were needed.[71] This involvement needs to be substantial. Top management should be directly involved throughout the process, from the design of the project, to the determination of the composition of the team, and through every step of the implementation. ProSci, an educational and consulting firm, conducted a benchmarking study in search of the best practices in Business Process Reengineering via the Internet in the fall

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[67] Hall, Gene, Rosenthal, Jim, and Judy Wade, How to make Reengineering Really Work, Harvard Business Review, 71 (6), Nov/Dec 1993, pp. 119-131.

[68] Manganelli, Raymond L., It's Not a Silver Bullet, Journal of Business Strategy, 14 (6), Nov/Dec 1993, p. 45.

[69] Dixon, J. Robb, Arnold, Peter, Heinike, Janelle, Kim, Jay S., and Paul Mulligan, Business Process Reengineering: Improving in New Strategic Directions, California Management Review, 36 (4), Summer 1994, pp. 93-108.

[70] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

[71] Dixon, Arnold, Janelle, Kim, and Mulligan, California Management Review, pp. 93-108.

of 1996 and the winter of 1997.[72] Top management sponsorship of the reengineering project was cited as the most important key success factor by a ratio of almost 10:1. More than 90 percent said that top management sponsorship was critical or very critical to the success of the project.

Realistic goals and objectives are also necessary for success. Bashein, Markus, and Riley found that companies with executives who fully understand the problems and opportunities associated with reengineering establish realistic targets and therefore have a higher chance for success.[73] If a reengineering project is going to take 18 to 24 months, executives should not expect results in 6 months. An understanding of business process reengineering, including the magnitude and duration of the effort helps executives set realistic expectations.

Success is facilitated when empowered workers, with cooperative work styles, are members of the reengineering cross-functional team. Typical project teams should include a flexible mix of line managers and internal experts. If a reengineering project spans a functional area, such as operations, the cross-functional team is generally made up entirely of managers from the operations area. If the reengineering project spans multiple functional areas, such as marketing, operations, and accounting, then the teams were truly cross-functional with managers from marketing, operations, and accounting. The advantage of having cross functional teams was concluded by the studies conducted by Dixon, Arnold, Heineke, Kim, and Mulligan and also in the work of Bashein, Markus, and Riley.[74,75]

**More Prerequisites for Success:** When employees view a reengineering project as growth-oriented, rather than cost-cutting, they are enthusiastic and the project has a better chance of succeeding. When the project is viewed as a cost-cutting measure, there is

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[72] Anonymous., Best Practices Report for Reengineering and Business Process Design Teams - 1997 Benchmarking Study - Executive Summary, ProSci, Loveland Colorado, 1997.

[73] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

[74] Dixon, Arnold, Janelle, Kim, and Mulligan, California Management Review, pp. 93-108.

[75] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

resistance to the project. When the project is viewed in terms of growth and expansion, the project generates enthusiasm. Firms with a strategy of product innovation will often redesign a process differently than firms pursuing a strategy of operational efficiency. The differences in the redesigned process may have as much impact on the project as the attitudes of the employees. Bashein, Markus, and Riley found that employees rally around an important strategic initiative. Therefore, it is critical to frame the project in terms of growth rather than operational efficiency.[76]

It is important for the top executives of an organization to have a clear vision of how the organization will meet strategic goals for the business processes being reengineered. In their study, Bashein, Markus, and Riley found that it is even more important for the vision to be clear to all levels of the organization. The top executive's vision is of little value to the firm if the vision is not shared.[77] Some executives, knowing how important a shared vision is to the firm, have a simple technique to test the communication ability of the firm. These executives ask members at all levels in the organization what their top three objectives are. If these objectives are not in concurrence with the vision, then a greater effort has to be made in the communications area. Bashein, Markus, and Riley found in their study that consultants feel that the companies most likely to succeed with reengineering are those who are most likely to succeed without it. The survey response received from the CEO of a well-known multi-billion dollar global corporation is in agreement with Bashein, Markus, and Riley's findings. Companies that begin reengineering projects with sound management practices in place have a greater chance of succeeding. Therefore, the first step in many reengineering projects is to strengthen the firm's management and support processes.[78] Management processes include strategic planning, capital budgeting, expense budgeting, IT investing, and employee evaluation/reward programs. One may speculate that this step is also important to the consulting firm, as they provide services to aid in this project also. However, the

[76] Ibid., p. 7-13.

[77] Ibid., p. 7-13.

[78] Ibid., p. 7-13.

reengineering of operational processes first can place excessive stress on inadequate management processes.

Bashein, Markus, and Riley also found that reengineering efforts are more successful if the project team members are assigned to the project full-time, allowing for their total participation, not a diluted effort.[79] Reengineering project team members regular jobs and responsibilities should be reassigned for the duration of the project. It is also helpful if the proper mix of personnel is assigned to the project. The proper mix would include personnel both internal and external to the process. Insiders provide the proper subject matter expertise required. Outsiders provide a fresh perspective to the redesign effort. Ideally, the outsiders can include representatives from the firm's suppliers and customers.

Too often, companies initiate reengineering efforts with inadequate budgets for improvements. Many reengineering efforts are initiated by firms in poor financial conditions with the belief that the project will pay for itself, even in the short term. However, this may not be realistic if the project requires new information technology to support the new processes. Bashein, Markus, and Riley concluded that to achieve improvement, the company must be willing to create an adequate budget.[80]

Dixon, Arnold, Heineke, Kim, and Mulligan found that a considerable amount of training was required. Training was required before the project and was required well into the project. Training topics most commonly mentioned were process analysis, team effectiveness, and TQM.[81] Bashein, Markus, and Riley also found that specialized training in reengineering concepts and design principles was required. Training was required for both the project team member and the workers. The project team members need specialized training. The workers need training in their redesigned jobs and training on empowerment and collaborative work styles. These are necessary for the design and implementation of new

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[79] Ibid., p. 7-13.

[80] Ibid., p. 7-13.

[81] Dixon, Arnold, Janelle, Kim, and Mulligan, California Management Review, pp. 93-108.

business processes.[82] Perhaps the biggest mistake companies make when reengineering is to assume that people and jobs can be redesigned a easily as business processes. The process redesign empowers the people at the keyboards to make decisions, rather than just enter data. The people at the keyboard need to be trained to make the proper decisions. Managers also need to be prepared to let go of some of what use to be their responsibility.[83]

It is ironic that the study conducted by Dixon, Arnold, Heineke, Kim, and Mulligan found that the communication was deemed critically important while the study by Bashein, Markus, and Riley found that the failure to communicate was common. Communications of management's involvement in and commitment to the reengineering project is critical to develop employee's trust in the project. While the project is underway, communicating the reengineering team's efforts is also critically important. It is almost impossible to overcommunicate when reengineering projects are underway. Communications to the employees should also focus on the positive of reengineering. Growth opportunities should be emphasized.

Hall, Rosenthal, and Wade's study of reengineering projects identified the following four factors common to successful reengineering projects, none of which were identified by the other studies.[84] First, the firm must set aggressive reengineering performance targets, such as a 15% cost reduction and a 5% revenue increase. Target of this magnitude can only be reached by increasing both the depth and breadth of the reengineering project. The narrowest of breadth, reengineering a single activity or function can result in a less than 1% to 3% cost reduction as a percent of the business unit. The broadest of breadth, reengineering all business activities that drive competitive advantage, can result in a 5-17% cost reduction as a percent of the business unit. The shallowest of depth, unidimensional redesign, affecting only a single organization, skill, or systems can reduce the cost savings by 50% when

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[82] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

[83] Koch, C., Surprise, Surprise - And You thought redesigning your business processes was going to be tough..., CIO, September, 15, 1997

[84] Hall, Rosenthal, and Wade, Harvard Business Review, pp. 119-131.

compared to a multidimensional redesign, affecting multiple organizations, skills, and systems. Second, commit 20% to 50% of the chief executive time to the project. Committed top managers helped the reengineering redesign pay off. Firms having a CEO's commitment considered to be high had the actual financial impact of the project closely parallel the planned impact. Firms with a CEO's commitment considered low had dismal actual financial impact when compared to planned impact. The involvement may start at the 20% level during the project planning stages and increase to 50% during the implementation stages. Weekly status meetings that inform the CEO of the project's status should be scheduled. Third, assign a senior executive to be responsible for the project. Although the CEO is greatly involved, the assignment of a senior executive to be responsible for the project gives the project an even greater chance for success. If the senior executive cannot be assigned for the complete project, then the executive should be assigned to the critical implementation phase. Fourth, conduct a comprehensive pilot implementation before the full implementation. This will allow for a test of the overall impact while building enthusiasm for the full implementation. Pilot projects also can be considered a small wins strategy. When a project is large, there is usually an extended time span from the project planning stages to the final implementation phase. Top executives, project sponsors, and even project team members grow impatient. Why is it taking so long to receive any payback from this project? Using the small wins strategy, small portions of the total system are implemented at shorten intervals. Attitudes at all levels are improved. Whatever the scale of the reengineering project, a pilot is advisable. A pilot is a smaller scaled down version or model of the complete system. If multiple problems occur during a full-scale implementation, most project teams do not have the staff size adequate to put out all the fires. When the implementation is scaled down to pilot size, the project team can usually handle the problems adequately.

Dixon, Arnold, Heineke, Kim, and Mulligan found many anecdotes reported in the business press that infer that the existence of a crisis in the firm is a key driver to successful reengineering projects. However, their interview data did not confirm this belief. However, it was common practice for many of the organization in their study to create a sense of urgency

to promote the need for radical broad scope changes. Employees were told that if the firm does not radically change the way it conducted business, they would eventually be out of business.[85]

**Impediments to Success**

The following sections discuss the impediments to success variables used in the conceptual model.

**The Most Common Impediments to Success** The most frequently mentioned reason for failure in reengineering projects is that some organizations are trying to reengineer functions rather than processes. Manganelli states that when the scope that is chosen for a project includes only part of a process, the opportunity for success is diminished, possibly eliminated. One of the main reasons that reengineering improves performance is by reducing or eliminating the error and inefficiencies that inevitably arise when processes cross-organizational boundaries.[86] Hammer warned of this trap in his early works on the subject and reiterated it in his book authored with Champy.

Reengineering is not straightforward or easily defined. Often, it is incorrectly applied when put to use. This causes the "reengineering is confusing" syndrome. It frequently becomes the disguise for a downsizing activity. It is also confused with TQM, restructuring, and automation which deliver only incremental returns. Many organizations select the wrong processes to reengineer. Projects should be selected because of their importance to the firm. Not all processes are equal in importance or in their contribution to organizational goals. Manganelli states that effective reengineering projects are focused on strategic value-added processes.[87]

**Other Impediments to Success** As with any project, reengineering projects must have a road map to arrive at their destination. Manganelli found that many firms desire the payback of reengineering, but have no clear idea how to bring it about. The path to

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[85] Dixon, Arnold, Janelle, Kim, and Mulligan, California Management Review, pp. 93-108.

[86] Manganelli, Journal of Business Strategy, p. 45.

[87] Manganelli, Journal of Business Strategy, p. 45.

success in any project with a scope as deep and broad as a reengineering project requires a detailed methodology.[88]

Most efforts to reengineer are under-financed and under-staffed. Manganelli found that nearly two-third of U.S. companies do not budget for reengineering, in either time or money. When this is the case, reengineering project work has to be absorbed into the day-to-day activities of the employees. When this occurs, and the employee is already working overtime, the reengineering project is allocated some small portion of the individual's day. Reengineering assignments can account for as little as 5% of employee's time. The reengineering project work suffers. The balance of the employee's work also suffers. To properly contribute to these projects, an employee should spend up to 50% of time.[89]

Two of the major impediments to project success are sponsor related. The sponsor is either not a senior level executive or the executive is the wrong sponsor for the project. When the scope of the reengineering project is limited to functions, rather than processes, the executive sponsor is usually not at the level required. Processes cover broad areas and require the most senior management to sanction and guide the project. Functions cover smaller areas, with a corresponding lower level of management.[90,91] This was the conclusion of Manganelli and backed up by the study conducted by Bashein, Markus, and Riley. There are many reasons why wrong sponsors are selected. Many reengineering projects are technically focused. Therefore, the sponsor is too technically focused and lacks the business vision to properly lead the project. The only executive available to take on the project is one who is ready to retire or phasing out of his current job. Sometimes, the executive selected for the project lacks the credibility or leadership abilities to head the project. The executive selected for the project must also be able to develop a good working relationship with internal and/or

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[88] Ibid., p. 45.

[89] Ibid., p. 45.

[90] Ibid., p. 45.

[91] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

external business process redesign consultants. The executive must also have excellent strategic vision and know when to say no to a reengineering project that is excessive risky.

Bashein, Markus, and Riley found that some executives want to continue doing business as usual, keeping their best employees in their day-to-day jobs, and hire consultants as a swat team to reengineer the business. These executives do not want to get involved in the project. They want to let the consultant do it and consider the project a turnkey deliverable. These executives are unwilling to make the necessary personnel changes in management styles and priorities. The knowledge base is depleted as soon as the project is complete. The consultants, with all the project knowledge and expertise, turn over the day to day management and operation of the reengineered process and exit. This results in confusion and a continued reliance on the consultants, until the process owner can absorb the new process. This management style and attitude is wrong for reengineering and most consultants avoid these assignments.[92]

Manganelli found that often reengineering is used as a euphemism for downsizing and is sometimes confused with TQM.[93] Bashein, Markus, and Riley found that managers and employees are not willing to make the investments necessary, both budgetary and effort, when they view the project as a cost-cutting effort. The cost-cutting focus restricts the creativity of team members. They will avoid the radical changes inherent in reengineering and necessary for its success if this success threatens to eliminate their job and the jobs of others. Even when organizations invest in information technology, organizations may not invest adequately in people. Firms may train the people how to use the new system, but they are unwilling to invest in the total cost of human resources development.[94]

In some reengineering projects, technology is perceived as the primary motivator of the project, rather than the enabler to pursue a new approach in the market place. This may be due to the fascination with the technology or creeping elegance, rather than search for an

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[92] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

[93] Manganelli, Journal of Business Strategy, p. 45.

[94] Bashein, Markus, and Riley, Information Systems Management, p. 7-13.

important strategic thrust. Bashein, Markus, and Riley found that technology driven projects tend to have a much lower success rate unless they are driven by a highly visible senior line manager. The third element necessary to obtain project success, in addition to technology and the highly visible line manager is the connection to an important strategic thrust.[95] The often used FedEx example of the blending of bar code labels and scanning at all points in the delivery chain with offering their customers visibility of the location of the package is a perfect example of tying technology to a strategic thrust.

Management by committee is often criticized. Bashein, Markus, and Riley found this true in the case of reengineering projects. Consensus decision making in the world of radical change can delay or even halt progress on the project. Although a collaborative work style among project members is positive, a strong executive, willing to make decisions and place demands on the team, is necessary for project success.

A company that is not healthy financially, having too much debt and too leveraged to be able to commit the significant financial investment required is unlikely to succeed at reengineering. The payback on reengineering projects is often not short term. This may prevent a company short on funds to commit the resources required to reengineer.[96]

If one reengineering project is good for the firm, then two or three will be even better. Bashein, Markus, and Riley found that this is not the case when multiple projects dilute the efforts of key personnel. This may result in the failure of all the projects. Executive battles occur in firms where too many improvement projects are competing for scarce resources.[97]

A crisis atmosphere can promote reengineering success as previously discussed. However, crises can create fear and destroy optimism. Bashein, Markus, and Riley found that optimism, essential for creativity in the redesign effort, is key to the reengineering project.

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[95] Ibid., p. 7-13.

[96] Ibid., p. 7-13.

[97] Ibid., p. 7-13.

Optimism is low among employees who fear for their jobs. It is also low in managers who have a lack of faith in the abilities of their employees to achieve better results.[98]

Line managers in many firms distrust Human Resources and do not hold the Information Systems departments in high esteem. Information Systems personnel are considered too technical. Line managers do not understand what the Information Systems personnel are saying and the Information Systems personnel have to explain things to them multiple times. Additionally, Information Systems personnel are also generally behind schedule on critical systems enhancements and have a huge backlog following that enhancement. The addition of Information Systems in early planning will only slow progress on the backlog of enhancements. Consequently, Information Systems and Human Resources are excluded from early planning and when called in during the later phase of the project give lackluster performances.[99]

Based on their experience as consultants, Hall, Rosenthal, and Wade compiled a short list of ways to fail. The first way to fail is to assign average performers to the project. Business units are reluctant to assign top performers to a project. These business unit believe their performance will falter if one or more of their top performer is assigned full time to the project. The solution some firms use is to assign mediocre performers from the corporate organization to the project. These individuals are rarely missed. The same logic is used in the selection of the manager of the project. This manager's lack of credibility and the absence of the skills to lead dooms the project. Second, the failure to build a good measurement system to track performance before, during, and after implementation can allow a project to drift off course without proper corrective action. Project planners spend most of their time estimating project costs and the resources required. They rarely develop a measurement system that will be applicable to both the current system and the reengineered system. The measurement system should measure performance at both the location level and the employee level. Third, reengineering projects are often scaled back due to politics.

[98] Ibid., p. 7-13.

[99] Ibid., p. 7-13.

While companies strive to develop redesigns that are radically new, their aspirations seldom translate into reality. The new innovative approaches are watered down by political infighting before implementation. Two sensitive areas are incentives and information technology[100]

Middle management is responsible for the day-to-day operations of the firm. They are also key to the success of any project undertaken at the firm. When middle managers are excluded from the design and implementation of the reengineering project, the manager feel that their power and even their jobs may disappear as a result of the redesign. They will actively resist the incorporation of the redesigned process across all functions and sites.

**Research Hypothesis**

Based on the literature reviewed in the previous sections, two sets of research variables were identified. Preconditions (prerequisites and impediments) for success in reengineering projects and the outcome (success or failure, project budget performance, and project schedule performance) of these projects. Hence, we can expect:

$H1a_0$: There will be no relationship between the prerequisites for success and the outcome (project success) of reengineering projects.

$H1b_0$: There will be no relationship between the impediments to success and the outcome (project success) of reengineering projects.

$H2a_0$: There will be no relationship between the prerequisites for success and the project budget performance of reengineering projects.

$H2b_0$: There will be no relationship between the impediments to success and the project budget performance of reengineering projects.

$H3a_0$: There will be no relationship between the prerequisites for success and the project schedule performance of reengineering projects.

$H3b_0$: There will be no relationship between the impediments to success and the project schedule performance of reengineering projects.

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[100] Hall, Rosenthal, and Wade, Harvard Business Review, pp. 119-131.

## CHAPTER III

## RESEARCH METHODOLOGY

The overall purpose of this research revolved around two broad research questions and one secondary question. The two broad research questions pertain to the presence or absence of certain prerequisites for success and impediments to success (the independent variables), and their relationship to the success or failure of reengineering projects initiated at firms (the dependent variables). These broad research questions are:

> How does the presence or absence of prerequisites for success relate to the outcome, success or failure of reengineering projects?
>
> How does the presence or absence of impediments to success relate to the outcome, success or failure of reengineering projects?

The secondary question revolved around the collection of data regarding the costs associated with reengineering projects and the benefits attributed with reengineering.

> What are the costs and benefits associated with completed reengineering projects?

### Research Objective

The objective of this research was to find the most important factors or variables that affect or determine the outcome, success or failure, of reengineering projects. In order to fulfill this objective, a three-part research questionnaire was developed to measure logistics practitioner's reengineering project experiences. This instrument was designed to capture measurements of success in reengineering projects and the determinants of success, prerequisites and impediments, in these projects.

This instrument was also designed to collect data regarding the firms. The firms selected for this survey were firms where logistics would play a major role in the firm, such as manufacturers, transportation providers, warehousing, and distribution companies. The information regarding the firms was used to classify the firms to determine if there were any differences in the success or failure of reengineering projects within any given classification of firms.

## Research Design

A three-part questionnaire, contained in the Appendix, was developed to measure logistics practitioner's reengineering experience. The company data and product line categories in Part I of the questionnaire were based on previous research projects. These research projects surveyed logistics firms and/or technology applications in logistics firms.[102,103,104] The Likert scale questions in Part II of the questionnaire were based on an examination of previous reengineering research and articles on the experiences of reengineering consultants described in detail in Chapter II. The project management questions in Part III of the questionnaire were based on the project management literature.[105,106,107,108,109,110]

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[102] Bowersox, Donald J., Daugherty, Patricia J., Droge, Cornelia L., Rogers, Dale S., and Daniel L. Wardlow, Leading Edge Logistics: Competitive Positioning for the 1990s, Oak Brook, IL, Council of Logistics Management, 1990.

[103] Spencer, Michael S., Daugherty, Patricia J., and Dale S. Rogers, Towards a Deeper Understanding of JIT: A Comparison Between APICS and Logistics Managers, Production and Inventory Management Journal, 35 (3), Third Quarter, 1994, pp. 23-28.

[104] Premkumar, G., Ramamurthy, K., and Sree Nilakanta, Implementation of Electronic Data Interchange: An Innovation Diffusion Perspective, Journal of Management Information Systems, 11 (2), Fall, 1994, pp. 157-186.

[105] Page-Jones, Meiler, Practical Project Management: Restoring Quality to DP Projects and Systems, New York, Dorset House Publishing, 1985

[106] Green, Leslie H., Organizing for Project Management, A Practical Guide to Systems Development Management, edited by James Hannan, Auerbach Publishers, New York, Van Nostrand Reinhold, 1982, pp. 115-126.

[107] Umbaugh, Robert E., DP Management: A Modern Challenge, A Practical Guide to Data Processing Management, edited by James Hannan, Auerbach Publishers, New York, Van Nostrand Reinhold, 1982, pp. 1-8.

[108] Pressman, Roger S., Software Engineering: A Practitioner's Approach, New York, McGraw-Hill, 1987.

[109] Laudon, Kenneth C. and Jane Price Laudon, Management Information Systems: A Contemporary Perspective, New York, Macmillan, 1991.

[110] Weaks, Helena, Draft of Project System Engineering Support for JLSC Integration & Migration, unpublished, Dayton, OH, 1995.

**Procedure and Sample**

The practitioners to be surveyed were selected from three sources. The first two sources of survey practitioners were the membership roles of the American Production and Inventory Control Society (APICS) and the Council of Logistics Management (CLM). APICS and CLM are professional societies dedicated to the education of their membership. APICS is a 70,000 member not-for-profit international organization dedicated to increase manufacturing and service industry competitiveness and global prosperity. APICS members have been in the forefront of such management and manufacturing achievements as the widespread use of MRP, JIT, and computer-integrated-manufacturing (CIM).[111] CLM is a not-for-profit professional organization of individuals who are interested in improving their logistics and distribution management skills. CLM provides leadership in defining and understanding the logistics process. CLM also provides research that contributes to enhanced customer value and supply chain performance.[112] Practitioners from the membership roles of APICS and CLM have been selected as they are representative of logistics practitioners. They have been selected for numerous surveys by leading academics, and generally have an adequate response rate. Using practitioners from both societies can also provide insight into the view of these similar but different organizations. Spencer, Daugherty, and Rogers found significant differences in the way APICS and CLM practitioners view JIT.[113] One objective of this study was to compare the responses from both groups to determine if there are any differences. The third source of survey practitioners was the Standards and Poor's on-line database. Standards and Poor's comprehensive database contains both private and publicly held firms. Included in the database is a business classification such as industrial, health, or financial.

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[111] American Production and Inventory Control Society 1995 Calendar of Learning Opportunities

[112] Council of Logistics Management Bylaws

[113] Spencer, Daugherty, and Rogers, Production and Inventory Management Journal, pp. 23-28.

**Survey Participants**

The logistics practitioners were selected from the membership roles of the American Production and Inventory Control Society (APICS) and the Council of Logistics Management (CLM). Members were randomly selected from CLM Membership Roster and APICS Membership Directory using a random number generator to select the page number from the membership directory. Further, the column and row on the selected page were selected using the same random number generator. If that selection was a consultant or an educator, the next selection was used. The third group of respondents, designed to assess the view of reengineering from the Chief Executive Officer (CEO), were randomly selected from firms designated as industrial in the Standards and Poor's on-line database. A similar numbers of questionnaires were sent to all groups -- 400 to CEOs, 300 to CLM members, and 300 to APICS members. Questionnaires were marked to indicate whether the recipient was a CEO, an APICS member, or a CLM member. It was determined after the survey was completed that the questionnaire did not ask which societies the respondent maintained membership. Therefore, the survey failed to capture whether a CEO was a CLM member and/or an APICS member and other combinations.

**Problems Encountered with Survey**

The survey was pre-tested on a small sample of all groups before a general mailing. It was fully understood that collection of data for the secondary question, cost and benefit data, would be difficult to obtain. The first batch of returned questionnaires verified that the difficult to obtain cost and benefit data met our low expectations. We expected difficulty with the cost and benefit data. The results met our expectations. Questionnaires were returned with no entries in these fields, partial entries in these fields, numbers with entries with comments beside them such as "Guess", "NA", and "Unknown". Similar results were encountered in a benchmarking survey conducted on the Internet by ProSci. ProSci, a learning center for reengineering teams, provides business process reengineering and change management resources. ProSci also provides benchmarking and best practices

information on business process reengineering. ProSci's study, considered highly successful, reached 57 organizations in 26 countries on six continents. Success measures were weak as two-thirds of the participants did not know how they would measure the effectiveness of the process they used in the project. These participants were also reluctant to judge their success. Many of those who had completed their projects considered it too soon to tell how successful they were.[114]

Questions regarding the makeup of the project team and the educational background of the project managers and systems architect also proved difficult. The response to the project team, project manager, and systems architect questions on most of the initial survey was either blank or incomplete.

**Questionnaire Revisions**

Minor revisions were made to the questionnaire, asking for less quantitative cost data and project data. Instead of asking for planned project costs and actual project costs, respondents were asked to indicate whether the reengineering project was completed under budget (greatly or slightly), had no budget variance, or was completed over budget (slightly or greatly). Instead of asking for planned project duration and actual project duration, respondents were asked to indicate whether the reengineering project was completed ahead of schedule (greatly or slightly), completed on schedule, or completed behind schedule (slightly or greatly). The information attribute for project budget performance is a five point scale using respondent provided information where:

1 equals greatly under budget
2 equals slightly under budget
3 equals no budget variance
4 equals slightly over budget
5 equals greatly over budget

The information attribute for project schedule performance is a five point scale using respondent provided information where:

1 equals greatly ahead of schedule
2 equals slightly ahead of schedule

[114] Anonymous., Best Practices Report for Reengineering and Business Process Design Teams - 1997 Benchmarking Study - Executive Summary.

3 equals on schedule
4 equals slightly behind schedule
5 equals greatly behind schedule

Questions regarding the makeup of the project team and the educational background of the project managers and systems architect were dropped. The revised Part III of the questionnaire is contained in the Appendix. Response to the new version of the questionnaire greatly improved.

## Survey Response

### Response Summary

There were 1000 questionnaires mailed. There were 285 valid responses. In addition, there were 46 responses primarily in the form of a letter on company letterhead attached to the questionnaire declining participation in surveys, generally due to company policy. Some responses stated that a high workload prevented a response. Additionally, some were considered non-responses where blank questionnaires were returned without comment or an enclosed cover letter. Figure 3.1 is a summary of the survey response.

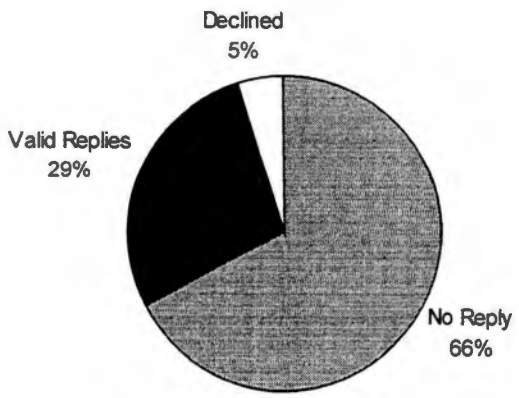


**Figure 3.1 Survey Response Summary**

**Response by Reengineering Effort Initiated**

Approximately 75% of the 285 valid respondents indicated that a reengineering effort had been initiated at their company (see Figure 3.2).

**Survey Response by Group**

The number of responses received from questionnaires mailed to CEOs and CLM members were very similar (see Figure 3.3). The responses from questionnaires mailed to APICS members was approximately 50% less. The 285 valid responses consisted of 81 from mailings to CEOs, 79 from mailings to CLM members, and 42 from mailings to APICS members. The 83 responses designated as unknown were mailed to CEOs but were delegated to others in their organization for a response. Although the respondents classified as unknown could be an APICS member and/or CLM member, there was no question on the questionnaire to indicate this. The survey was mailed in three waves of equal size. In an effort to assess the potential for non-response bias, comparisons were made across the waves for the response rate by group. The response rate from each group was consistent for all waves. Responses by CEOs were 30, 27, and 24 by wave totaling 81. Responses by CLM members were 28, 25,

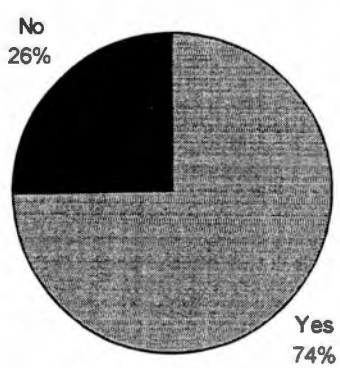


**Figure 3.2 Survey Responses - Reengineering Initiated**

and 26 by wave totaling 79. Responses by APICS members were 13, 15, and 14 by wave totaling 42. Responses by the group designated as Unknown were 27, 27, and 29 by wave totaling 83. While this does not ensure that the non-respondents wouldn't have answered the questions differently, it shows that there is no systematic bias in the response rate across the waves.

**Survey Response - Reengineering Initiated by Group**

The 212 valid responses from individuals indicating their firm had initiated reengineering consisted of 53 from questionnaires mailed to CEOs, 66 from questionnaires mailed to CLM members, and 42 from questionnaires mailed to APICS members (see Figure 3.4). The 51 unknown responses were mailed to CEOs but were delegated for a response to others in their organization. The overall response rate from questionnaires mailed to APICS members was the lowest of the three groups. However, every response from the APICS group indicated that reengineering had been initiated. Over 80% of the CLM group who responded indicated that reengineering had been initiated. The response from CEOs group and the unknown group was much lower. Approximately 60% of these groups had initiated reengineering projects.

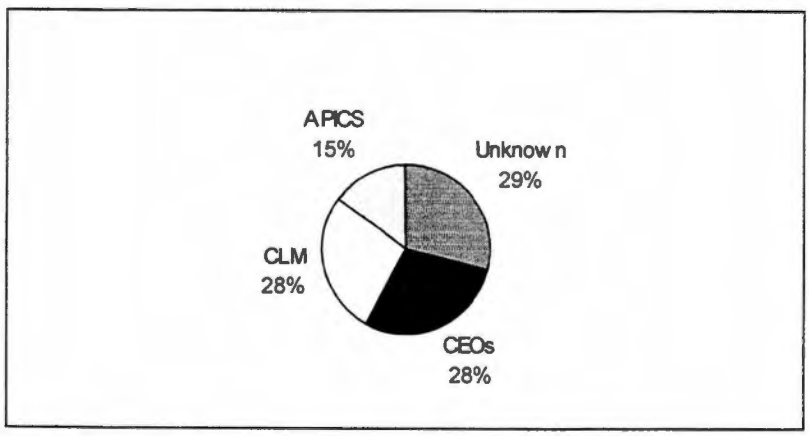


**Figure 3.3 Survey Response by Group**

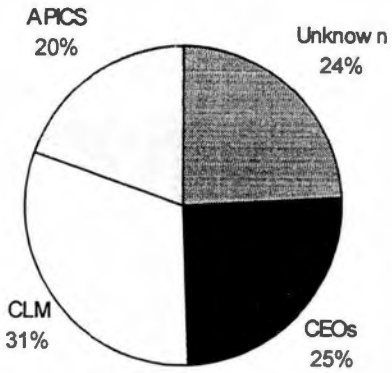


**Figure 3.4 Survey Response - Reengineering Initiated by Group**

**Company Type and Product Line Data**

The company type and product line data format for Part I of the survey questionnaire are based on a format used by Bowersox, Daugherty, Droge, Rogers, and Wardlow[115] and further adapted and used by Spencer, Daugherty, and Rogers.[116] A similar format was used by Premkumar, Ramamurthy, and Nilakanta.[117]

**Survey Response by Company Type**

For this study, firms were classified by company type into four primary groups as determined by the survey respondents (see Figure 3.5). However, respondents will also have the capability to enter an "other" group and specify a company type not on the list. The company types are:

1. Manufacturer
2. Transportation company

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[115] Bowersox, Daugherty, Droge, Rogers, and Wardlow, Leading Edge Logistics: Competitive Positioning for the 1990s.

[116] Spencer, Daugherty, and Rogers, Production and Inventory Management Journal, pp. 23-28.

[117] Premkumar, Ramamurthy, and Nilakanta, Journal of Management Information Systems, pp. 157-186.

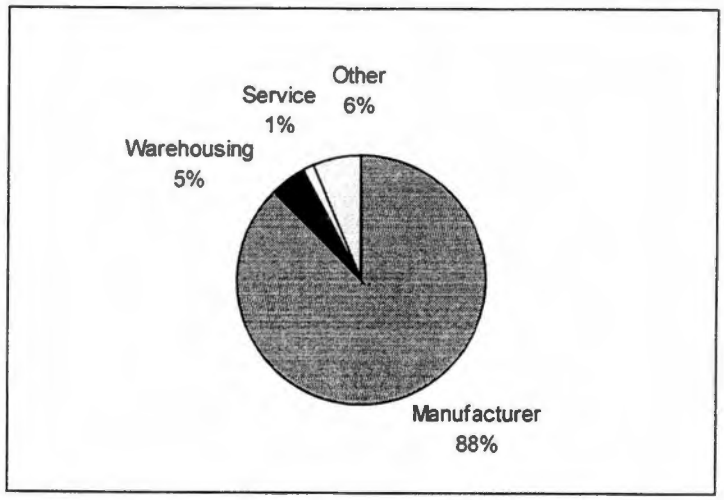


**Figure 3.5 Survey Response by Company Type**

3. Warehouse/distribution center
4. Service Company
5. Other

Data on company type was captured in order to group responses to find any significant differences between company types. Most of the responses received were from manufacturing companies. There were no responses received from transportation companies.

**Survey Response - Reengineering Initiated by Company Type**

Most of the responses received were from manufacturing companies (see Figure 3.6). The ratio of responses by company type for firms that have initiated reengineering projects is very similar to the ratio for all responses. However, all firms with a company type of other indicated that their firm had initiated a reengineering project.

**Survey Response by Gross Sales Dollars**

For this study, firms were classified by gross sales dollars into seven primary groups as determined by the survey respondents (see Figure 3.7). Data on gross sales was captured in order to group responses to find any significant differences between companies of different sizes or between companies that are a division of a larger firm. All groups by sales dollars were

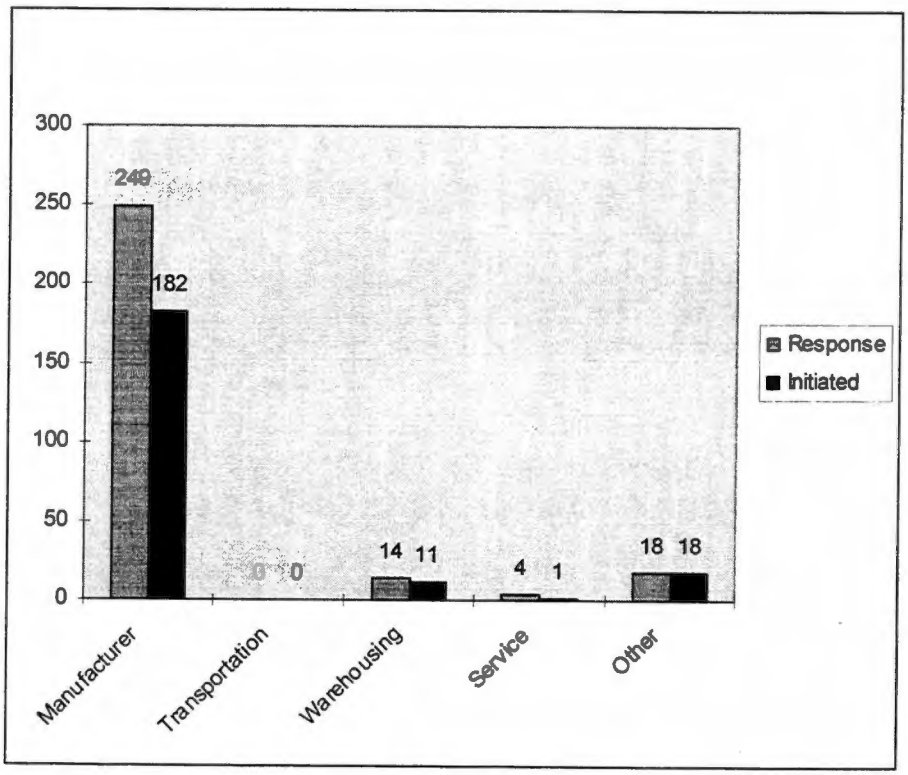


**Figure 3.6 Response vs. Reengineering Initiated by Company Type**

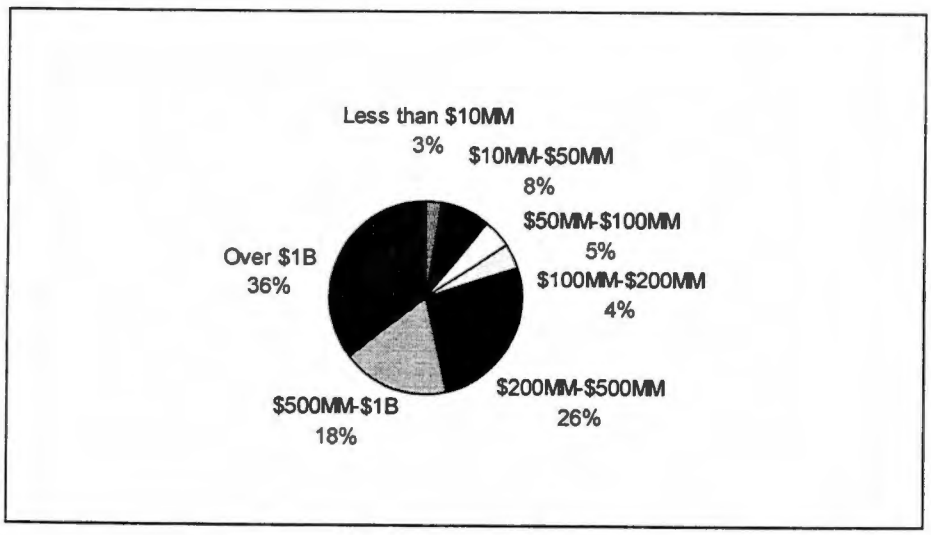


**Figure 3.7 Survey Response by Gross Sales Dollars**

represented. Over 50% of the respondents were from firms with sales dollars exceeding $500 million.

**Survey Response - Reengineering Initiated by Gross Sales Dollars**

All groups by sales dollars were represented (see Figure 3.8). Over 50% of the respondents were from firms with sales dollars exceeding $500 million. The ratio of responses by sales dollars for firms that have initiated reengineering projects is very similar to the ratio for all responses. However, all firms with gross sales dollars less than $10 million indicated that their firm had initiated a reengineering project.

**Survey Response by Number of Employees**

For this study, firms were classified by number of employees into six primary groups as determined by the survey respondents. Data on number of employees was captured in order to group responses to find any significant differences between companies of different sizes or between companies that are a division of a larger firm. All groups by number of employees were represented. Approximately 80% of the respondents worked for companies with over 1000 employees.

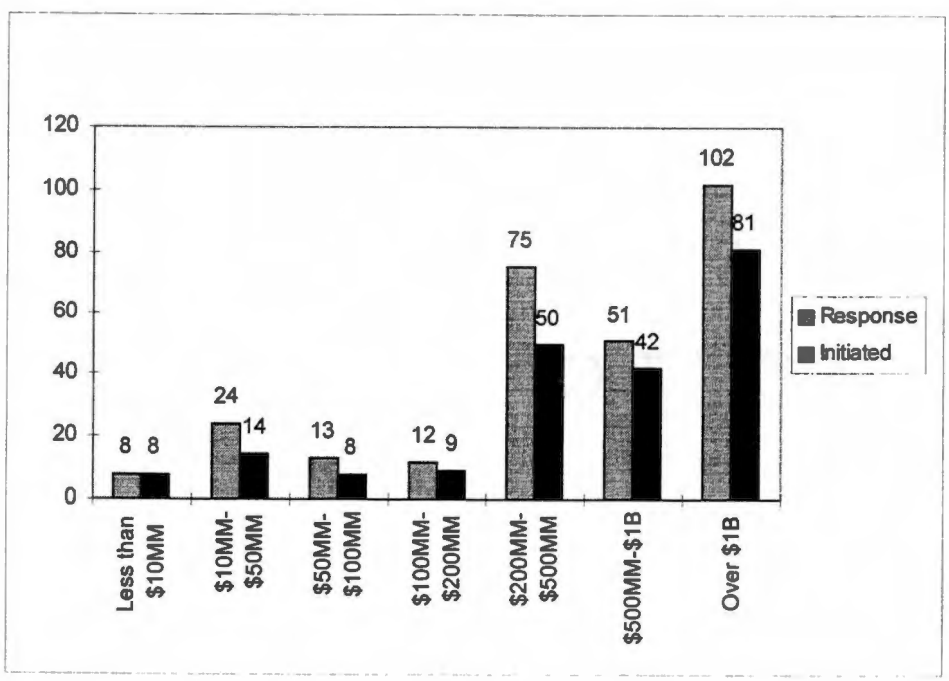


**Figure 3.8 Response vs. Reengineering Initiated by Gross Sales Dollars**

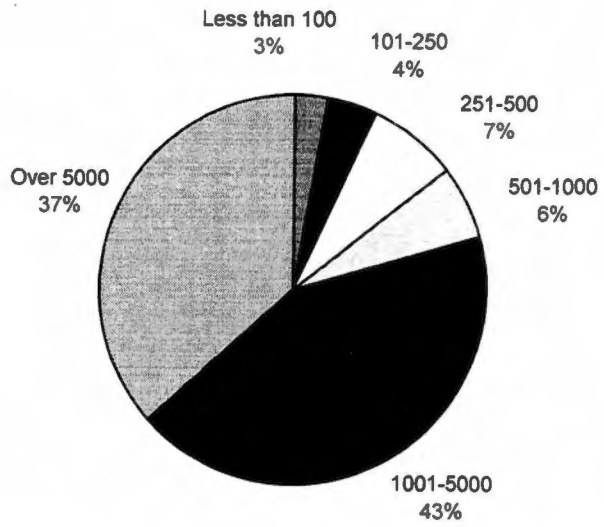


**Figure 3.9 Survey Response by Number of Employees**

**Survey Response - Reengineering Initiated by Number of Employees**

All groups by number of employees were represented (see Figure 3.11). Approximately 80% of the respondents worked for companies with over 1000 employees. The ratio of responses by number of employees for firms that have initiated reengineering projects is very similar to the ratio for all responses. All firms responding with less than 100 employees indicated that their firm had initiated a reengineering project. When reviewing the responses from the larger companies, those over 1000 employees, and the smallest companies, they was less concern over budget and finances in their responses. However, the companies in the middle were more concerned over budget and finances. This could be a possible explanation for the low percentage of middle sized companies that initiated reengineering projects. The larger companies had the funds required to reengineer and the smallest companies were agile and did not require a large amount of funds to reengineer their processes.

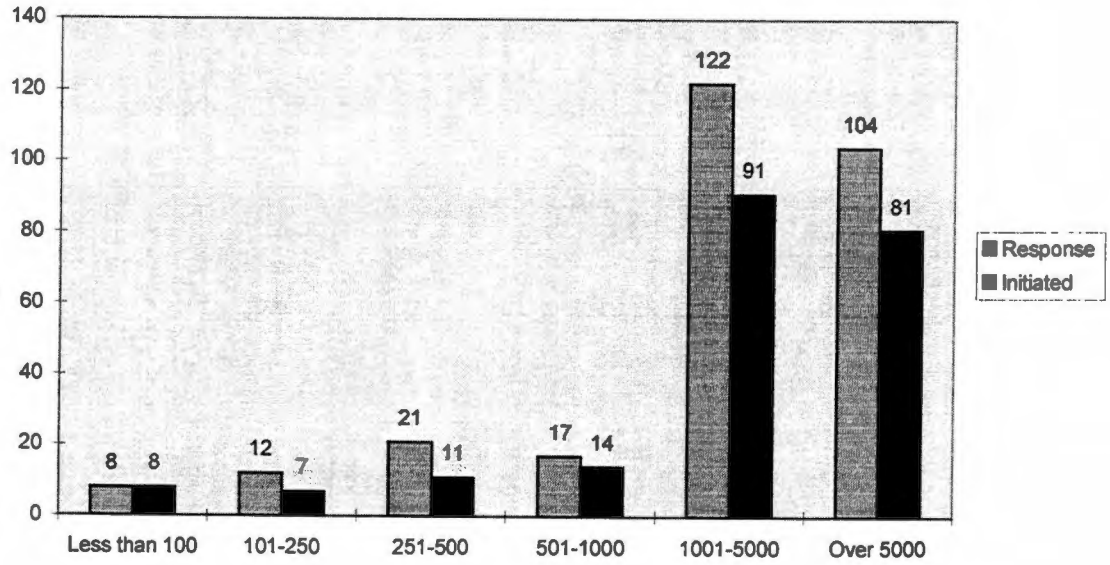


**Figure 3.10 Response vs. Reengineering Initiated by Number of Employees**

**Survey Response by Product/Product Line**

For this study, firms were classified by product/product line into eleven primary groups as determined by the survey respondents. However, respondents also had the capability to enter an "other" group and specify a product/product line not on the list. The product/product line classifications are:

1. Automotive
2. Motor and transportation equipment
3. Computer/electronics
4. Textiles/apparel
5. Building materials
6. Chemicals
7. Services
8. Food
9. Pharmaceuticals/health and beauty
10. Furniture/home furnishings
11. Paper/office supplies
12. Other

Data on product/product line were captured in order to group responses to find any significant differences between product/product line. All product line groupings were

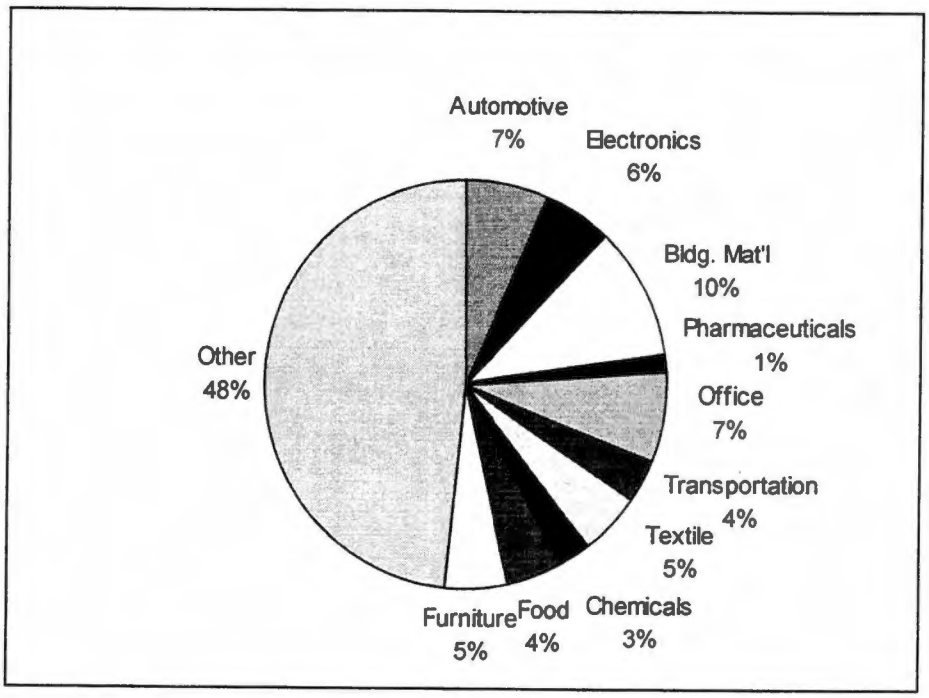


**Figure 3.11 Survey Response by Product/Product Line**

represented. Approximately 50% of the respondents worked for companies with a primary product/product line classified as other.

**Survey Response - Reengineering Initiated by Product Line**

All product line groupings were represented. Approximately 50% of the respondents worked for companies with a primary product/product line classified as other. The ratio of responses by product line for firms that have initiated reengineering projects is very similar to the ratio for all responses.

**Survey Response by View of Company's Computerization**

Most respondents indicated that their company was highly computerized. Over four times as many respondents indicated their firms were highly computerized (a response of 7, 6, or 5) as those who indicated they were not highly computerized (a response of 3, 2, or 1). There were no respondents that indicated that they strongly disagreed.

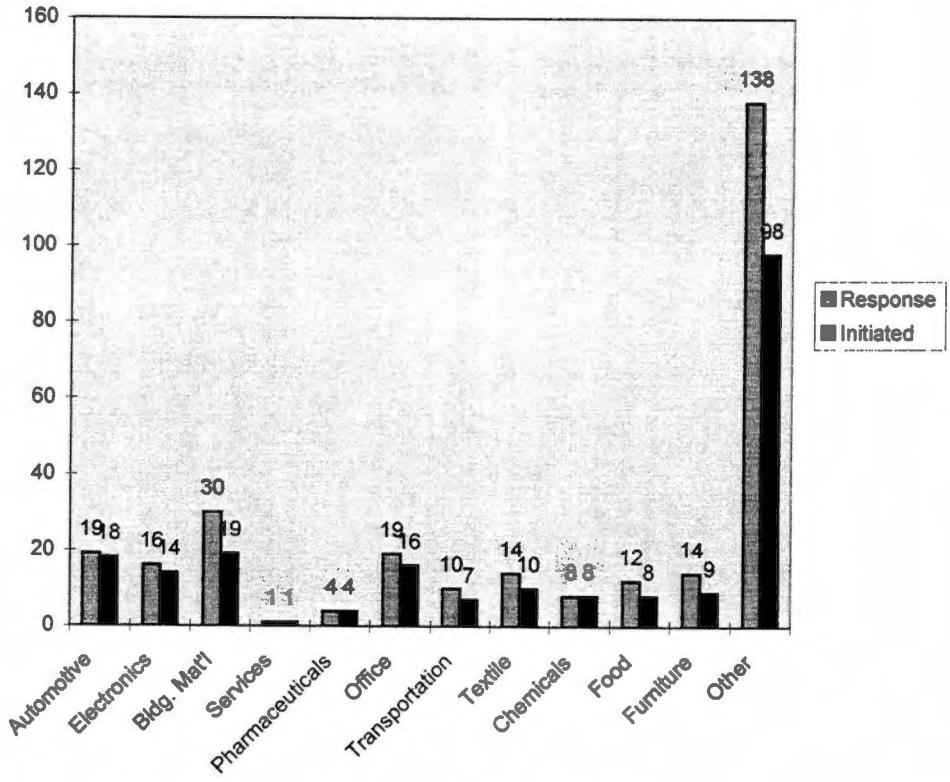


**Figure 3.12 Survey Response - Reengineering Initiated by Product Line**

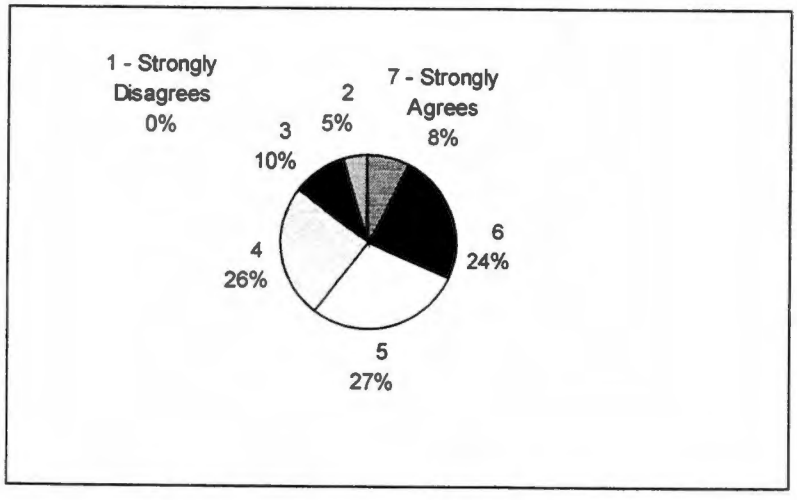


**Figure 3.13 Survey Response by View of Company's Computerization**

**Survey Response - Reengineering Initiated by View of Company's Computerization**

Most respondents indicated that their company was highly computerized. The ratio of responses by view of company's computerization for firms that have initiated reengineering projects is very similar to the ratio for all responses. However, every respondent who indicated that they strongly agreed that their firm was highly computerized also indicated their firm had initiated a reengineering project.

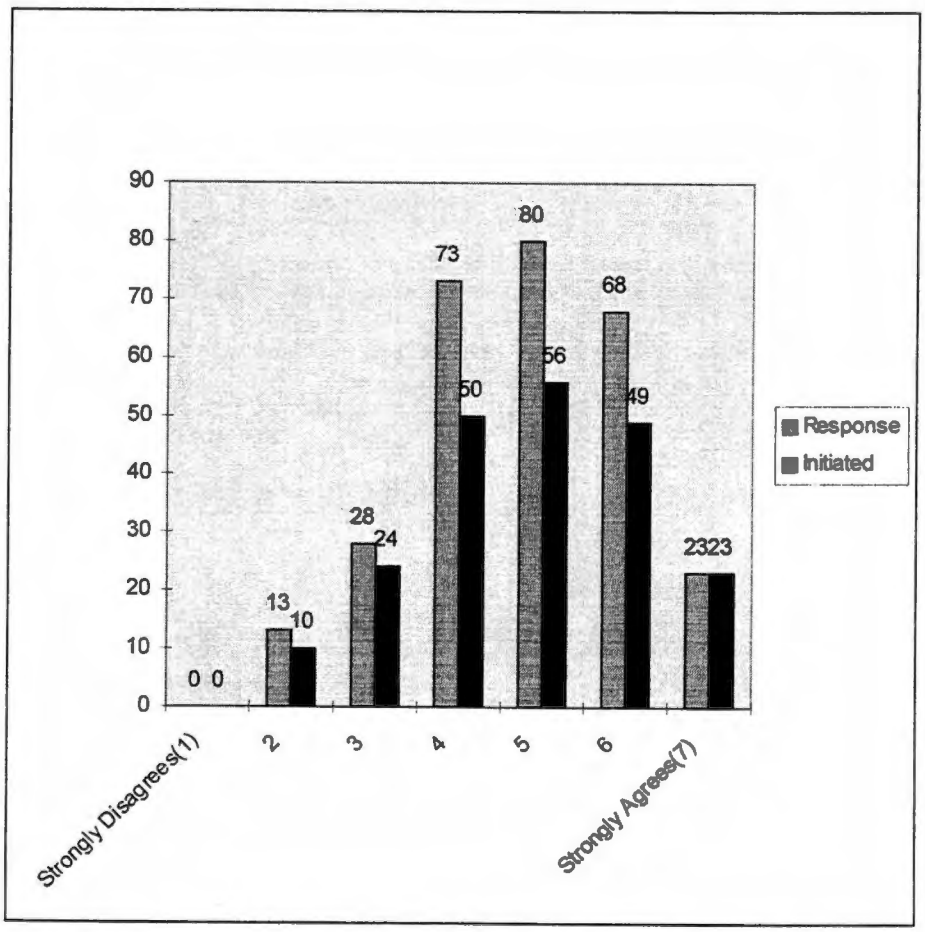


**Figure 3.14 Response vs. Reengineering Initiated by View of Company's Computerization**

## CHAPTER IV

## RESULTS AND DISCUSSION

Chapter IV presents the research results. The chapter is divided into two sections. The first section presents the statistical analysis and evaluation of the hypothesis. The second section is a summary.

### Statistical Analysis and Evaluation

The analytical procedures performed on the responses consisted of classical statistical techniques: descriptive statistics (mean and standard deviation), single factor analysis of variance (ANOVA), correlation analysis, multiple regression analysis, and stepwise regression analysis.

**Mean and Standard Deviation -- Dependent Variables**

Table 4.1 presents the mean and standard deviation of the dependent variables – Project Success, Project Budget Performance, and Project Schedule Performance for all respondents.

Table 4.2 presents the mean and standard deviation of the dependent variables – Project Success, Project Budget Performance, and Project Schedule Performance by group – Group Unknown, CEOs, CLM members, and APICS members.

**Table 4.1 Mean and Standard Deviation -- Dependent Variables All Respondents**

**ALL Respondents**

| Dependent Variable | Mean | Standard Error |
|---|---|---|
| Project Success | 3.24 | 1.36 |
| Project Budget Performance | 3.21 | 1.08 |
| Project Schedule Performance | 3.47 | 1.10 |

**Table 4.2 Mean and Standard Deviation -- Dependent Variables by Group**

| Group Unknown | | |
|---|---|---|
| Dependent Variable | Mean | Standard Error |
| Project Success | 3.16 | 1.21 |
| Project Budget Performance | 2.93 | 1.30 |
| Project Schedule Performance | 3.33 | 1.28 |

| CEOs | | |
|---|---|---|
| Dependent Variable | Mean | Standard Error |
| Project Success | 2.94 | 1.12 |
| Project Budget Performance | 2.92 | 1.16 |
| Project Schedule Performance | 3.14 | 1.13 |

| CLM Members | | |
|---|---|---|
| Dependent Variable | Mean | Standard Error |
| Project Success | 3.45 | 0.94 |
| Project Budget Performance | 3.58 | 1.53 |
| Project Schedule Performance | 3.78 | 1.02 |

| APICS Members | | |
|---|---|---|
| Dependent Variable | Mean | Standard Error |
| Project Success | 3.21 | 1.03 |
| Project Budget Performance | 3.41 | 1.22 |
| Project Schedule Performance | 3.56 | 0.79 |

Project Success is an information attribute rated by survey respondents that connotes how reengineering projects at their firms have been viewed. Project Success is a seven point scale where 1 equals very successful and 7 equals dismal failure. The overall mean Project Success for all respondents was 3.24. This indicates that reengineering projects were viewed as mildly successful. As a group, the CEOs rated reengineering project success higher than any other group. CLM members rated reengineering projects the lowest of any group. Did the mean Project Success for the CEOs vary from the other groups, such as the CLM members and the APICS members? Single factor analysis of variance was performed on the survey data to determine if there was a variation among the groups. There was a significant

variation among the means of the different groups. The F Statistic was 3.356 indicating significance at the .05 level. Results from the ANOVA are contained in Appendix, Table A-58.

Project Budget Performance is an information attribute rated by survey respondents that connotes how close the actual reengineering project expenses were compared to the reengineering project budget. The information attribute for Project Budget Performance is a five point scale where:

1 equals greatly under budget
2 equals slightly under budget
3 equals no budget variance
4 equals slightly over budget
5 equals greatly over budget

The overall mean Project Budget Performance for all respondents was 3.21, slightly over budget. Responses from CEOs indicated that reengineering budget performance was slightly under budget. This was very similar to the response from Group Unknown. CLM members reported the greatest budget variance, followed closely by APICS members. Did the mean Project Budget Performance for the CEOs vary from the other groups, such as the CLM members and the APICS members? Single factor analysis of variance was performed on the survey data to determine if there was a variation among the groups. There was not a significant variance among the means of the different groups. The F Statistic was 2.216 and is not significance at the .05 level. The result of the ANOVA is contained in the Appendix, Table A-59.

Project Schedule Performance is an information attribute rated by survey respondents that connotes how close the actual reengineering project completion date was compared to scheduled reengineering project completion date. The information attribute for project schedule performance is a five point scale where:

1 equals greatly ahead of schedule
2 equals slightly ahead of schedule
3 equals on schedule
4 equals slightly behind schedule
5 equals greatly behind schedule

The overall mean Project Schedule Performance for all respondents was 3.47, slightly behind schedule. Responses from CEOs indicated that reengineering project performance was

slightly behind schedule. However, CLM members indicated that project performance was closely approaching greatly behind schedule. Did the mean Project Schedule Performance for the CEOs vary from the other groups, such as the CLM members and the APICS members? Single factor analysis of variance was performed on the survey data to determine if there was a variation among the groups. There was a significant variance among the means of the different groups. The F Statistic was 3.772 indicating significance at the .05 level. The result of the ANOVA is contained in the Appendix, Table A-60.

This indicates, in general, that reengineering projects for all respondents were slightly behind schedule and slightly over budget. The project schedule slippage was somewhat greater than the project budget overrun. One possible reason for the differences is that project administrative costs, comprised heavily of training and travel costs, was curtailed due to a slipped schedule. Another possible reason could be over-budgeting in anticipation of a slippage, although the planned project completion date was mandated.

**Table 4.3 Mean and Standard Deviation – Prerequisites for Success**

| Prerequisites | Mean | Standard Error |
|---|---|---|
| Strong senior management commitment/sponsorship | 1.98 | 1.31 |
| Aggressive target(s) set | 2.49 | 1.20 |
| Senior executive responsible for the project | 2.52 | 1.44 |
| Extensive use of cross-functional memberships on projects teams | 2.58 | 1.65 |
| Extensive user involvement in design | 2.63 | 1.59 |
| Firm has a clear vision of project goals | 2.71 | 1.32 |
| Communications with employees | 2.92 | 1.47 |
| Sound proactive senior management already in place | 3.00 | 1.47 |
| Adequate budget | 3.06 | 1.49 |
| Project expectations were realistic | 3.17 | 1.41 |
| Full-time participation of key practitioners | 3.29 | 1.72 |
| Adequate training/workshops conducted | 3.53 | 1.66 |
| Project growth-oriented, not cost-cutting | 3.74 | 1.83 |
| Pilot project prior to full implementation | 3.88 | 2.01 |
| Significant portion of CEO's time committed to project | 4.36 | 1.65 |
| Crisis as a key driver of the project | 4.59 | 1.86 |

**Mean and Standard Deviation – Prerequisites for Success**

Table 4.3 presents the mean and standard deviation of the independent variable, prerequisites for success. The list of prerequisites for success consists of sixteen items. Practitioners were asked to circle the number on a rating scale from 1 (strongly applies) to 7 (does not apply) to indicate how each prerequisite applied to reengineering projects at their firm. The overall mean for all prerequisites for success was 3.15.

Based on the mean for all respondents, the three most important prerequisites for success as they applied to the respondent's reengineering project(s) were *"Strong senior management commitment/sponsorship"*, *"Aggressive target(s) set"*, and *"Senior executive responsible for the project"*. The three least important prerequisites for success were *"Pilot project prior to full implementation"*, *"Significant portions of CEO's time committed to project"*, and *"Crisis as a key driver of the project"*. CEOs were in agreement with the lack of importance given to their time commitment to reengineering projects. CEOs, as a group, rated the prerequisite that specifically applied to their time committed to reengineering projects lower than APICS members and the unknown source group. Only CLM members rated this prerequisite lower than the CEOs. Did the mean Prerequisites for Success in reengineering projects for the CEOs vary from the other groups, such as the CLM members and the APICS members? Single factor analysis of variance was performed on the survey data to determine if there was a variation among the groups. There was not a significant variance among the means of the different groups for any of the sixteen prerequisites. The result of the ANOVA is contained in the Appendix, Tables A-64 and A-65.

**Mean and Standard Deviation – Impediments to Success**

Table 4.4 presents the mean and standard deviation of the independent variable, impediments to success. The list of impediments to success consists of eighteen items. Practitioners were asked to circle the number on a rating scale from 1 (strongly applies) to 7 (does not apply) to indicate how each impediment applied to reengineering projects at their firm. The mean impediment to success was 4.71.

Based on the mean for all respondents, the three most important impediments to success as they applied to the respondent's reengineering project(s) were: *"Too many projects for key team members"*, *"Reengineered functions rather than processes"*, and *"Not focused on strategic value-added processes"*. The three least important impediments to success were: "*Staff driven by fear - lacks optimism*", "*Let the consultant do it attitude*", and "*Financial condition of firm not sound*". Did the mean Impediments to Success in reengineering projects for the CEOs vary from the other groups, such as the CLM members and the APICS members? Single factor analysis of variance was performed on the survey data to determine if there was a variation among the groups. There was a significant variance among the means of the different groups for four of the eighteen impediments. The result of the ANOVA is contained in the Appendix, Tables A-61 through A-63.

**Table 4.4 Mean and Standard Deviation – Impediments to Success**

| Impediments | Mean | Standard Error |
|---|---|---|
| Too many projects for key team members | 3.75 | 1.63 |
| Reengineered functions rather than processes | 4.13 | 1.76 |
| Not focused on strategic value-added processes | 4.29 | 1.79 |
| Not following detailed methodology | 4.43 | 1.71 |
| Failure to measure performance (before, during, and after project) | 4.53 | 1.92 |
| Management by consensus (lack of strong management | 4.58 | 1.83 |
| Project too focused on cost-cutting | 4.58 | 1.85 |
| Project under-financed and/or under-staffed | 4.64 | 1.94 |
| Failure to involve middle management early in the project | 4.68 | 1.88 |
| Average performers assigned to the project | 4.73 | 1.76 |
| Information Management (IT) viewed as driver of project, not the enabler | 4.80 | 2.05 |
| Wrong sponsor | 4.85 | 1.95 |
| Animosity towards Information Systems and Human Resources | 4.93 | 1.68 |
| Project lacks senior executive sponsorship | 4.96 | 1.83 |
| Reengineering scaled back due to politics | 5.08 | 1.74 |
| Staff driven by fear, lacks optimism | 5.12 | 1.57 |
| Let the consultant do it attitude | 5.34 | 2.02 |
| Financial condition of firm not sound | 5.44 | 1.87 |

Responses for some of the prerequisites and impediments do not appear consistent. The most important prerequisite, based on the mean, "*Strong senior management commitment/sponsorship*" appears to very closely related to the impediment, *"Project lacks senior executive sponsorship"*. However, this impediment did not rank highly based on the mean. The most important impediment appears to be related to a prerequisite not considered important. The impediment, "*Too many projects for key team members*" is ranked considerably higher than the prerequisite, *"Full-time participation of key practitioners"*.

There were consistent responses when queried regarding the state of the organization. Fear, crisis, and the financial condition of the firm were not considered important. The prerequisite, *"Crisis as a key driver of the project"* and the impediments, *"Staff driven by fear, lacks optimism"* and "*Financial condition of firm not sound*" were not rated as important by the respondents. It appears that sound management is considered important and rallying around a crisis at the firm is not important.

**Mean and Standard Deviation – Independent Variables**

Overall, the mean for the prerequisites for success, 3.15, was much lower than the mean for the impediments to success, 4.71. The prerequisites was approximately one-third lower than the impediments. If based solely on the mean, prerequisites are viewed as more important to reengineering projects than impediments. The most important impediment had a mean of 3.75. There were 13 of the 16 prerequisites with a mean lower than 3.75.

**Mean and Standard Deviation – By Group**

There were 212 valid responses from individuals indicating their firm had initiated reengineering. There were 53 from questionnaires mailed to CEOs, 66 from questionnaires mailed to CLM members, 42 from questionnaires mailed to APICS members, and 51 from unknown sources, questionnaires mailed to CEOs but completed by others. Tables 4.5 and 4.6 are summaries of the most important impediments and prerequisites based on their mean. There are very few differences between the summary for all responses and the responses by group, especially for the prerequisites to success groupings. The only major differences in the impediments to success summary were in the responses from unknown

sources. The only group that ranked the impediment, *"Failure to involve middle management early in the project"* was the CEOs group. Perhaps this is because they value the importance of middle management and are willing to state it. Many of the other respondents are considered middle management and probably not so willing to proclaim their own importance.

### Correlation Analysis

The next step in the analysis of the data is to determine if a relationship exists between the variables. This is accomplished in a process called correlation analysis. Correlation analysis was first performed on each pair of the independent variables (prerequisites for success and impediments to success) and dependent variables (project success, project budget performance, and project schedule performance). Then correlation

**Table 4.5 Summary of Means – Impediments to Success**

| Impediments | All | CEO | CLM | APICS | Unknown |
|---|---|---|---|---|---|
| Too many projects for team members | 1 (3.75) | 2 (4.21) | 1 (3.61) | 1 (3.50) | 1 (3.65) |
| Reengineered functions rather than processes | 2 (4.13) | 1 (4.11) | 2 (4.00) | 2 (4.21) | |
| Not focused on strategic value-added processes | 3 (4.29) | 3 (4.38) | 3 (4.02) | 3 (4.24) | |
| Not following detailed methodology | 4 (4.43) | 4 (4.60) | 4 (4.23) | 5 (4.55) | |
| Failure to measure performance (before, during, and after) | 5 (4.53) | | | | 4 (4.20) |
| Project too focused on cost cutting | | | 5 (4.32) | 4 (4.50) | |
| Project under-financed or under-staffed | | | | | 2 (4.00) |
| Average performers assigned to the project | | | | | 3 (4.18) |
| Management by consensus (lack of strong leadership) | | | | | 4 (4.20) |
| Failure to involve middle management early in the project | | 5 (4.68) | | | |

**Table 4.6 Summary of Means – Prerequisites for Success**

| Prerequisites | All | CEO | CLM | APICS | Unknown |
|---|---|---|---|---|---|
| Strong senior management commitment/sponsorship | 1 (1.98) | 1 (1.79) | 1 (2.08) | 1 (2.02) | 1 (2.02) |
| Aggressive target(s) set | 2 (2.49) | 3 (2.58) | 2 (2.35) | 2 (2.36) | 5 (2.67) |
| Senior executive responsible for the project | 3 (2.52) | 2 (2.25) | 5 (2.58) | 4 (2.86) | 2 (2.45) |
| Extensive use of cross-functional memberships on project teams | 4 (2.58) | 4 (2.66) | | 3 (2.52) | 3 (2.53) |
| Extensive user involvement in design | 5 (2.63) | | 3 (2.36) | | 4 (2.59) |
| Firm has a clear vision of project goals | | 5 (2.72) | 4 (2.53) | 5 (2.88) | |

analysis was performed on each pair of the independent variables to determine if the independent variables were highly intercorrelated.

**Correlation Analysis -- Independent and Dependent Variables**

Tables 4.7 through 4.9 consist of summary data extracted from the correlation analysis for the independent variables (prerequisites for success and impediments to success) and the dependent variables (project success, project budget performance, and project schedule performance). There is a significant correlation as measured by the Pearson Correlation Coefficient between the dependent variables and many of the independent variables, both prerequisites and impediments. The impediments *"Too many projects for key team members"* and the prerequisite, *"Aggressive target(s) set"* were both significantly correlated with both Project Budget Performance and Project Schedule Performance. They were not significantly correlated with Project Success. It is ironic that the prerequisite *"Significant portion of CEO's time committed to project"* was negatively correlated to Project Success. One might expect that the more the CEO was involved, the better the results of the reengineering project. Survey responses indicated the opposite. A full listing of the correlation analyses are contained in the Appendix, Tables A-85 through A-87.

**Table 4.7 Correlation Analysis -- Independent Variables and Project Success**

| Impediments | Project Success |
|---|---|
| Information Management (IT) viewed as driver of project, not the enabler | -.287 ** |
| Financial condition of firm not sound | -.262 ** |
| Project under-financed and/or under-staffed | -.219 ** |
| Reengineered functions rather than processes | -.216 ** |
| Staff driven by fear, lacks optimism | -.191 ** |
| Not focused on strategic value-added processes | -.182 * |

| Prerequisites | Project Success |
|---|---|
| Significant portion of CEO's time committed to project | -.319 ** |
| Sound proactive senior management already in place | .304 ** |
| Senior executive responsible for the project | .270 ** |
| Project expectations were realistic | .244 ** |
| Firm has a clear vision of project goals | .207 ** |
| Communications with employees | .197 ** |
| Extensive use of cross-functional memberships on projects teams | .190 ** |
| Full-time participation of key practitioners | .187 ** |
| Adequate training/workshops conducted | .158 * |

** -- Indicates correlation is significant at the .01 level
* -- Indicates correlation is significant at the .05 level

**Table 4.8 Correlation Analysis -- Independent Variables and Budget Performance**

| Impediments | Budget Performance |
|---|---|
| Failure to involve middle management early in the project | .194 ** |
| Project lacks senior executive sponsorship | .165 * |
| Reengineered functions rather than processes | -.152 * |
| Too many projects for key team members | -.144 * |

| Prerequisites | Budget Performance |
|---|---|
| Project growth-oriented, not cost-cutting | -.283 ** |
| Project expectations were realistic | .236 ** |
| Adequate budget | .201 ** |
| Firm has a clear vision of project goals | .192 ** |
| Aggressive target(s) set | -.186 ** |
| Sound proactive senior management already in place | .163 * |

** -- Indicates correlation is significant at the .01 level
* -- Indicates correlation is significant at the .05 level

**Table 4.9 Correlation Analysis -- Independent Variables and Project Performance**

| Impediments | Schedule Performance |
|---|---|
| Financial condition of firm not sound | -.237 ** |
| Too many projects for key team members | -.186 ** |

| Prerequisites | Schedule Performance |
|---|---|
| Aggressive target(s) set | -.215 ** |
| Pilot project prior to full implementation | -.171 * |

** -- Indicates correlation is significant at the .01 level
* -- Indicates correlation is significant at the .05 level

**Intercorrelation**

Next, correlation analysis was performed on each independent variable to determine if the independent variables are highly intercorrelated. High intercorrelation among the independent variables can weaken the results of some statistical analysis. If the independent variables are highly intercorrelated, it would be very tenuous to make statements about the importance of these variables based on the results of regression analysis. Williams suggests that r values over .70 are highly correlated.[118] It has been further suggested that pairwise relationships over .80 should be dropped before stepwise regression. There were no pairwise relationships with r values over .80. The highest r value was .749.

**Correlation Analysis -- Independent Variables**

Table 4.10 consists of pair of variables with r values more than .500 extracted from the complete correlation analysis for the independent variables -- prerequisites for success and impediments to success. The full correlation analysis is contained in the Appendix section, Tables A-66 through A-70. Many of the independent variables, both prerequisites and impediments are correlated with some r values over .700. The variables with an * in the column to the left of the variable were dropped due to multicollinearity. A quick review of the r values shows that every pair of variables in Table 4.10 varied positively, except for the last pair listed. The impediment, *"Project too focused on cost-cutting"* has a negative correlation with the prerequisite, "*Project growth-oriented, not cost-cutting*".

[118] Williams, Frederick, Reasoning With Statistics, Harcourt Brace Jovanovich College Publishers, New York, 1991

## Table 4.10 Correlation Analysis -- Independent Variables

| | | | |
|---|---|---|---|
| | Wrong sponsor | | Project lacks senior executive sponsorship .749 |
| | Project lacks senior executive sponsorship | | Management by consensus (lack of strong management .744 |
| | Project lacks senior executive sponsorship | * | Let the consultant do it attitude .738 |
| * | Adequate training/workshops conducted | | Communications with employees .723 |
| | Extensive user involvement in design | | Extensive use of cross-functional memberships on projects teams .716 |
| | Strong senior management commitment/sponsorship | | Sound proactive senior management already in place .701 |
| | Management by consensus (lack of strong management | | Reengineering scaled back due to politics .698 |
| | Management by consensus (lack of strong management | | Project under-financed and/or under-staffed .693 |
| | Failure to measure performance (before, during, and after project) | | Failure to involve middle management early in the project .667 |
| * | Let the consultant do it attitude | | Management by consensus (lack of strong management .641 |
| | Strong senior management commitment/sponsorship | | Firm has a clear vision of project goals .637 |
| | Project under-financed and/or under-staffed | | Project lacks senior executive sponsorship .635 |
| | Wrong sponsor | | Management by consensus (lack of strong management .634 |
| | Extensive use of cross-functional memberships on projects teams | | Sound proactive senior management already in place .628 |
| | Project lacks senior executive sponsorship | | Project too focused on cost-cutting .620 |
| | Strong senior management commitment/sponsorship | | Extensive use of cross-functional memberships on projects teams .598 |
| | Project under-financed and/or under-staffed | | Failure to involve middle management early in the project .591 |
| | Project lacks senior executive sponsorship | | Failure to measure performance (before, during, and after project) .588 |
| | Project lacks senior executive sponsorship | * | Staff driven by fear, lacks optimism .585 |
| | Not focused on strategic value-added processes | * | Staff driven by fear, lacks optimism .581 |
| | Firm has a clear vision of project goals | * | Full-time participation of key practitioners .578 |
| | Extensive user involvement in design | | Communications with employees .574 |
| | Extensive user involvement in design | * | Adequate training/workshops conducted .573 |
| * | Full-time participation of key practitioners | * | Adequate training/workshops conducted .573 |
| * | Let the consultant do it attitude | * | Staff driven by fear, lacks optimism .573 |
| * | Staff driven by fear, lacks optimism | | Animosity towards Information Systems and Human Resources .568 |
| | Extensive use of cross-functional memberships on projects teams | * | Adequate training/workshops conducted .567 |
| | Reengineered functions rather than processes | | Not focused on strategic value-added processes .559 |
| | Firm has a clear vision of project goals | | Sound proactive senior management already in place .559 |
| | Project under-financed and/or under-staffed | | Failure to measure performance (before, during, and after project) .554 |
| | Failure to measure performance (before, during, and after project) | | Reengineering scaled back due to politics .553 |
| | Wrong sponsor | | Reengineering scaled back due to politics .553 |
| | Strong senior management commitment/sponsorship | | Senior executive responsible for the project .551 |
| | Strong senior management commitment/sponsorship | * | Full-time participation of key practitioners .549 |
| | Average performers assigned to the project | | Failure to involve middle management early in the project .547 |
| | Average performers assigned to the project | | Failure to measure performance (before, during, and after project) .541 |
| | Not following detailed methodology | | Project under-financed and/or under-staffed .537 |
| | Project under-financed and/or under-staffed | | Animosity towards Information Systems and Human Resources .534 |
| | Project under-financed and/or under-staffed | | Financial condition of firm not sound .531 |
| | Extensive user involvement in design | | Strong senior management commitment/sponsorship .530 |
| | Management by consensus (lack of strong management | | Failure to measure performance (before, during, and after project) .529 |
| | Project lacks senior executive sponsorship | | Reengineering scaled back due to politics .529 |
| | Project too focused on cost-cutting | * | Staff driven by fear, lacks optimism .526 |
| | Project too focused on cost-cutting | | Average performers assigned to the project .525 |
| * | Adequate training/workshops conducted | * | Pilot project prior to full implementation .524 |
| | Project expectations were realistic | * | Full-time participation of key practitioners .522 |
| | Project expectations were realistic | * | Adequate training/workshops conducted .521 |
| | Wrong sponsor | * | Staff driven by fear, lacks optimism .520 |
| | Project too focused on cost-cutting | | Failure to involve middle management early in the project .517 |
| | Project under-financed and/or under-staffed | * | Let the consultant do it attitude .516 |
| * | Staff driven by fear, lacks optimism | | Crisis as a key driver of the project .513 |
| | Project lacks senior executive sponsorship | | Financial condition of firm not sound .512 |
| | Not following detailed methodology | | Failure to measure performance (before, during, and after project) .511 |
| * | Let the consultant do it attitude | | Project too focused on cost-cutting .508 |
| | Wrong sponsor | | Failure to measure performance (before, during, and after project) .505 |
| | Adequate budget | * | Pilot project prior to full implementation .505 |
| | Wrong sponsor | * | Let the consultant do it attitude .504 |
| | Management by consensus (lack of strong management | * | Staff driven by fear, lacks optimism .504 |
| | Extensive use of cross-functional memberships on projects teams | | Communications with employees .501 |
| | Not following detailed methodology | | Project lacks senior executive sponsorship .500 |
| | Project too focused on cost-cutting | | Project growth-oriented, not cost-cutting -.513 |

**Stepwise Regression Analysis**

When the pool of potential independent variables is large, stepwise regression is recommended in place of regression analysis. Generally, the greater the number of variables, the greater the resultant R, R square, and adjusted R square. As additional variables are added to the model, R square usually increased, even if slightly. Essentially, stepwise regression develops a sequence of regression models, adding or deleting variables until the "best" model is found.

When stepwise regression analysis was performed and the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were checked, there were condition numbers with values greater than 30 indicating that some multicollinearity was present. Three independent variables, those with condition numbers greater than 30, were removed and the process was repeated. The variables dropped were *"Full-time participation of key practitioners"* (prerequisite), *"Staff driven by fear, lacks optimism"* (impediment), and *"Let the consultant do it attitude"* (impediment). Stepwise regression analysis was performed again and the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were checked. There continued to be condition numbers with values greater than 30 indicating that some multicollinearity was still present. Two more independent variables were removed, those with condition numbers greater than 30, and the process was repeated. The variables dropped were *"Pilot project prior to full implementation"* (prerequisite) and *"Adequate training/workshops conducted"* (prerequisites). Stepwise regression analysis was performed again and the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were within the acceptable range, indicating that multicollinearity was no longer present.

Tables 4.11 through 4.13 list the important variables identified by the stepwise regression analysis, in predicting Project Success, Project Budget Performance, and Project Schedule Performance. The standardized beta coefficient is also listed for each variable. The standardized beta coefficient is interpreted as showing which independent variables have a greater impact on the dependent variable. The iterative stepwise regression analysis and multicollinearity diagnostics are contained in the Appendix, Tables A-1 through A-57.

**Table 4.11 Stepwise Regression Analysis -- Project Success**

| Project Success | Standardized Beta Coefficient |
|---|---|
| Failure to measure performance (before, during, and after project) | 0.529 |
| Project under-financed and/or under-staffed | -0.580 |
| Not focused on strategic value-added processes | -0.500 |
| Significant portion of CEO's time committed to project | -0.490 |
| Sound proactive senior management already in place | 0.456 |
| Senior executive responsible for the project | 0.421 |
| Strong senior management commitment/sponsorship | -0.379 |
| Average performers assigned to the project | -0.309 |
| Project growth-oriented, not cost-cutting | -0.280 |
| Project expectations were realistic | 0.240 |
| Management by consensus (lack of strong management | 0.223 |
| Not following detailed methodology | 0.159 |
| Aggressive target(s) set | 0.157 |
| Animosity towards Information Systems and Human Resources | 0.148 |
| Wrong sponsor | 0.144 |

**Table 4.12 Stepwise Regression Analysis -- Project Budget**

| Project Budget | Standardized Beta Coefficient |
|---|---|
| Sound proactive senior management already in place | 0.435 |
| Failure to involve middle management early in the project | 0.391 |
| Too many projects for key team members | -0.353 |
| Adequate budget | 0.328 |
| Project growth-oriented, not cost-cutting | -0.285 |
| Reengineered functions rather than processes | -0.241 |
| Project too focused on cost-cutting | 0.238 |
| Aggressive target(s) set | -0.219 |
| Reengineering scaled back due to politics | -0.200 |
| Financial condition of firm not sound | 0.183 |
| Wrong sponsor | 0.138 |

**Table 4.13 Stepwise Regression Analysis -- Project Schedule**

| Project Schedule | Standardized Beta Coefficient |
|---|---|
| Financial condition of firm not sound | -0.422 |
| Too many projects for key team members | -0.271 |
| Aggressive target(s) set | -0.251 |
| Management by consensus (lack of strong management | 0.214 |
| Reengineered functions rather than processes | 0.194 |
| Animosity towards Information Systems and Human Resources | 0.172 |

### Stepwise Regression – All Variables versus Separate Variables

The results shown in Tables 4.11 through Table 4.13 were produced by stepwise regression using all independent variables, both prerequisites and impediments combined. However, the research hypothesis, as stated below, specifically separates prerequisites and impediments. When stepwise regression is run separately for prerequisites and impediments, the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were within the acceptable range, indicating that multicollinearity was not present. The stepwise regression analysis and multicollinearity statistics are presented in the Appendix. Tables 4.14 through 4.16 list the prerequisites in the order of their ability to contribute to the overall prediction of Project Success, Project Budget Performance, and Project Schedule Performance. Tables 4.17 through 4.19 list the impediments in the order of their ability to contribute to the overall prediction of Project Success, Project Budget Performance, and Project Schedule Performance. Results of the stepwise regression analysis are contained in the Appendix, Tables A-71 through A-84.

**Table 4.14 Stepwise Regression Analysis Prerequisites -- Project Success**

| Project Success | Standardized Beta Coefficient |
|---|---|
| Sound proactive senior management already in place | 0.563 |
| Significant portion of CEO's time committed to project | -0.474 |
| Senior executive responsible for the project | 0.337 |
| Strong senior management commitment/sponsorship | -0.264 |
| Pilot project prior to full implementation | -0.151 |

**Table 4.15 Stepwise Regression Analysis Prerequisites -- Project Budget**

| Project Budget | Standardized Beta Coefficient |
|---|---|
| Project growth-oriented, not cost-cutting | -0.404 |
| Firm has a clear vision of project goals | 0.284 |
| Project expectations were realistic | 0.258 |
| Extensive user involvement in design | -0.248 |
| Adequate budget | 0.194 |
| Significant portion of CEO's time committed to project | 0.159 |
| Aggressive target(s) set | -0.134 |

**Table 4.16 Stepwise Regression Analysis Prerequisites -- Project Schedule**

| Project Schedule | Standardized Beta Coefficient |
|---|---|
| Aggressive target(s) set | -0.215 |

**Table 4.17 Stepwise Regression Analysis Impediments -- Project Success**

| Project Success | Standardized Beta Coefficient |
|---|---|
| Project lacks senior executive sponsorship | 0.509 |
| Project under-financed and/or under-staffed | -0.504 |
| Not focused on strategic value-added processes | -0.379 |
| Financial condition of firm not sound | -0.314 |
| Not following detailed methodology | 0.283 |
| Failure to involve middle management early in the project | 0.223 |
| Information Management (IT) viewed as driver of project, not the enabler | -0.178 |

**Table 4.18 Stepwise Regression Analysis Impediments -- Project Budget**

| Project Budget | Standardized Beta Coefficient |
|---|---|
| Management by consensus (lack of strong management | -0.559 |
| Reengineering scaled back due to politics | 0.540 |
| Financial condition of firm not sound | 0.509 |
| Failure to involve middle management early in the project | -0.409 |
| Not focused on strategic value-added processes | -0.388 |
| Too many projects for key team members | 0.336 |
| Let the consultant do it attitude | -0.280 |
| Project lacks senior executive sponsorship | 0.230 |
| Failure to measure performance (before, during, and after project) | -0.206 |

**Table 4.19 Stepwise Regression Analysis Impediments -- Project Schedule**

| Project Schedule | Standardized Beta Coefficient |
|---|---|
| Too many projects for key team members | -0.736 |
| Reengineered functions rather than processes | 0.666 |
| Failure to involve middle management early in the project | -0.469 |
| Staff driven by fear, lacks optimism | 0.365 |
| Let the consultant do it attitude | 0.352 |
| Reengineering scaled back due to politics | 0.342 |
| Project lacks senior executive sponsorship | -0.321 |
| Not focused on strategic value-added processes | -0.303 |
| Failure to measure performance (before, during, and after project) | -0.221 |

## Research Hypothesis

Based on the literature reviewed in the previous sections, two sets of research variables were identified: preconditions for success or failure in reengineering projects and the outcome of these projects. The preconditions for success or failure consisted of prerequisites for success and impediments to success in reengineering projects. The outcome of the projects consisted of project success (or failure), project budget performance, and project schedule performance. Hence, we can expect:

$H1a_0$: There will be no relationship between the prerequisites for success and the outcome of reengineering projects.

$H1b_0$: There will be no relationship between the impediments to success and the outcome of reengineering projects.

$H2a_0$: There will be no relationship between the prerequisites for success and the project budget performance of reengineering projects.

$H2b_0$: There will be no relationship between the impediments to success and the project budget performance of reengineering projects.

$H3a_0$: There will be no relationship between the prerequisites for success and the project schedule performance of reengineering projects.

$H3b_0$: There will be no relationship between the impediments to success and the project schedule performance of reengineering projects.

## Regression Analysis – Independent Variables/Dependent Variables

Regression analysis was performed on the survey data to determine if a relationship exists between the independent variables (prerequisites for success or impediments to success) and the dependent variables (Project Success, Project Budget Performance, and Project Schedule Performance). A significant positive relationship was found between all sets of variables. Therefore, all null hypotheses $H1a_0$, $H1b_0$, $H2a_0$, $H2b_0$, $H3a_0$ and $H3b_0$ are rejected. Results of the regression analyses are found in Table 4.20. The full results of the regression analyses are presented in the Appendix.

**Table 4.20 Regression Analysis – Independent Variables/Dependent Variables**

| Research Hypotheses | | | |
|---|---|---|---|
| **Independent Variables** | **Dependent Variable** | **Adjusted r square** | **Significance** |
| Prerequisites | Project Success | 0.407 | 0.0000 |
| Prerequisites | Project Budget | 0.334 | 0.0000 |
| Prerequisites | Project Schedule | 0.142 | 0.0002 |
| Impediments | Project Success | 0.273 | 0.0000 |
| Impediments | Project Budget | 0.344 | 0.0000 |
| Impediments | Project Schedule | 0.390 | 0.0000 |

**Analysis Summary**

The first statistical test was to determine the mean of the dependent variables. The overall mean project success was 3.24 indicating that reengineering projects were viewed as mildly successful. The overall mean Project Budget Performance was 3.21. The overall mean Project Schedule Performance was 3.47. This indicates, in general, that reengineering projects were slightly behind schedule and slightly over budget. The project schedule slippage was somewhat greater than the project budget overrun.

The second statistical test was to determine the mean of the independent variables. Based on the mean for all respondents, the three most important prerequisites for success as they applied to the respondent's reengineering project(s) were *"Strong senior management commitment/sponsorship"*, *"Aggressive target(s) set"*, and *"Senior executive responsible for the project"*. Based on the mean for all respondents, the three most important impediments to success as they applied to the respondent's reengineering project(s) were: *"Too many projects for key team members"*, *"Reengineered functions rather than processes"*, and *"Not focused on strategic value-added processes"*. Overall, the mean for the prerequisites for success, 3.15, were lower than the mean for the impediments to success, 4.71. If based solely on the mean, prerequisites are viewed as more important to reengineering projects than impediments.

The third statistical test was to perform correlation analysis. There is a significant correlation as measured by the Pearson Correlation Coefficient between the dependent variables and many of the independent variables, both prerequisites and impediments.

Many of the independent variables, both prerequisites and impediments were highly correlated with some r values over .700. High intercorrelation among the independent variables can weaken the results of some statistical analysis and results from stepwise regression analysis cannot be used to make statements about the ranking of the most important variables. Further, stepwise regression cannot be used to determine what set of variables best predict project success, project budget performance, or project schedule performance. Stepwise regression analysis with multicollinearity diagnostics was run and three variables were identified for exclusion from the model. Stepwise regression analysis with multicollinearity diagnostics was run for the second time and two additional variables were identified for excluding from the model. When all five variables were removed, stepwise regression analysis was again performed, and the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were within the acceptable range, indicating that multicollinearity was no longer present. The stepwise regression analyses described above were produced combining both prerequisites and impediments. The research hypothesis specifically separated prerequisites and impediments, rather than combining them. When stepwise regression was run separately for prerequisites and impediments, the resultant variance inflation factors (VIFs), Eigenvalues, and condition numbers were within the acceptable range, indicating that multicollinearity was not present.

The fourth statistical test was to perform regression analysis in order to test the hypotheses. Regression analysis was performed to determine if a relationship exists between some of the independent variables and the dependent variables. Relationships existed for all set of variables and all hypotheses were rejected.

# CHAPTER V

# DISCUSSION AND CONCLUSIONS

This chapter contains five sections. The first section examines the independent variables. The second section discusses the implications of the research. The third section projects future research opportunities. The fourth section details limitations of the research. The final section summarizes the overall findings.

## Discussion of the Variables

This section presents a discussion of the independent variables. The results of the stepwise regression can also be displayed by the type of independent variable, prerequisite or impediment, in a matrix format. In this manner, we can see whether any independent variable is considered important to more than one dependent variable.

### Combined Independent Variables Matrix

The results of the stepwise regression produced when all independent variables are combined are displayed in Table 5.1. When displaying the results in this format, only one variable, the prerequisite *"Aggressive target(s) set"* affects all three dependent variables significantly. Eight of the independent variables affect two of the three dependent variables. Most of the impediments and prerequisites that affected two variables were management and cost/project related. Survey participants were extremely concerned over management commitment, cost and budgets, and realistic project schedule. They share the concerns of many project participants, management that shows up for the project kickoff with the free lunch and dinner and then quickly disappears. Unless the top management of the company is involved in the project and take charge to obtain proper funding and a realistic schedule the project can be headed for failure. Survey participants were very concerned over underfunded projects with a backbreaking schedule. Twelve of the independent variables affect only one of the three dependent variables. Only eight of the sixteen prerequisites (50%) affected the dependent variables. In comparison, fourteen of the eighteen impediments (78%) affected the independent variables.

**Table 5.1 Combined Independent Variable Matrix**

| Impediments | Project Success | Project Budget | Project Schedule |
|---|---|---|---|
| Reengineered functions rather than processes | | X | X |
| Not focused on strategic value-added processes | X | | |
| Not following detailed methodology | X | | |
| Project under-financed and/or under-staffed | X | | |
| Wrong sponsor | X | X | |
| Project too focused on cost-cutting | | X | |
| Management by consensus (lack of strong management | X | | X |
| Financial condition of firm not sound | | X | X |
| Too many projects for key team members | | X | X |
| Animosity towards Information Systems and Human Resources | X | | X |
| Average performers assigned to the project | X | | |
| Failure to measure performance (before, during, and after project) | X | | |
| Reengineering scaled back due to politics | | X | |
| Failure to involve middle management early in the project | | X | |

| Prerequsites | Project Success | Project Budget | Project Schedule |
|---|---|---|---|
| Strong senior management commitment/sponsorship | X | | |
| Project expectations were realistic | X | X | |
| Project growth-oriented, not cost-cutting | X | X | |
| Sound proactive senior management already in place | X | X | |
| Adequate budget | | X | |
| Aggressive target(s) set | X | X | X |
| Significant portion of CEO's time committed to project | X | | |
| Senior executive responsible for the project | X | | |

### Separate Independent Variables Matrix

The results of the stepwise regression produced when all independent variables are combined are displayed in Table 5.2. When displaying the results in this format, three variables affect all three dependent variables significantly. All three variables were impediments covering diverse concerns. The three impediments were *Failure to involve middle management early in the project*, *Project lacks senior executive sponsorship*, and *Not focused on strategic value added processes.* Eight of the independent variables affect two of the three dependent variables. Fourteen of the independent variables affect only one of the three dependent variables. Eleven of the sixteen prerequisites (69%) affected the dependent variables. In comparison, fourteen of the eighteen impediments (78%) affected the independent variables.

**Table 5.2 Separate Independent Variable Matrix**

| Impediments | Project Success | Project Budget | Project Schedule |
|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | | | X |
| IMPED02 Not focused on strategic value-added processes | X | X | X |
| IMPED03 Not following detailed methodology | X | | |
| IMPED04 Project under-financed and/or under-staffed | X | X | |
| IMPED06 Project lacks senior executive sponsorship | X | X | X |
| IMPED07 Let the consultant do it attitude | | X | X |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | X | | |
| IMPED10 Management by consensus (lack of strong management) | | X | |
| IMPED11 Financial condition of firm not sound | X | X | |
| IMPED12 Too many projects for key team members | | X | X |
| IMPED13 Staff driven by fear, lacks optimism | | | X |
| IMPED16 Failure to measure performance (before, during, and after project) | | X | X |
| IMPED17 Reengineering scaled back due to politics | | X | X |
| IMPED18 Failure to involve middle management early in the project | X | X | X |

| Prerequisites | Project Success | Project Budget | Project Schedule |
|---|---|---|---|
| PREREQ01 Extensive user involvement in design | | | X |
| PREREQ02 Strong senior management commitment/sponsorship | X | | |
| PREREQ03 Project expectations were realistic | | | X |
| PREREQ05 Project growth-oriented, not cost-cutting | | | X |
| PREREQ06 Firm has a clear vision of project goals | | | X |
| PREREQ07 Sound proactive senior management already in place | X | | |
| PREREQ09 Adequate budget | | | X |
| PREREQ12 Aggressive target(s) set | | X | X |
| PREREQ13 Significant portion of CEO's time committed to project | X | | X |
| PREREQ14 Senior executive responsible for the project | X | | |
| PREREQ15 Pilot project prior to full implementation | X | | |

### Prerequisites for Success of Importance

Listed below are the prerequisites for success considered important based on the stepwise regression analysis.

**Extensive User Involvement in Design** Computer systems designed entirely by information systems professionals are not adequate and require rework and redesign. Traditionally, users are busy individuals. Key users are even busier. Although the success of a project is very dependent upon extensive user involvement in the design of the system, this

is not always possible. The users needed are too busy. The users offered are not the proper users required. Deadlines do not shift and information systems professionals use everything at their disposal – trade magazines, books, professional society literature, and past experiences to arrive at a design. In many cases, it still falls short of an adequate design.

**Strong Senior Management Commitment/Sponsorship** The influence that strong senior management brings to the reengineering project is very similar to the authority that the CEO brings to the project. However, strong senior management does not necessarily mean that the committed senior manager will spend a significant amount of time on the project. If the project needs additional resources or a higher priority, senior management can obtain these for the project manager. A project receives many benefits from being associated with the CEO such as requests for extra staffing and favorable outcomes when conflicts arise over priority. These benefits are also present when the project has strong senior management commitment and sponsorship.

**Realistic Project Expectation** Realistic project expectations are target dates that are achievable, increased revenues that can be met, and improvement in operating ratios that are reachable. When the expectations are not realistic, project goals, schedules, and budgets are seldom met. Roger Bannister's expectation or target of a four-minute mile was aggressive but realistic and he obtained that goal, although he collapsed at the finish. A target of three minutes and fifty seconds was not realistic at that time and was not obtained until years later. The three minutes and fifty second mile is now being surpassed, with the three minutes and forty seconds mile only a few seconds away. Runners are clocking these times with enough stamina left to run a victory lap carrying their country's flag. Advances in training, conditioning, shoe design, and clothing have help cut seconds off the timings and have made the three minute and fifty seconds time a common occurrence today. Advances in technology have allowed managers to change processes. The new processes have enabled firms to lower inventory, increase turns, and increase service to levels previously not attainable.

**Project growth-oriented, not cost-cutting** The main reason this prerequisite is important is the employee cooperation that this obtains. When employees know their jobs are secure, they are open with information and cooperation. When these same employees feel their jobs are in jeopardy, many will look for and obtain new jobs, leaving a job vacuum. If they stay, they will be uncooperative, providing false or misleading information about job processes. In the worst scenario, employees who feel threatened will sabotage existing systems and perform substandard work affecting plant and service performance.

**Firm Has a Clear Vision of Project Goals** The first step in the development of a project plan is to define the purpose and scope of the proposed system. The scope contains the boundary of the proposed system. It defines what is to be included. It also defines what is to be excluded. It also states why the system is being developed. It defines the business problem the system is addressing. Using the purchasing example, the purpose of the project is to develop a purchasing system for both production and non-production materials used at the manufacturing plants. The scope of the system includes manufacturing plants only. The system excludes purchase orders for office supplies, janitorial supplies, computer hardware and software. The new purchasing system is being developed to replace the current system, which is inadequate for current plant requirements.

**Sound Proactive Senior Management Already in Place** Organizations perform well in all tasks when able leaders guide them. When sound proactive senior management is in place, the organization functions as a team. Day to day activities are performed well. Additional tasks, such as a reengineering project, are handled in stride with minimal disruptions. Staffs were not burned out and made bitter by having their normal fifty-hour weeks turned into eighty-hour week marathons. Projects completed by teams working together are viewed as a success. The management style of senior executives is critical. Senior managers can be active or passive. They can be active attendees in regular scheduled project meetings. They can take steps to assist the project team at the request of the project manager. They can take steps to save an ailing project by replacing the project manager, if the project is not being managed properly. They can also be passive attendees at

less frequent project meetings. Infrequently scheduled project meetings can result in poorly managed projects that drift out of control. Passive senior management allow projects to succeed or to drift, taking little or no action in the latter case. Their only involvement is to either reward the project manager if the project is successful or punish the project manager if the project failed.

**Adequate Budget** An adequate budget is one of the keys to success in a project. When the budget is adequate, project team members feel that management is actually committed to the project. Management's statements about the importance of the project are empty words when they fail to provide an adequate budget. Project team members feel that management is not really committed to the project. When an adequate budget is provided, it means that travel to plant and warehouse sites by project team members can be made. Project interviews can be made face to face, rather than by telephone. Site assessments can be performed by a professional, rather that the professional walking a novice through the procedure over the telephone. Project software, tools, and training can also be provided. All of these contribute to a successful project, delivered on time and within budget.

**Aggressive Target(s) Set** The selection of a proper target date is very important to the success of the project. When an aggressive, hard to reach, but attainable target is set, the project team responds with a commensurate effort and project performance is optimum. When the target is unnecessarily aggressive and not attainable, the project team responds with a defeatist attitude. Project schedule performance is poor. When the team feels the target is unattainable, a missed due date becomes a self-fulfilling prophecy. When the target date is not aggressive and a country club attitude exists, the project team often responds with a whimsical attitude. Bad practices are established. Easy to reach milestones are missed. Eventually the target date is missed.

**Significant Portion of CEO's Time Committed to Project** When a CEO devotes a significant portion of time to a reengineering project or any other project, the entire organization senses the importance of the project. The CEO does not spend time on the easiest projects. The CEO selected the project because of the importance of the project to

the firm. The best staff is usually assigned to the CEO's project. Conflicts over resources between projects are usually settled in favor of the CEO's project. CEO's projects are difficult. They may slip due to their difficulty. CEO's projects are important. Requests for extra staff and materials for the CEO's projects are usually approved quickly. However, CEO's projects are usually implemented successfully even if over budget and past the scheduled target date. The general view of the firm towards the CEO's project is that the project was a success. However, based on the survey, respondents in general felt that the CEO does not have to devote a significant portion of time to a reengineering project to insure the success of the project. A reengineering project may not always benefit from significant portions of the CEO's time, depending on the style of the CEO. Senior executives, who interface with the CEO on a normal basis, are strong self-confident seasoned individuals with the ability to work well with any managerial style. Many CEOs are strong aggressive managers and their managerial style can intimidate lower-level project members and affect the project negatively.

**Senior Executive Responsible for the Project** Any project having a senior executive responsible for the project will benefit from the attention received from this executive. If the project needs additional resources or a higher priority, the executive can obtain these for the project manager. Many of the benefits a project receives from being associated with the CEO are also true of a project having a senior executive responsible for the project. The senior executive either was assigned to the project or took special interest in the project because of the importance of the project to the firm. Requests for additional staff or funds for these important projects are usually approved quickly.

**Pilot Project Prior to Full Implementation** The pilot project is a miniature version of the complete or full project. It could affect only one product line instead of all products. It could affect a portion of a plant instead of the whole plant. This smaller version of the project allows the project team to provide better implementation coverage. The project team can better assist in the identification and resolution of startup problems. The pilot project allows the project team to observe gaps in the reengineering pilot project design. The problems can be fixed before full implementation. The gap can be filled before full implementation. Rework

is much easier and faster when it affects a pilot. However, pilot projects are not always feasible. Conditions at the implementation site, plant or distribution center, or design constraints affecting the reengineered process can prevent a pilot. When a pilot is not feasible, conversion and startups are more difficult, but the problems that this presents are not insurmountable. Many are preventable.

**Impediments to Success of Importance**

Listed below are the impediments to success considered to be important based on the stepwise regression analysis.

**Reengineered Functions Rather than Processes** Traditionally, businesses are comprised of departments which perform business functions. These departments pass information and/or goods to another department. The receipt of a customer order by the sales department triggers a complete series of events. Manufacturing requisitions the raw material. The purchasing department issues the purchase order for raw material. The vendor ships the raw material. Manufacturing receives the raw material. Manufacturing produces and ships the finished goods to fulfill the customer order. Meanwhile, the vendor invoices the company for the raw material. The accounting department pays the invoice. The accounting department in most firms has long matched purchase requisitions, purchase orders, receiving notifications, and vendor invoices to authorize and produce a payment for the material received. Information systems professionals have developed computer systems to automate these functions. Bar codes were added to documents to speed the input of data and reduce errors. Data passed between purchasing systems, manufacturing systems, and accounting systems. The accounting department (accounts payable) cross-checked the computerized requisition, the computerized purchase order, the computerized receipt, and the paper invoice to authorize payment. Sometimes the invoice and the payment are automated. Many times the computer screen was split to show all documents at the same time. The cow paths were not only paved; a six-lane highway was built. The process could have been modified to automatically pay the vendor when the material was received, eliminating the filing of documents, extracting documents from these files, cross-checking of these documents, and

subsequent re–filing of these documents. Controls, built into the process, could prevent fraudulent payments.

We have just described how an organization modified (reengineered) a process. The process crossed departments (functions). Since processes are performed by these departments (functions), many individuals in organizations too often confuse processes and departments (functions). When they do, these organizations try to reengineer a department or a function. However, a department (function) is merely a collection of individuals. Reengineering, properly done affects processes, not departments. Ideally, they process is broad, crossing multiple departments or functions.

**Not Focused on Strategic Value-Added Processes** The selection of the proper reengineering project is very important to the success of the project. Reengineering projects are often selected because of their impact on the bottom line. The impact on the bottom line is quickest when personnel are eliminated. When the driving force behind the reengineering project is to reduce cost, the user's opinion of the project suffers. One of the highest costs in a process is labor. When labor costs are reduced, the direct result is a reduction in the labor force. Many of the user community, even when their jobs are spared, take little satisfaction working on a project that reduces the labor force. Ideally, the focus of the reengineering projects should be strategic value-added processes. Strategic value-added processes generally result in increasing revenue or increasing customer service. Increased customer service can also result in increased revenue. When the driving force is to increase revenue or to improve customer service, the view of the project is good. Both of these driving forces are viewed as derivatives of value-added processes.

**Not Following Detailed Methodology** Most reengineering projects can be based on a model. Very few reengineering projects are completely new or unique. The base model is a compilation of generalized tasks required to complete a project. The model is a roadmap. While we may not need a map to cross town, we do need one if our destination is many states away. Small or short projects may not require a rigorous methodology and project plan. However, the typical reengineering project encompasses multiple organizations, is highly

complex, and spans months rather than days. Often the project can span years. There are model and methodologies to follow. They will help the project manager arrive on time and within budget.

**Project Under-Financed and/or Under-Staffed** An adequate budget is one of the major keys to success in a project. When the budget is adequate project travel, staff training, and clerical support are included. These important items are sometimes eliminated from a tightly budgeted project. An inadequate budget cannot be compared to an aggressive target date. It is not something for the project team to strive to attain. It is not something that is attainable. It is the major reason for poor project budget performance.

**Wrong Sponsor** The wrong sponsor is someone on the organization that is a senior executive nearing retirement and is coasting, lacking the initiative to lead a project. The wrong sponsor is also a senior staff executive who has little line experience, especially in the area that is being reengineered.

**Project Lacks Senior Executive Sponsorship** Sponsorship by a senior executive is critical to the success of a project. Projects having a senior executive as a sponsor for the project will benefit from the attention received from this executive and the respect received by members of the project. When the project needs additional resources or a higher priority, the executive sponsor can obtain these for the project manager.

**Let The Consultant Do It Attitude** Successful projects are not accidents. They are the result of teamwork by individuals on the project team. When the team has an attitude that will allow project work to be completed by the consultant, the team lacks the desire required to meet an aggressive schedule. Consultants are advisors. Consultants are knowledge providers. Consultants are catalysts. Consultants are not individual contributors to a project. When the consultant performs project work, the internal staff will not gain the knowledge or experience to do this task the next time it is required. However, the practitioners surveyed do not feel that this is an important impediment to success. We can only speculate on the reason. It could be that the respondents have not observed this attitude

or their firms do not allow consultants to perform project work. It could also be that the respondents do not feel that work performed by consultants does not prevent future success.

**Project Too Focused on Cost-Cutting** Projects that are too focused on cost-cutting do not gain the support of the project team or the user community. Too often, the user community knows that cost cutting may involve job cutting. Users are reluctant to describe what they do or how they do their job. They feel that cooperation with the project team provides the information needed to eliminate their job.

**Information Management (IT) Viewed as Driver of Project , Not as Enabler** Technology is too often viewed as the driver of the project, not the enabler. RF technology allows for entry of data where the transaction occurs, not from a fixed location restricted by cables. Less warehouse workers can be required when this technology is used. The technology is the enabler, allowing warehouse managers to make changes to the process. The changed process can require fewer workers to perform the same amount of work. The reduction in costs and improved input with less errors are the driver of the project.

**Management by Consensus - Lack of Strong Management** Strong leadership and direction are required to move a project from start to finish. Project Management is even more difficult when there is an aggressive target set. When a committee controls the project, project slippage and budget overrun will be the probable outcome. No single individual is responsible. Slow decisions, made by committee, can slow the momentum of a project.

**Financial Condition of Firm Not Sound** There is not a better way to rally a work force than when the corporation is in a turnaround situation and trying to reverse corporate misfortunes. This situation is considered a threat to an employee's existence. When the financial condition of a firm is not sound, employees fear the loss of extra benefits their years of service have earned. They fear the loss of retirement benefits they may have accrued. They even fear the loss of employment. When the financial condition of the firm is not sound, most employees are willing to work extra hours without complaint. They are willing to make the extra effort to do an excellent day to day job and learn the new processes to make the reengineering project successful. This extra effort will result in a superior project schedule

performance. This will allow for the increased revenue or reduced cost or both to start sooner, improving the financial condition of the firm. Therefore, when the financial condition of a firm is not sound, it is not considered an impediment to success.

**Too Many Projects for Key Team Members** Key project team members are usually important members of their department. Ideally, they are excused from day-to-day job duties and assigned full-time to this special reengineering project until the implementation is complete. Too often, they keep their current assignment and become members of multiple special projects. Many sample implementation plans advise that the implementation project manager be assigned full time to the project. Full time implies that the project manager be relieved of other day-to-day duties. These sample plans also recommend that the project manager be an employee from the department affected by the implementation, not from the information systems or data processing department. Some suggest that the department manager assume the responsibility of implementation manager. However, the department manager is usually considered such a key employee that the manager is given both jobs. In some cases, with multiple projects, the manager is expected to manage a department and two projects. We are all very familiar with the advice that the best person to assign to a task is a busy person. That individual will somehow find the time to complete the additional task. The busy individual is the perfect candidate to add to your team. However, when the saturation point is reached, deadlines on the special projects are missed and performance on the day-to-day assignments starts to slip. Both the new projects and the current business are put in jeopardy. The ultimate problem can occur when the busy individual decides that the intense work schedule is too burdensome and seeks employment elsewhere.

**Staff Driven by Fear, Lacks Optimism** The main reason reengineering projects are initiated is to reduce cost, increase revenue or both reduce costs and increase revenue. If the project increases the value-added services offered by the firm, staffs are optimistic. Increased business is good. Profits may increase. Raises may be better. Even bonus plans may be better, If the project reduces costs only, staffs are fearful. Will they lose

their job? Will they be transferred? Staffs driven by fear do not perform well. They will spend much of their productive energy dwelling over their possible fate and discussing it.

**Animosity towards Information Systems and Human Resources** There is a core belief held by operational personnel in many traditional firms. This belief is that both information systems personnel and human resources cannot be trusted. Both organizations are normally affiliated with the corporate organization and are perfect examples of the individuals from corporate who are here to help you. When they finish their assignment and return to corporate, the operational organization has fewer staff and more job duties to perform.

**Average Performers Assigned to the Project** Results derived from a reengineering project are only as good as the personnel assigned to the project. This is especially critical for the key positions on the project team. These key positions include the system designer or architect and the project manager. When the personnel assigned are average performers, the quality of the system suffers. There is also impact on the project budget and project schedule as average performers take longer to do the same work as above average or superior performers.

**Failure to Measure Performance - Before, During, and After Project** Reengineering projects center around modifying business processes. If properly designed, the reengineered business process should benefit the organization by reducing cost, improving service, or bettering the business in some tangible way. The only real way to know the benefit of the reengineering project is to measure the process being reengineered. How long does it take to process an order? How long does it take to pick an item from inventory? How long does it take to find the exact status of an order or shipment? If we measure these processes before the reengineering project, we can again measure after the project is complete and determine the real benefit of the project.

**Reengineering Scaled Back Due to Politics** Reengineering projects cross multiple functions or departments. Small reengineering projects cross only a few departments. Large reengineering projects can cross many departments. Certain departments or organizations

resist reengineering projects because the project could increase the workload or responsibility in a given department. It could also decrease the department staff size. An increase in workload or responsibility can make a department manager and staff vulnerable to a sub-standard performance. A decrease in staff size reduces the relative importance of the department manager. The manager may fight or resist the reengineering project. If the manager is powerful enough, the department may be removed from the scope of the project.

**Failure to Involve Middle Management Early in the Project** Historically, one of the biggest problems with change is barriers created from organizations or individuals not included in the decision to undertake a new project. If the idea was not invented here, by the organization or individual excluded, then the idea is not worth the time and effort required. Top management and senior executives of the firm set the direction. Middle management of the firm acts to insure that the day-to-day activities of the firm are completed. Middle management also makes sure that special tasks, such as a reengineering project, are completed on schedule and within budget. Without middle management's attention, projects drift and are completed behind schedule and over budget.

## Managerial Implications

This research has one strong message for managers. Managers are usually willing to adjust their techniques for managing projects if the adjustments will provide a better chance of success. Managers now have an opportunity to field test and verify the findings of this research. Previous articles and research provided a large list of prerequisites to success and impediments to success. These lists of 16 prerequisites and 18 impediments made the difficult job of a project manager even more difficult. Are all prerequisites required? Should all impediments be removed before the project start date? If all prerequisites and impediments cannot be accommodated, which one can be skipped? Which prerequisites and impediments should the project manager concentrate on in the project? The original list of 34 has now been shortened to a more manageable list, although still sizeable.

## Suggestions for Future Research

The scope of this research was the determination of the important prerequisites for success and impediments to success in reengineering projects at firms classically categorized as logistics firms. Beyond this limited scope of reengineering projects initiated at logistically sensitive firms, an examination of other types of projects at logistics firms and projects at other type of firms would be warranted. Do the same prerequisites and impediments apply to information systems projects? Do the same prerequisites and impediments apply to engineering projects? Beyond the limited scope of firms classically categorized as logistics firms, an examination of other firms would also be warranted. Do the same prerequisites and impediments apply to other types of firms, such as financial firms, medical establishments, government, and non-profit organizations?

There was no attempt to determine if the firms who initiated reengineering projects fared better because of their projects than their counterparts who did not initiate reengineering projects. Certainly, not all improvements in sales dollars, profits, and other important indicators of performance could be attributed to reengineering. However, is the type of firm who initiates reengineering projects actually a business leader more likely to improve performance than their counterpart?

CEOs are very busy individuals. What constitutes a typical workweek for a CEO? If 10% to 50% of a CEO's time is devoted to reengineering projects, what duties were dropped or ignored. Has the workweek of the CEO increased as a result of reengineering projects? Did corporate performance indicators drop during the reengineering project or before the reengineering project implementation because of the CEO's involvement?

Are prerequisites considered more important to project success? Based on the Likert scale, the mean of the prerequisites were considerably lower (applied more to the project) than the mean of the impediments.

This research had a complex array of independent variables. It would be useful to determine whether they could have been combined into fewer, more basic variables. For example, one might find that the prerequisites *"Strong senior management*

*commitment/sponsorship"* and *"Sound proactive senior management already in place"* and the Impediment *"Project lacks senior executive sponsorship"* could be combined into one overall variable of "senior management". Factor analysis could be used to make this analysis.

**Limitations**

The research is based on questionnaires received from 285 respondents. There are general limitations of conducting empirical research through mail questionnaires and interpreting the results of such studies. These limitations are sample related and survey response related. While this is a sizeable and comprehensive database, the results may not be statistically representative of all firms. Because of the selection methodology used for the mailing of the questionnaire, all the firms that completed the survey were logistically sensitive. Due to their membership in APICS and CLM by over 40% of the respondents, these respondents are probably above average in adopting new techniques, such as reengineering. In fact, almost 90% of the APICS and CLM respondents worked for firms that had initiated reengineering projects. The balance of the respondents, CEOs and their subordinates worked for firms that had initiated reengineering projects only slightly over 60%. Response rates vary with the nature of the survey and the length and complexity of the questionnaire used. The response rate of this survey was 28.5%, 285 responses received from 1000 surveys mailed. Generalizations and interpretations that develop from this research should be gauged considering this limitation.

**Summary of Findings**

This research found that there was a relationship between project success in reengineering projects and prerequisites for success and impediments to success. This research further found that there was also a relationship between project schedule performance and project budget performance in reengineering projects and prerequisites for success and impediments for success. Further analysis of these relationships resulted in the development of a short list of the most important prerequisites and impediments.

The most important prerequisites to success and impediments to success based on their ability to contribute to the overall prediction are listed in Table 5.3.

**Table 5.3 Most Important Prerequisites and Impediments**

| Most Important Impediments |
|---|
| Reengineered functions rather than processes |
| Information Management (IT) viewed as driver of project, not the enabler |
| Financial condition of firm not sound |
| Failure to involve middle management early in the project |
| **Most Important Prerequisites** |
| Project expectations were realistic |
| Project growth-oriented, not cost-cutting |
| Sound proactive senior management already in place |
| Aggressive target(s) set |
| Significant portion of CEO's time committed to project |

Managers now have an opportunity to field test and verify the findings of this research. The list of 34 prerequisites to success and impediments to success developed mainly from the work of consultants has now been shortened to a manageable list. The scope of this research was the determination of the most important prerequisites for success and impediments to success in reengineering projects at firms classically categorized as logistics firms. Beyond this limited scope of reengineering projects initiated at logistically sensitive firms, an examination of other types of projects and other type of firms would be warranted.

# REFERENCES

Alter, Allan, Japan, Inc. Embraces Change, Computerworld, March 7, 1994.

Alter, Allan E., Re-engineering Tops List Again, Computerworld, February 6, 1994.

American Production and Inventory Control Society 1995 Calendar of Learning Opportunities

Anonymous, Is The Re-engineering ERA Over? No Way, Say CFOs, Computerworld, May 8, 1995

Anonymous, Realizing Technology's Strategic Potential, Consumer Goods, Fall, 1998.

Anonymous, Aligning Technology and Corporate Goals is Top I/S Issue Worldwide in Tenth Annual CSC Study, CSC Website.

Anonymous., Best Practices Report for Reengineering and Business Process Design Teams - 1997 Benchmarking Study - Executive Summary, ProSci, Loveland Colorado, 1997.

Anonymous., Best Practices Report for Reengineering and Business Process Design Teams - 1997 Benchmarking Study - Executive Summary.

Bashein, Barbara J., Markus, M. Lynne, and Patricia Riley, Preconditions for BPR Success and How to Prevent Failures, Information Systems Management, 11 (2), Spring, 1994, pp. 7-13.

Booker, Ellis, Information Technology Patriot, Computerworld, February 15, 1993.

Bowersox, Donald J., Daugherty, Patricia J., Droge, Cornelia L., Rogers, Dale S., and Daniel L. Wardlow, Leading Edge Logistics: Competitive Positioning for the 1990s, Oak Brook, IL, Council of Logistics Management, 1990.

Bulkeley, Debra, Andersen Reengineers Big Business, Systems Integration Business, August 1992, pp. 22-27.

Cafasso, Rosemary, Rethinking Re-engineering, Computerworld, March 15, 1993, pp. 102-105

Caldwell, Bruce, Missteps, Miscues, Information Week, June 20, 1994. pp. 50-60.

Carlson, Walter and Barnara McNurlin, Basic Principles for Measuring IT Value, I/S Analyzer, 30 (10), Oct. 1992, pp. 1-16.

Carmel, Erran, Randall D. Whitaker and Joey F. George, PD (Participatory Design) and Joint Application Design: A TransAtlantic Comparison, Communication of the ACM, 36 (4), Jun. 1993, pp. 40- 48.

Champy, James A. and Michael Hammer, Help Wanted: Heroes and Visionaries Preferred, Computerworld, March 20, 1989, pp. 69-78.

Champy, James A., Grand Designs, CIO, Jan. 1993, p. 26.

Clement, Andrew, and Peter Van den Besselaar, A Retrospective Look at PD (Participatory Design) Projects, Communication of the ACM, 36 (4), Jun. 1993, pp. 29-37.

Interview with George Colony, Forecasting Technology Trends, Platforms, Bachman Information Systems, Burlington, Massachusetts, Summer/Fall 1993.

Council of Logistics Management Bylaws

Davenport, Thomas H., A Meeting of the Minds, CIO, September, 15, 1997.

Davenport, Thomas H., Process Innovation: Reengineering Work through Information Technology, Harvard Business School Press, 1993.

Davenport, Thomas H., and James E. Short, The New Industrial Engineering: Information Technology and Business Process Redesign, Sloan Management Review, Summer, 1990, pp. 11-27.

Delligatta, Ann, Systems Reengineering and the User, Information Systems Management, 9 (1), 1992, pp. 76-77.

deRoulet, David G. and Roger W. Kallock. Logistics Drives Dramatic Innovations. Transportation & Distribution, November, 1992.

Dixon, J. Robb, Arnold, Peter, Heinike, Janelle, Kim, Jay S., and Paul Mulligan, Business Process Reengineering: Improving in New Strategic Directions, California Management Review, 36 (4), Summer 1994, pp. 93-108.

Ein-Dor, P., and Segev, E., Organizational Context and the Success of Management Information Systems, Management Science, 24, 1978, pp. 1064-1077.

Ein-Dor and Sagev, Management Science, pp. 1064-1077Freedman, David, Reengineering the Turf, CIO, 6 (4), November 15, 1992, pp. 74-80.

Green, Leslie H., Organizing for Project Management, A Practical Guide to Systems Development Management, edited by James Hannan, Auerbach Publishers, New York, Van Nostrand Reinhold, 1982, pp. 115-126.

Hall, Gene, Rosenthal, Jim, and Judy Wade, How to make Reengineering Really Work, Harvard Business Review, 71 (6), Nov/Dec 1993, pp. 119-131.

Hammer, Michael and James Champy, Reengineering The Corporation: A Manifesto for Business Revolution, Harper Business, New York, 1993.

Hammer, Michael, Reengineering Work: Don't Automate, Obliterate, Harvard Business Review 68 (4) 1990, pp. 104-112.

Hay, Jim, Letters to the Editor, Information Week, June 14, 1993.

Hayes, Robert M., and Timothy Erickson, Added Value as a Function of Purchases of Information Services, The Information Society, 1 (4), 1982.

Hayley, Kathryn, Fordonski, Jennifer and Bob Puckett, What CIOs Need to do Now, Datamation, 38 (15), Jul. 15, 1992, pp. 83-85.

Hazeltine, Frank W., Why Reengineer Business Processes?, 36th International Conference Proceedings, The American Production and Inventory Control Society, Falls Church, Virginia, 1993, pp. 368-372.

Hein, Kenneth, Reengineering undergoes reconstruction, Incentive, 17 (2), Feb 1997, p. 5.

Huff, Sid L., Reengineering the Business, Business Quarterly, 56 (3), 1992, pp. 38.42.

Isaacson, Portia, Frontline, CIO, Feb. 1993, pp. 68-72.

Johansson, H. J., P. McHugh, A. J. Pendlebury, and W. A. Wheeler, Business Process Reengineering, John Wiley & Sons Ltd., West Sussex, England, 1993, pp. 1-4.

Kallock, Roger W. and David G. Robinson, Reengineering Business Logistics, Council of Logistics Management Annual Proceedings, 1991, pp. 171-185.

Keen, Peter G. W., Shaping the Future: Business Design through Information Technology, Harvard Business School Press, 1991.

Knorr, Robert O., Business Process Redesign: Key to Competitiveness, Journal of Business Strategy, 12 (6), 1991, pp. 48-51.

Koch, C., Surprise, Surprise - And You thought redesigning your business processes was going to be tough..., CIO, September, 15, 1997

Korchinsky, Mike., Is Re-engineering Still Relevant, Computerworld, April 21, 1997.

Laudon, Kenneth C. and Jane Price Laudon, Management Information Systems: A Contemporary Perspective, New York, Macmillan, 1991.

Lees, J. D., Successful Development of Small Business Information Systems, American Journal of Small Business, 38, 1987, pp. 32-39.

Maglitta, Joseph., One on One with Michael Hammer, Computerworld, January 24, 1994.

Manganelli, Raymond L., It's Not a Silver Bullet, Journal of Business Strategy, 14 (6), Nov/Dec 1993, p. 45.

Marsden, Ross, Paving the Cow Paths, Computing Canada, 18 (6), Mar. 16, 1992, p. 11.

McPartlin, John P., High Hopes for Reengineering, Information Week, May 17, 1993.

Page-Jones, Meiler, Practical Project Management: Restoring Quality to DP Projects and Systems, New York, Dorset House Publishing, 1985

Park, Seong Whoe, The Characteristics and Usage of Computerized Information Systems in Small Apparel and Textile Companies, Ph.D. Dissertation, Georgia State University, 1990.

Premkumar, G., Ramamurthy, K., and Sree Nilakanta, Implementation of Electronic Data Interchange: An Innovation Diffusion Perspective, Journal of Management Information Systems, 11 (2), Fall, 1994, pp. 157-186.

Pressman, Roger S., Software Engineering: A Practitioner's Approach, New York, McGraw-Hill, 1987.

Radosevich, Lynda, Evasive Action, Computerworld, October 14, 1993, pp. 83-85

Rassmus, Dan, 'Reengineering,' or Evolution through Violent Overthrow, Manufacturing Systems, 10 (9), Sept. 1992, pp. 52-58.

Ravikumar, Ravi, Business Process Reengineering: The Competitive Advantage, 36th International Conference Proceedings, The American Production and Inventory Control Society, Falls Church, Virginia, 1993, pp. 70-73.

Saporito, Bill, The Toppling of King James III, Fortune, January 11, 1993. pp. 42-43.

Schrage, Michael, No Frills, Fewer Tangles, Compuworld, Sept. 27, 1993, p. 37.

Schumpter, J., Capitalism, Socialism and Democracy, Harper and Row, New York, 1942.

Smykay, Edward W., Bowersox, Donald J., and Frank Mossman, Physical Distribution Management. The Macmillan Co., New York, 1961, p. 4.

Spencer, Michael S., Daugherty, Patricia J., and Dale S. Rogers, Towards a Deeper Understanding of JIT: A Comparison Between APICS and Logistics Managers, Production and Inventory Management Journal, 35 (3), Third Quarter, 1994, pp. 23-28.

Strassman, Paul, The Business Value of Computers, The Information Economics Press, New Canaan, Conn., 1990.

Strassman, Paul, Letters to the Editor, Computerworld, March 7, 1994

Strassman, Paul A., Re-engineering: An Emetic in a Perfume Bottle, Computerworld, August 16, 1993, pp. 33..

Thurow, Lester C., "Foreword" in Michael S. Scott Morton, ed., The Corporation of the 1990s: Information Technology and Organizational Transformation, Oxford University Press, New York, 1991.

Trunick, Perry A., On the Edge of Excellence, Transportation & Distribution, 31 (13), Dec. 1990, pp. 12-14.

Umbaugh, Robert E., DP Management: A Modern Challenge, A Practical Guide to Data Processing Management, edited by James Hannan, Auerbach Publishers, New York, Van Nostrand Reinhold, 1982, pp. 1-8.

Waller, David G., EDI is Reengineering the Warehouse, P&IM Review, May 1991, p. 32.

Watson, Stephen E., Technology in Retail's Business Strategies of the Future, Retail Control, Oct. 1991, pp. 13-17.

Weaks, Helena, Draft of Project System Engineering Support for JLSC Integration & Migration, unpublished, Dayton, OH, 1995.

Wilde, William T., Process Progress: Why Automation Hasn't Paid Off, and What to Do About IT, Inform, 6 (2), Feb. 1992, pp. 22-26.

Wilkinson, Richard, Reengineering: Industrial Engineering in Action, Industrial Engineering, August, 1991, pp. 47-49.

Williams, Frederick, Reasoning With Statistics, Harcourt Brace Jovanovich College Publishers, New York, 1991

Zahedi, F., Reliability of Information Systems based on Critical Success Factors – Formulation, MIS Quarterly, 11, 1987, pp. 187-203.

Zahedi, MIS Quarterly, pp. 187-203

# APPENDIX

The data collected on this questionnaire will be the primary data to support a Doctoral Dissertation being completed as part of the requirements for the graduate degree program at the University of Tennessee in Knoxville, TN. The questionnaire consists of three parts. Part I is a series of questions designed to collect demographic information on your corporation. Part II is a list of prerequisites for success and impediments to success. We are asking how they apply to your reengineering project(s). Part III is designed to collect specific information relating to your reengineering project(s).

Would you be willing to participate in a short telephone follow-up interview to this questionnaire?

[ ] Yes [ ] No

Name:_____

Title:_____

Parent Company:_____

Division:_____

Street Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____

Please return to: Kenneth J. Preissler
23938 Fairview
Farmington, MI 48335

**THIS INFORMATION WILL BE KEPT CONFIDENTIAL**

**Figure A-1 Questionnaire Cover Sheet**

**PART I**

What is your company type?

[ ] Manufacturer
[ ] Transportation company
[ ] Warehouse/distribution center
[ ] Service company
[ ] Other (specify) _____

What were the annual gross dollar sales of your business during the most recent fiscal year?

| At your site | Corporate Wide |
|---|---|
| [ ] Less than $10 million | [ ] Less than $10 million |
| [ ] Over $ 10-$ 50 million | [ ] Over $ 10-$ 50 million |
| [ ] Over $ 50-$100 million | [ ] Over $ 50-$100 million |
| [ ] Over $100-$200 million | [ ] Over $100-$200 million |
| [ ] Over $200-$500 million | [ ] Over $200-$500 million |
| [ ] Over $500 million-$1 billion | [ ] Over $500 million-$1 billion |
| [ ] Over $1 billion | [ ] Over $1 billion |

How many people do you currently employ?

| At your site | Corporate Wide |
|---|---|
| [ ] Less than 100 | [ ] Less than 100 |
| [ ] 101 to 250 | [ ] 101 to 250 |
| [ ] 251 to 500 | [ ] 251 to 500 |
| [ ] 501 to 1000 | [ ] 501 to 1000 |
| [ ] 1001 to 5000 | [ ] 1001 to 5000 |
| [ ] over 5000 | [ ] over 5000 |

Our company is highly computerized.

Strongly Disagree ... Strongly Agree
1.....2.....3.....4.....5.....6.....7

What is your primary product/product line?

| | |
|---|---|
| [ ] Automotive | [ ] Motor and transportation equipment |
| [ ] Computer/electronics | [ ] Textiles/apparel |
| [ ] Building materials | [ ] Chemicals |
| [ ] Services | [ ] Food |
| [ ] Pharmaceuticals/health and beauty | [ ] Furniture/home furnishings |
| [ ] Paper/office supplies | [ ] Other |

Have reengineering efforts been initiated at your firm?

[ ] Yes [ ] No

If yes, the following pages seek to evaluate the effectiveness of these reengineering projects and the factors that contribute to their success or failure.

**Figure A-2 Part I of the Questionnaire**

**PART II**

The following is a list of prerequisites for success. Please indicate how they apply to your reengineering project(s) by circling the appropriate number on the rating scale. (1=strongly applies.....7=does not apply)

| Strongly Applies | | | | | | Does Not Apply | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extensive user involvement in design |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strong senior management commitment/sponsorship |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Project expectations were realistic |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extensive use of cross-functional memberships on project teams |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Project growth-oriented, not cost-cutting |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Firm has a clear vision of project goals |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Sound proactive senior management already in place |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Full-time participation of key practitioners |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Adequate budget |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Adequate training/workshops conducted |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Communications with employees |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Aggressive target(s) set |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Significant portion of CEO's time committed to project |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Senior executive responsible for the project |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Pilot project prior to full implementation |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Crisis as a key driver of the project |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | _____ |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | _____ |

The following is a list of impediments to success. Please indicate how they apply to your reengineering project(s) by circling the appropriate number on the rating scale. (1=strongly applies.....7=does not apply)

| Strongly Applies | | | | | | Does Not Apply | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Reengineered functions rather than processes |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Not focused on strategic value-added processes |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Not following detailed methodology |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Project under-financed and/or under-staffed |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Wrong sponsor |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Project lacks senior executive sponsorship |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Let the consultant do it attitude |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Project too focused on cost cutting |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Information Technology (IT) viewed as driver of project, not the enabler |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Management by consensus (lack of strong leadership) |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Financial condition of firm not sound |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Too many projects for key team members |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Staff driven by fear, lacks optimism |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Animosity towards Information Systems and Human Resources |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Average performers assigned to the project |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Failure to measure performance (before, during, and after project) |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Reengineering scaled back due to politics |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | Failure to involve middle management early in the project |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | _____ |

**Figure A-3 Part II of the Questionnaire**

**PART III**

Please provide the following detail information on your reengineering project(s), one for each project. Please copy if have multiple projects.

Business area: _____

Brief description of project: _____

_____

_____

Title of project sponsor/initiator of project _____

Project status:

Project start _____ (month/year)
Project finish _____ (month/year)
Planned duration of project _____
If project is still in process, is project:
[ ] Ahead of schedule? By what percent ____%
[ ] On schedule?
[ ] Behind schedule? By what percent ____%

Project budget: _____

Budget status:

[ ] Under budget? By what percent ____%
[ ] No budget variance
[ ] Over budget? By what percent ____%

Project team:

% Outside consultants _____
% In-house staff _____

Educational background of project manager:

[ ] Technical
[ ] Business Administration
[ ] Liberal Arts

Title of chief designer/architect of project _____

Educational background of chief designer/architect:

[ ] Technical
[ ] Business Administration
[ ] Liberal Arts

Improvements attributed to project:

_____

_____

_____

Problems/difficulties encountered during project:

_____

_____

_____

Was this project considered successful?

Very Successful ..... Dismal Failure
1.....2.....3.....4.....5.....6.....7

**Figure A-4 Original Part III of the Questionnaire**

**PART III**

What percentage of your time is devoted to reengineering projects? _____ %

What is the driving force behind your reengineering projects?

[ ] Increased Revenue
[ ] Reduced Cost
[ ] Both
[ ] Other _____

What business areas did your reengineering project(s) address?

1. _____
2. _____
3. _____
4. _____

What improvements do you attribute to your reengineering projects?

1. _____
2. _____
3. _____
4. _____

Based on your firms experience:

How have reengineering projects been viewed?

| Very | | | | | | Dismal |
|---|---|---|---|---|---|---|
| Successful | | | | | | Failure |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

What is your performance experience with reengineering projects?

Projects completed ahead of schedule.....[ ] Slightly [ ] Greatly
Project completed on schedule.....[ ]
Project completed behind schedule.....[ ] Slightly [ ] Greatly

What is your financial experience with reengineering projects?

Projects under budget.....[ ] Slightly [ ] Greatly
No budget variance.....[ ]
Projects over budget.....[ ] Slightly [ ] Greatly

In your own words, please describe reengineering:

_____
_____
_____
_____

**Figure A-5 Revised Part III of the Questionnaire**

## Table A-1 Regression Analysis Project Success Impediments

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED14, IMPED07, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06[c,d] | . | .583 | .339 | .273 | 1.16 |

a. Dependent Variable: Project Success

b. Method: Enter

c. Independent Variables: (Constant), IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED14, IMPED07, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 123.536 | 18 | 6.863 | 5.140 | .000[b] |
| | Residual | 240.363 | 180 | 1.335 | | |
| | Total | 363.899 | 198 | | | |

a. Dependent Variable: Project Success

b. Independent Variables: (Constant), IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED14, IMPED07, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

## Table A-2 Regression Analysis Project Budget Impediments

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06[c,d] | . | .635 | .403 | .344 | .87 |

a. Dependent Variable: Project Budget

b. Method: Enter

c. Independent Variables: (Constant), IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 93.018 | 18 | 5.168 | 6.763 | .000[b] |
| | Residual | 137.535 | 180 | .764 | | |
| | Total | 230.553 | 198 | | | |

a. Dependent Variable: Project Budget

b. Independent Variables: (Constant), IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

## Table A-3 Regression Analysis Project Schedule Impediments

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06[c,d] | . | .667 | .445 | .390 | .86 |

a. Dependent Variable: Project Schedule

b. Method: Enter

c. Independent Variables: (Constant), IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 105.790 | 18 | 5.877 | 8.026 | .000[b] |
| | Residual | 131.808 | 180 | .732 | | |
| | Total | 237.598 | 198 | | | |

a. Dependent Variable: Project Schedule

b. Independent Variables: IMPED18, IMPED12, IMPED03, IMPED01, IMPED05, IMPED09, IMPED11, IMPED07, IMPED14, IMPED15, IMPED17, IMPED02, IMPED08, IMPED16, IMPED13, IMPED04, IMPED10, IMPED06

## Table A-4 Regression Analysis Project Success Prerequisites

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ11, PREREQ09, PREREQ14, PREREQ04, PREREQ01, PREREQ07, PREREQ08, PREREQ02, PREREQ10[c,d] | . | .674 | .455 | .407 | 1.04 |

a. Dependent Variable: Project Success

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ11, PREREQ09, PREREQ14, PREREQ04, PREREQ01, PREREQ07, PREREQ08, PREREQ02, PREREQ10

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 165.554 | 16 | 10.347 | 9.494 | .000[b] |
| | Residual | 198.346 | 182 | 1.090 | | |
| | Total | 363.899 | 198 | | | |

a. Dependent Variable: Project Success

b. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ11, PREREQ09, PREREQ14, PREREQ04, PREREQ01, PREREQ07, PREREQ08, PREREQ02, PREREQ10

## Table A-5 Regression Analysis Project Budget Prerequisites

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10[c,d] | . | .623 | .388 | .334 | .88 |

a. Dependent Variable: Project Budget

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 89.381 | 16 | 5.586 | 7.202 | .000[b] |
| | Residual | 141.171 | 182 | .776 | | |
| | Total | 230.553 | 198 | | | |

a. Dependent Variable: Project Budget

b. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10

## Table A-6 Regression Analysis Project Schedule Prerequisites

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10[c,d] | . | .459 | .211 | .142 | 1.01 |

a. Dependent Variable: Project Schedule

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10

d. All requested variables entered.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 50.139 | 16 | 3.134 | 3.042 | .000[b] |
| | Residual | 187.459 | 182 | 1.030 | | |
| | Total | 237.598 | 198 | | | |

a. Dependent Variable: Project Schedule

b. Independent Variables: (Constant), PREREQ16, PREREQ15, PREREQ06, PREREQ13, PREREQ12, PREREQ03, PREREQ05, PREREQ09, PREREQ11, PREREQ14, PREREQ04, PREREQ07, PREREQ08, PREREQ01, PREREQ02, PREREQ10

**Table A-7 Regression Analysis Project Success All Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ03, PREREQ05, PREREQ09, PREREQ14, IMPED11, IMPED14, IMPED09, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED16, IMPED02, PREREQ10, IMPED18, IMPED10, PREREQ01, PREREQ08, PREREQ07, PREREQ02, IMPED04, IMPED13, IMPED06[c,d] | . | .874 | .764 | .715 | .72 |

a. Dependent Variable:Project Success

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ03, PREREQ05, PREREQ09, PREREQ14, IMPED11, IMPED14, IMPED09, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED16, IMPED02, PREREQ10, IMPED18, IMPED10, PREREQ01, PREREQ08, PREREQ07, PREREQ02, IMPED04, IMPED13, IMPED06

d. All requested variables entered.

**Table A-8 Regression Analysis Project Success All Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 277.978 | 34 | 8.176 | 15.605 | .000[b] |
| | Residual | 85.921 | 164 | .524 | | |
| | Total | 363.899 | 198 | | | |

a. Dependent Variable: Project Success

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ03, PREREQ05, PREREQ09, PREREQ14, IMPED11, IMPED14, IMPED09, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED16, IMPED02, PREREQ10, IMPED18, IMPED10, PREREQ01, PREREQ08, PREREQ07, PREREQ02, IMPED04, IMPED13, IMPED06

## Table A-9 Regression Analysis Project Budget All Variables

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06[c,d] | | .790 | .625 | .547 | .73 |

a. Dependent Variable: Project Budget

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-10 Regression Analysis Project Budget All Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 143.999 | 34 | 4.235 | 8.025 | .000[b] |
| | Residual | 86.554 | 164 | .528 | | |
| | Total | 230.553 | 198 | | | |

a. Dependent Variable: Project Budget

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06

**Table A-11 Regression Analysis Project Schedule All Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06[c,d] | | .786 | .617 | .538 | .74 |

a. Dependent Variable: Project Schedule

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-12 Regression Analysis Project Schedule All Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 146.701 | 34 | 4.315 | 7.785 | .000[b] |
| | Residual | 90.897 | 164 | .554 | | |
| | Total | 237.598 | 198 | | | |

a. Dependent Variable: Project Schedule

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED07, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED05, IMPED12, PREREQ09, PREREQ03, PREREQ05, IMPED14, IMPED11, IMPED09, PREREQ14, IMPED17, IMPED15, IMPED08, PREREQ04, IMPED02, IMPED16, PREREQ10, IMPED18, PREREQ07, PREREQ08, IMPED10, PREREQ02, IMPED13, IMPED04, PREREQ01, IMPED06

## Table A-13 Stepwise Regression Analysis Project Success All Variables

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ13 | . | .319 | .102 | .097 | 1.29 |
| 2 | PREREQ07 | . | .553 | .305 | .298 | 1.14 |
| 3 | IMPED02 | . | .596 | .355 | .345 | 1.10 |
| 4 | IMPED16 | . | .627 | .393 | .381 | 1.07 |
| 5 | PREREQ14 | . | .653 | .426 | .411 | 1.04 |
| 6 | PREREQ02 | . | .696 | .485 | .469 | .99 |
| 7 | IMPED04 | . | .723 | .523 | .505 | .95 |
| 8 | IMPED05 | . | .756 | .572 | .554 | .91 |
| 9 | PREREQ05 | . | .767 | .588 | .569 | .89 |
| 10 | IMPED15 | . | .778 | .605 | .584 | .87 |
| 11 | PREREQ03 | . | .788 | .622 | .599 | .86 |
| 12 | PREREQ12 | . | .800 | .640 | .617 | .84 |
| 13 | IMPED10 | . | .807 | .652 | .627 | .83 |
| 14 | IMPED03 | . | .815 | .665 | .639 | .81 |
| 15 | IMPED14 | . | .822 | .675 | .649 | .80 |
| 16 | PREREQ15 | . | .829 | .688 | .660 | .79 |
| 17 | PREREQ08 | . | .836 | .699 | .671 | .78 |
| 18 | IMPED13 | . | .843 | .710 | .682 | .77 |
| 19 | IMPED13[u] | . | .843 | .710 | .682 | .77 |

a. Dependent Variable: Project Success

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

u. Probability of F-to-enter = .050 limits reached.

## Table A-14 Stepwise Regression Analysis Project Success All Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Significant portion of CEO's time committed to project | 1.000 | 0.064 | 5.498 |
| 2 | Significant portion of CEO's time committed to project | 1.153 | 0.106 | 5.161 |
| | Sound proactive senior management already in place | 1.153 | 0.064 | 6.654 |
| 3 | Significant portion of CEO's time committed to project | 1.199 | 0.217 | 4.106 |
| | Sound proactive senior management already in place | 1.165 | 0.098 | 6.117 |
| | Not focused on strategic value-added processes | 1.076 | 0.035 | 10.188 |
| 4 | Significant portion of CEO's time committed to project | 1.232 | 0.277 | 4.030 |
| | Sound proactive senior management already in place | 1.298 | 0.120 | 6.129 |
| | Not focused on strategic value-added processes | 1.230 | 0.068 | 8.112 |
| | Failure to measure performance (before, during, and after project) | 1.289 | 0.032 | 11.826 |
| 5 | Significant portion of CEO's time committed to project | 1.235 | 0.344 | 3.919 |
| | Sound proactive senior management already in place | 1.407 | 0.152 | 5.900 |
| | Not focused on strategic value-added processes | 1.255 | 0.120 | 6.641 |
| | Failure to measure performance (before, during, and after project) | 1.290 | 0.068 | 8.828 |
| | Senior executive responsible for the project | 1.190 | 0.030 | 13.221 |
| 6 | Significant portion of CEO's time committed to project | 1.242 | 0.421 | 3.807 |
| | Sound proactive senior management already in place | 2.107 | 0.154 | 6.303 |
| | Not focused on strategic value-added processes | 1.268 | 0.122 | 7.066 |
| | Failure to measure performance (before, during, and after project) | 1.366 | 0.114 | 7.319 |
| | Senior executive responsible for the project | 1.421 | 0.054 | 10.663 |
| | Strong senior management commitment/sponsorship | 2.223 | 0.028 | 14.723 |
| 7 | Significant portion of CEO's time committed to project | 1.261 | 0.492 | 3.757 |
| | Sound proactive senior management already in place | 2.108 | 0.157 | 6.645 |
| | Not focused on strategic value-added processes | 1.269 | 0.140 | 7.042 |
| | Failure to measure performance (before, during, and after project) | 1.833 | 0.115 | 7.765 |
| | Senior executive responsible for the project | 1.427 | 0.072 | 9.843 |
| | Strong senior management commitment/sponsorship | 2.289 | 0.047 | 12.153 |
| | Project under-financed and/or under-staffed | 1.528 | 0.027 | 15.896 |
| 8 | Significant portion of CEO's time committed to project | 1.281 | 0.553 | 3.757 |
| | Sound proactive senior management already in place | 2.124 | 0.159 | 7.013 |
| | Not focused on strategic value-added processes | 1.291 | 0.140 | 7.458 |
| | Failure to measure performance (before, during, and after project) | 1.896 | 0.123 | 7.978 |
| | Senior executive responsible for the project | 1.543 | 0.081 | 9.834 |
| | Strong senior management commitment/sponsorship | 2.379 | 0.063 | 11.113 |
| | Project under-financed and/or under-staffed | 1.726 | 0.047 | 12.945 |
| | Wrong sponsor | 1.657 | 0.024 | 17.965 |

## Table A-15 Stepwise Regression Analysis Project Success All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 9 | Significant portion of CEO's time committed to project | 1.380 | 0.584 | 3.843 |
| | Sound proactive senior management already in place | 2.127 | 0.197 | 6.613 |
| | Not focused on strategic value-added processes | 1.471 | 0.159 | 7.377 |
| | Failure to measure performance (before, during, and after project) | 1.905 | 0.125 | 8.303 |
| | Senior executive responsible for the project | 1.544 | 0.096 | 9.459 |
| | Strong senior management commitment/sponsorship | 2.406 | 0.081 | 10.351 |
| | Project under-financed and/or under-staffed | 1.742 | 0.060 | 11.992 |
| | Wrong sponsor | 1.657 | 0.044 | 13.941 |
| | Project growth-oriented, not cost-cutting | 1.492 | 0.021 | 20.049 |
| 10 | Significant portion of CEO's time committed to project | 1.428 | 0.621 | 3.914 |
| | Sound proactive senior management already in place | 2.131 | 0.215 | 6.645 |
| | Not focused on strategic value-added processes | 1.480 | 0.162 | 7.668 |
| | Failure to measure performance (before, during, and after project) | 2.198 | 0.126 | 8.679 |
| | Senior executive responsible for the project | 1.605 | 0.097 | 9.903 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.082 | 10.795 |
| | Project under-financed and/or under-staffed | 1.763 | 0.067 | 11.949 |
| | Wrong sponsor | 1.660 | 0.057 | 12.911 |
| | Project growth-oriented, not cost-cutting | 1.618 | 0.042 | 15.011 |
| | Average performers assigned to the project | 1.792 | 0.019 | 22.476 |
| 11 | Significant portion of CEO's time committed to project | 1.467 | 0.627 | 4.062 |
| | Sound proactive senior management already in place | 2.388 | 0.217 | 6.913 |
| | Not focused on strategic value-added processes | 1.531 | 0.214 | 6.963 |
| | Failure to measure performance (before, during, and after project) | 2.346 | 0.140 | 8.594 |
| | Senior executive responsible for the project | 1.605 | 0.112 | 9.594 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.096 | 10.390 |
| | Project under-financed and/or under-staffed | 1.765 | 0.070 | 12.140 |
| | Wrong sponsor | 1.722 | 0.057 | 13.466 |
| | Project growth-oriented, not cost-cutting | 1.676 | 0.052 | 14.117 |
| | Average performers assigned to the project | 1.799 | 0.042 | 15.737 |
| | Project expectations were realistic | 1.406 | 0.019 | 23.510 |
| 12 | Significant portion of CEO's time committed to project | 1.468 | 0.647 | 4.163 |
| | Sound proactive senior management already in place | 2.450 | 0.243 | 6.796 |
| | Not focused on strategic value-added processes | 1.532 | 0.217 | 7.191 |
| | Failure to measure performance (before, during, and after project) | 2.493 | 0.140 | 8.935 |
| | Senior executive responsible for the project | 1.663 | 0.116 | 9.818 |
| | Strong senior management commitment/sponsorship | 2.561 | 0.111 | 10.068 |
| | Project under-financed and/or under-staffed | 1.780 | 0.096 | 10.810 |
| | Wrong sponsor | 1.722 | 0.069 | 12.700 |
| | Project growth-oriented, not cost-cutting | 1.725 | 0.056 | 14.085 |
| | Average performers assigned to the project | 2.023 | 0.047 | 15.369 |
| | Project expectations were realistic | 1.538 | 0.035 | 17.795 |
| | Aggressive target(s) set | 1.689 | 0.019 | 24.506 |

## Table A-16 Stepwise Regression Analysis Project Success All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 13 | Significant portion of CEO's time committed to project | 1.488 | 0.726 | 4.080 |
| | Sound proactive senior management already in place | 2.561 | 0.244 | 7.042 |
| | Not focused on strategic value-added processes | 1.551 | 0.218 | 7.450 |
| | Failure to measure performance (before, during, and after project) | 2.497 | 0.140 | 9.277 |
| | Senior executive responsible for the project | 1.706 | 0.116 | 10.190 |
| | Strong senior management commitment/sponsorship | 2.656 | 0.115 | 10.235 |
| | Project under-financed and/or under-staffed | 2.387 | 0.100 | 10.981 |
| | Wrong sponsor | 2.034 | 0.070 | 13.173 |
| | Project growth-oriented, not cost-cutting | 1.753 | 0.059 | 14.258 |
| | Average performers assigned to the project | 2.192 | 0.051 | 15.354 |
| | Project expectations were realistic | 1.547 | 0.041 | 17.248 |
| | Aggressive target(s) set | 1.702 | 0.025 | 21.885 |
| | Management by consensus (lack of strong management | 3.021 | 0.019 | 25.454 |
| 14 | Significant portion of CEO's time committed to project | 1.488 | 0.755 | 4.143 |
| | Sound proactive senior management already in place | 3.075 | 0.244 | 7.293 |
| | Not focused on strategic value-added processes | 1.739 | 0.218 | 7.718 |
| | Failure to measure performance (before, during, and after project) | 2.698 | 0.149 | 9.339 |
| | Senior executive responsible for the project | 1.709 | 0.134 | 9.819 |
| | Strong senior management commitment/sponsorship | 2.744 | 0.116 | 10.582 |
| | Project under-financed and/or under-staffed | 2.904 | 0.107 | 11.029 |
| | Wrong sponsor | 2.043 | 0.073 | 13.334 |
| | Project growth-oriented, not cost-cutting | 1.792 | 0.069 | 13.704 |
| | Average performers assigned to the project | 2.234 | 0.053 | 15.585 |
| | Project expectations were realistic | 1.617 | 0.048 | 16.495 |
| | Aggressive target(s) set | 1.706 | 0.031 | 20.345 |
| | Management by consensus (lack of strong management | 3.074 | 0.022 | 24.190 |
| | Not following detailed methodology | 2.220 | 0.019 | 26.471 |
| 15 | Significant portion of CEO's time committed to project | 1.602 | 0.761 | 4.273 |
| | Sound proactive senior management already in place | 3.119 | 0.245 | 7.537 |
| | Not focused on strategic value-added processes | 1.767 | 0.220 | 7.944 |
| | Failure to measure performance (before, during, and after project) | 2.719 | 0.149 | 9.659 |
| | Senior executive responsible for the project | 1.745 | 0.135 | 10.138 |
| | Strong senior management commitment/sponsorship | 2.822 | 0.118 | 10.833 |
| | Project under-financed and/or under-staffed | 3.201 | 0.110 | 11.255 |
| | Wrong sponsor | 2.234 | 0.075 | 13.607 |
| | Project growth-oriented, not cost-cutting | 1.833 | 0.070 | 14.059 |
| | Average performers assigned to the project | 2.369 | 0.056 | 15.769 |
| | Project expectations were realistic | 1.617 | 0.049 | 16.915 |
| | Aggressive target(s) set | 1.761 | 0.048 | 17.078 |
| | Management by consensus (lack of strong management | 3.083 | 0.031 | 21.141 |
| | Not following detailed methodology | 2.228 | 0.021 | 25.479 |
| | Animosity towards Information Systems and Human Resources | 2.050 | 0.016 | 29.374 |

## Table A-17 Stepwise Regression Analysis Project Success All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 16 | Significant portion of CEO's time committed to project | 1.629 | 0.779 | 4.346 |
| | Sound proactive senior management already in place | 3.187 | 0.263 | 7.476 |
| | Not focused on strategic value-added processes | 1.767 | 0.220 | 8.171 |
| | Failure to measure performance (before, during, and after project) | 2.964 | 0.200 | 8.585 |
| | Senior executive responsible for the project | 1.765 | 0.138 | 10.316 |
| | Strong senior management commitment/sponsorship | 2.855 | 0.129 | 10.688 |
| | Project under-financed and/or under-staffed | 3.205 | 0.112 | 11.475 |
| | Wrong sponsor | 2.255 | 0.092 | 12.622 |
| | Project growth-oriented, not cost-cutting | 1.868 | 0.074 | 14.079 |
| | Average performers assigned to the project | 2.376 | 0.070 | 14.467 |
| | Project expectations were realistic | 1.781 | 0.056 | 16.224 |
| | Aggressive target(s) set | 1.777 | 0.049 | 17.403 |
| | Management by consensus (lack of strong management | 3.241 | 0.045 | 18.130 |
| | Not following detailed methodology | 2.236 | 0.030 | 22.121 |
| | Animosity towards Information Systems and Human Resources | 2.074 | 0.021 | 26.781 |
| | Pilot project prior to full implementation | 1.556 | 0.016 | 30.222 |
| 17 | Significant portion of CEO's time committed to project | 1.650 | 0.842 | 4.295 |
| | Sound proactive senior management already in place | 3.202 | 0.281 | 7.432 |
| | Not focused on strategic value-added processes | 1.852 | 0.223 | 8.339 |
| | Failure to measure performance (before, during, and after project) | 2.973 | 0.201 | 8.793 |
| | Senior executive responsible for the project | 1.822 | 0.163 | 9.767 |
| | Strong senior management commitment/sponsorship | 2.953 | 0.131 | 10.877 |
| | Project under-financed and/or under-staffed | 3.225 | 0.113 | 11.738 |
| | Wrong sponsor | 2.255 | 0.095 | 12.814 |
| | Project growth-oriented, not cost-cutting | 2.214 | 0.079 | 14.000 |
| | Average performers assigned to the project | 2.377 | 0.071 | 14.823 |
| | Project expectations were realistic | 1.942 | 0.066 | 15.359 |
| | Aggressive target(s) set | 1.783 | 0.055 | 16.878 |
| | Management by consensus (lack of strong management | 3.241 | 0.046 | 18.404 |
| | Not following detailed methodology | 2.272 | 0.043 | 19.090 |
| | Animosity towards Information Systems and Human Resources | 2.080 | 0.030 | 22.792 |
| | Pilot project prior to full implementation | 1.589 | 0.020 | 27.531 |
| | Full-time participation of key practitioners | 2.318 | 0.016 | 31.188 |
| 18 | Significant portion of CEO's time committed to project | 1.679 | 0.873 | 4.342 |
| | Sound proactive senior management already in place | 3.365 | 0.281 | 7.649 |
| | Not focused on strategic value-added processes | 2.505 | 0.224 | 8.573 |
| | Failure to measure performance (before, during, and after project) | 2.978 | 0.201 | 9.048 |
| | Senior executive responsible for the project | 1.843 | 0.163 | 10.053 |
| | Strong senior management commitment/sponsorship | 3.232 | 0.134 | 11.077 |
| | Project under-financed and/or under-staffed | 3.449 | 0.119 | 11.763 |
| | Wrong sponsor | 2.440 | 0.095 | 13.176 |
| | Project growth-oriented, not cost-cutting | 2.257 | 0.081 | 14.230 |
| | Average performers assigned to the project | 2.397 | 0.079 | 14.470 |
| | Project expectations were realistic | 2.333 | 0.067 | 15.648 |
| | Aggressive target(s) set | 1.815 | 0.056 | 17.116 |
| | Management by consensus (lack of strong management | 3.249 | 0.046 | 18.939 |
| | Not following detailed methodology | 2.306 | 0.043 | 19.642 |
| | Animosity towards Information Systems and Human Resources | 2.289 | 0.030 | 23.460 |
| | Pilot project prior to full implementation | 1.610 | 0.026 | 25.156 |
| | Full-time participation of key practitioners | 2.755 | 0.016 | 31.994 |
| | Staff driven by fear, lacks optimism | 3.386 | 0.014 | 34.313 |

**Table A-18 Stepwise Regression Analysis Project Budget All Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ05 | . | .283 | .080 | .076 | 1.04 |
| 2 | PREREQ03 | . | .399 | .159 | .151 | .99 |
| 3 | PREREQ09 | . | .449 | .201 | .189 | .97 |
| 4 | IMPED12 | . | .491 | .241 | .225 | .95 |
| 5 | IMPED18 | . | .548 | .301 | .282 | .91 |
| 6 | PREREQ07 | . | .595 | .355 | .334 | .88 |
| 7 | PREREQ12 | . | .632 | .399 | .377 | .85 |
| 8 | . | PREREQ03 | .628 | .395 | .376 | .85 |
| 9 | IMPED08 | . | .649 | .422 | .401 | .84 |
| 10 | IMPED01 | . | .667 | .445 | .422 | .82 |
| 11 | IMPED11 | . | .680 | .463 | .437 | .81 |
| 12 | IMPED17 | . | .689 | .474 | .446 | .80 |
| 13 | PREREQ10 | . | .699 | .489 | .458 | .79 |
| 14 | IMPED13 | . | .709 | .503 | .471 | .78 |
| 15 | IMPED07 | . | .718 | .515 | .481 | .78 |
| 16 | IMPED10 | . | .734 | .538 | .503 | .76 |
| 17 | IMPED10[s] | . | .734 | .538 | .503 | .76 |

a. Dependent Variable: Project Budget

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

s. Probability of F-to-enter = .050 limits reached.

## Table A-19 Stepwise Regression Analysis Project Budget All Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 1 | Project growth-oriented, not cost-cutting | 1.000 | 0.107 | 4.213 |
| 2 | Project growth-oriented, not cost-cutting | 1.023 | 0.159 | 4.172 |
| | Project expectations were realistic | 1.023 | 0.075 | 6.059 |
| 3 | Project growth-oriented, not cost-cutting | 1.043 | 0.166 | 4.673 |
| | Project expectations were realistic | 1.056 | 0.142 | 5.053 |
| | Adequate budget | 1.061 | 0.068 | 7.320 |
| 4 | Project growth-oriented, not cost-cutting | 1.083 | 0.218 | 4.511 |
| | Project expectations were realistic | 1.063 | 0.153 | 5.382 |
| | Adequate budget | 1.068 | 0.142 | 5.602 |
| | Too many projects for key team members | 1.051 | 0.041 | 10.461 |
| 5 | Project growth-oriented, not cost-cutting | 1.134 | 0.282 | 4.322 |
| | Project expectations were realistic | 1.063 | 0.169 | 5.592 |
| | Adequate budget | 1.162 | 0.149 | 5.941 |
| | Too many projects for key team members | 1.098 | 0.098 | 7.318 |
| | Failure to involve middle management early in the project | 1.230 | 0.027 | 13.991 |
| 6 | Project growth-oriented, not cost-cutting | 1.205 | 0.317 | 4.398 |
| | Project expectations were realistic | 1.231 | 0.170 | 6.009 |
| | Adequate budget | 1.183 | 0.152 | 6.347 |
| | Too many projects for key team members | 1.125 | 0.123 | 7.075 |
| | Failure to involve middle management early in the project | 1.325 | 0.076 | 8.984 |
| | Sound proactive senior management already in place | 1.498 | 0.026 | 15.364 |
| 7 | Project growth-oriented, not cost-cutting | 1.246 | 0.317 | 4.693 |
| | Project expectations were realistic | 1.309 | 0.192 | 6.033 |
| | Adequate budget | 1.186 | 0.166 | 6.496 |
| | Too many projects for key team members | 1.134 | 0.138 | 7.112 |
| | Failure to involve middle management early in the project | 1.380 | 0.108 | 8.045 |
| | Sound proactive senior management already in place | 1.746 | 0.062 | 10.626 |
| | Aggressive target(s) set | 1.290 | 0.026 | 16.417 |
| 8 | Project growth-oriented, not cost-cutting | 1.243 | 0.311 | 4.444 |
| | Adequate budget | 1.169 | 0.176 | 5.899 |
| | Too many projects for key team members | 1.120 | 0.145 | 6.504 |
| | Failure to involve middle management early in the project | 1.351 | 0.109 | 7.491 |
| | Sound proactive senior management already in place | 1.433 | 0.093 | 8.146 |
| | Aggressive target(s) set | 1.212 | 0.027 | 15.157 |
| 9 | Project growth-oriented, not cost-cutting | 1.485 | 0.428 | 4.039 |
| | Adequate budget | 1.252 | 0.176 | 6.288 |
| | Too many projects for key team members | 1.385 | 0.145 | 6.933 |
| | Failure to involve middle management early in the project | 1.488 | 0.110 | 7.978 |
| | Sound proactive senior management already in place | 1.519 | 0.093 | 8.673 |
| | Aggressive target(s) set | 1.236 | 0.055 | 11.224 |
| | Project too focused on cost-cutting | 2.395 | 0.018 | 19.534 |

## Table A-20 Stepwise Regression Analysis Project Budget All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 10 | Project growth-oriented, not cost-cutting | 1.492 | 0.471 | 4.075 |
| | Adequate budget | 1.256 | 0.194 | 6.342 |
| | Too many projects for key team members | 1.401 | 0.155 | 7.100 |
| | Failure to involve middle management early in the project | 1.534 | 0.119 | 8.099 |
| | Sound proactive senior management already in place | 1.607 | 0.093 | 9.162 |
| | Aggressive target(s) set | 1.269 | 0.083 | 9.722 |
| | Project too focused on cost-cutting | 2.492 | 0.051 | 12.436 |
| | Reengineered functions rather than processes | 1.382 | 0.018 | 21.132 |
| 11 | Project growth-oriented, not cost-cutting | 1.502 | 0.502 | 4.167 |
| | Adequate budget | 1.295 | 0.200 | 6.600 |
| | Too many projects for key team members | 1.401 | 0.159 | 7.400 |
| | Failure to involve middle management early in the project | 1.579 | 0.123 | 8.408 |
| | Sound proactive senior management already in place | 1.607 | 0.100 | 9.351 |
| | Aggressive target(s) set | 1.308 | 0.083 | 10.250 |
| | Project too focused on cost-cutting | 2.585 | 0.060 | 12.083 |
| | Reengineered functions rather than processes | 1.475 | 0.045 | 13.914 |
| | Financial condition of firm not sound | 1.529 | 0.016 | 23.032 |
| 12 | Project growth-oriented, not cost-cutting | 1.503 | 0.520 | 4.301 |
| | Adequate budget | 1.339 | 0.201 | 6.917 |
| | Too many projects for key team members | 1.524 | 0.159 | 7.774 |
| | Failure to involve middle management early in the project | 1.806 | 0.140 | 8.298 |
| | Sound proactive senior management already in place | 1.609 | 0.100 | 9.824 |
| | Aggressive target(s) set | 1.310 | 0.092 | 10.223 |
| | Project too focused on cost-cutting | 2.587 | 0.060 | 12.657 |
| | Reengineered functions rather than processes | 1.511 | 0.055 | 13.276 |
| | Financial condition of firm not sound | 1.553 | 0.044 | 14.773 |
| | Reengineering scaled back due to politics | 1.561 | 0.015 | 25.478 |
| 13 | Project growth-oriented, not cost-cutting | 1.585 | 0.569 | 4.285 |
| | Adequate budget | 1.446 | 0.213 | 6.998 |
| | Too many projects for key team members | 1.559 | 0.165 | 7.946 |
| | Failure to involve middle management early in the project | 1.837 | 0.142 | 8.566 |
| | Sound proactive senior management already in place | 1.873 | 0.115 | 9.515 |
| | Aggressive target(s) set | 1.354 | 0.099 | 10.258 |
| | Project too focused on cost-cutting | 2.621 | 0.082 | 11.258 |
| | Reengineered functions rather than processes | 1.559 | 0.055 | 13.749 |
| | Financial condition of firm not sound | 1.601 | 0.054 | 13.913 |
| | Reengineering scaled back due to politics | 1.599 | 0.041 | 16.011 |
| | Adequate training/workshops conducted | 1.606 | 0.015 | 26.666 |

## Table A-21 Stepwise Regression Analysis Project Budget All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 14 | Project growth-oriented, not cost-cutting | 1.587 | 0.589 | 4.399 |
| | Adequate budget | 1.494 | 0.214 | 7.289 |
| | Too many projects for key team members | 1.688 | 0.166 | 8.289 |
| | Failure to involve middle management early in the project | 1.877 | 0.142 | 8.942 |
| | Sound proactive senior management already in place | 1.893 | 0.116 | 9.895 |
| | Aggressive target(s) set | 1.355 | 0.100 | 10.697 |
| | Project too focused on cost-cutting | 2.646 | 0.083 | 11.688 |
| | Reengineered functions rather than processes | 1.639 | 0.056 | 14.220 |
| | Financial condition of firm not sound | 1.747 | 0.055 | 14.357 |
| | Reengineering scaled back due to politics | 1.731 | 0.041 | 16.577 |
| | Adequate training/workshops conducted | 1.611 | 0.032 | 18.736 |
| | Staff driven by fear, lacks optimism | 2.137 | 0.015 | 28.009 |
| 15 | Project growth-oriented, not cost-cutting | 1.618 | 0.611 | 4.485 |
| | Adequate budget | 1.543 | 0.219 | 7.484 |
| | Too many projects for key team members | 1.716 | 0.168 | 8.566 |
| | Failure to involve middle management early in the project | 1.951 | 0.143 | 9.268 |
| | Sound proactive senior management already in place | 2.097 | 0.120 | 10.135 |
| | Aggressive target(s) set | 1.362 | 0.102 | 10.980 |
| | Project too focused on cost-cutting | 2.690 | 0.098 | 11.225 |
| | Reengineered functions rather than processes | 1.654 | 0.061 | 14.190 |
| | Financial condition of firm not sound | 1.812 | 0.056 | 14.787 |
| | Reengineering scaled back due to politics | 1.733 | 0.052 | 15.404 |
| | Adequate training/workshops conducted | 1.976 | 0.041 | 17.233 |
| | Staff driven by fear, lacks optimism | 2.606 | 0.026 | 21.912 |
| | Let the consultant do it attitude | 2.181 | 0.013 | 31.042 |
| 16 | Project growth-oriented, not cost-cutting | 1.655 | 0.639 | 4.545 |
| | Adequate budget | 1.544 | 0.230 | 7.578 |
| | Too many projects for key team members | 1.822 | 0.174 | 8.697 |
| | Failure to involve middle management early in the project | 1.953 | 0.158 | 9.143 |
| | Sound proactive senior management already in place | 2.098 | 0.121 | 10.454 |
| | Aggressive target(s) set | 1.460 | 0.106 | 11.147 |
| | Project too focused on cost-cutting | 2.702 | 0.098 | 11.597 |
| | Reengineered functions rather than processes | 1.664 | 0.062 | 14.564 |
| | Financial condition of firm not sound | 1.829 | 0.059 | 14.962 |
| | Reengineering scaled back due to politics | 2.716 | 0.052 | 15.954 |
| | Adequate training/workshops conducted | 1.990 | 0.044 | 17.287 |
| | Staff driven by fear, lacks optimism | 2.657 | 0.030 | 20.872 |
| | Let the consultant do it attitude | 3.075 | 0.019 | 26.405 |
| | Management by consensus (lack of strong management | 3.805 | 0.012 | 33.290 |

**Table A-22 Stepwise Regression Analysis Project Scheduled All Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED11 | . | .237 | .056 | .051 | 1.07 |
| 2 | PREREQ12 | . | .344 | .119 | .110 | 1.03 |
| 3 | PREREQ15 | . | .393 | .154 | .141 | 1.02 |
| 4 | IMPED14 | . | .442 | .196 | .179 | .99 |
| 5 | IMPED12 | . | .465 | .216 | .196 | .98 |
| 6 | IMPED10 | . | .497 | .247 | .224 | .97 |
| 7 | IMPED07 | . | .567 | .321 | .296 | .92 |
| 8 | IMPED02 | . | .613 | .376 | .350 | .88 |
| 9 | IMPED17 | . | .641 | .410 | .382 | .86 |
| 10 | . | PREREQ12 | .636 | .404 | .379 | .86 |
| 11 | PREREQ10 | . | .652 | .426 | .398 | .85 |
| 12 | IMPED04 | . | .672 | .452 | .423 | .83 |
| 13 | PREREQ04 | . | .686 | .470 | .439 | .82 |
| 14 | PREREQ01 | . | .701 | .491 | .458 | .81 |
| 15 | PREREQ01[q] | . | .701 | .491 | .458 | .81 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

q. Probability of F-to-enter = .050 limits reached.

## Table A-23 Stepwise Regression Analysis Project Schedule All Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 1 | Financial condition of firm not sound | 1.000 | 0.055 | 5.973 |
| 2 | Financial condition of firm not sound | 1.018 | 0.166 | 4.105 |
| | Aggressive target(s) set | 1.018 | 0.040 | 8.333 |
| 3 | Financial condition of firm not sound | 1.069 | 0.210 | 4.144 |
| | Aggressive target(s) set | 1.060 | 0.145 | 4.991 |
| | Pilot project prior to full implementation | 1.105 | 0.033 | 10.401 |
| 4 | Financial condition of firm not sound | 1.163 | 0.214 | 4.602 |
| | Aggressive target(s) set | 1.111 | 0.146 | 5.581 |
| | Pilot project prior to full implementation | 1.167 | 0.071 | 7.989 |
| | Animosity towards Information Systems and Human Resources | 1.176 | 0.033 | 11.719 |
| 5 | Financial condition of firm not sound | 1.180 | 0.215 | 5.030 |
| | Aggressive target(s) set | 1.111 | 0.156 | 5.897 |
| | Pilot project prior to full implementation | 1.241 | 0.103 | 7.263 |
| | Animosity towards Information Systems and Human Resources | 1.310 | 0.066 | 9.062 |
| | Too many projects for key team members | 1.273 | 0.033 | 12.826 |
| 6 | Financial condition of firm not sound | 1.231 | 0.243 | 5.105 |
| | Aggressive target(s) set | 1.212 | 0.170 | 6.097 |
| | Pilot project prior to full implementation | 1.241 | 0.103 | 7.836 |
| | Animosity towards Information Systems and Human Resources | 1.438 | 0.071 | 9.420 |
| | Too many projects for key team members | 1.407 | 0.058 | 10.469 |
| | Management by consensus (lack of strong management | 1.514 | 0.032 | 14.150 |
| 7 | Financial condition of firm not sound | 1.231 | 0.265 | 5.226 |
| | Aggressive target(s) set | 1.222 | 0.171 | 6.508 |
| | Pilot project prior to full implementation | 1.250 | 0.103 | 8.382 |
| | Animosity towards Information Systems and Human Resources | 1.459 | 0.095 | 8.709 |
| | Too many projects for key team members | 1.407 | 0.063 | 10.697 |
| | Management by consensus (lack of strong management | 2.273 | 0.038 | 13.858 |
| | Let the consultant do it attitude | 1.832 | 0.031 | 15.330 |
| 8 | Financial condition of firm not sound | 1.257 | 0.297 | 5.229 |
| | Aggressive target(s) set | 1.260 | 0.171 | 6.890 |
| | Pilot project prior to full implementation | 1.270 | 0.104 | 8.831 |
| | Animosity towards Information Systems and Human Resources | 1.459 | 0.101 | 8.967 |
| | Too many projects for key team members | 1.506 | 0.093 | 9.341 |
| | Management by consensus (lack of strong management | 2.282 | 0.061 | 11.511 |
| | Let the consultant do it attitude | 2.034 | 0.034 | 15.342 |
| | Not focused on strategic value-added processes | 1.422 | 0.029 | 16.603 |

## Table A-24 Stepwise Regression Analysis Project Schedule All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 9 | Financial condition of firm not sound | 1.265 | 0.310 | 5.398 |
| | Aggressive target(s) set | 1.301 | 0.171 | 7.274 |
| | Pilot project prior to full implementation | 1.297 | 0.108 | 9.150 |
| | Animosity towards Information Systems and Human Resources | 1.461 | 0.103 | 9.366 |
| | Too many projects for key team members | 1.509 | 0.094 | 9.832 |
| | Management by consensus (lack of strong management | 3.843 | 0.068 | 11.505 |
| | Let the consultant do it attitude | 2.149 | 0.057 | 12.626 |
| | Not focused on strategic value-added processes | 1.481 | 0.029 | 17.530 |
| | Reengineering scaled back due to politics | 2.422 | 0.020 | 21.404 |
| 10 | Financial condition of firm not sound | 1.260 | 0.263 | 5.599 |
| | Pilot project prior to full implementation | 1.273 | 0.112 | 8.559 |
| | Animosity towards Information Systems and Human Resources | 1.376 | 0.108 | 8.733 |
| | Too many projects for key team members | 1.483 | 0.097 | 9.219 |
| | Management by consensus (lack of strong management | 3.412 | 0.073 | 10.611 |
| | Let the consultant do it attitude | 2.084 | 0.057 | 12.010 |
| | Not focused on strategic value-added processes | 1.419 | 0.037 | 14.949 |
| | Reengineering scaled back due to politics | 2.346 | 0.021 | 19.857 |
| 11 | Financial condition of firm not sound | 1.311 | 0.335 | 5.201 |
| | Pilot project prior to full implementation | 1.653 | 0.134 | 8.231 |
| | Animosity towards Information Systems and Human Resources | 1.377 | 0.112 | 8.986 |
| | Too many projects for key team members | 1.483 | 0.105 | 9.285 |
| | Management by consensus (lack of strong management | 3.442 | 0.073 | 11.130 |
| | Let the consultant do it attitude | 2.135 | 0.072 | 11.197 |
| | Not focused on strategic value-added processes | 1.447 | 0.057 | 12.598 |
| | Reengineering scaled back due to politics | 2.347 | 0.033 | 16.536 |
| | Adequate training/workshops conducted | 1.516 | 0.021 | 20.830 |
| 12 | Financial condition of firm not sound | 1.720 | 0.353 | 5.314 |
| | Pilot project prior to full implementation | 1.689 | 0.157 | 7.972 |
| | Animosity towards Information Systems and Human Resources | 1.581 | 0.115 | 9.329 |
| | Too many projects for key team members | 1.490 | 0.108 | 9.589 |
| | Management by consensus (lack of strong management | 4.114 | 0.077 | 11.413 |
| | Let the consultant do it attitude | 2.236 | 0.072 | 11.739 |
| | Not focused on strategic value-added processes | 1.520 | 0.061 | 12.742 |
| | Reengineering scaled back due to politics | 2.385 | 0.042 | 15.409 |
| | Adequate training/workshops conducted | 1.572 | 0.024 | 20.339 |
| | Project under-financed and/or under-staffed | 3.209 | 0.019 | 22.737 |

## Table A-25 Stepwise Regression Analysis Project Schedule All Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 13 | Financial condition of firm not sound | 1.794 | 0.521 | 4.528 |
| | Pilot project prior to full implementation | 1.693 | 0.164 | 8.080 |
| | Animosity towards Information Systems and Human Resources | 1.581 | 0.147 | 8.525 |
| | Too many projects for key team members | 1.789 | 0.110 | 9.861 |
| | Management by consensus (lack of strong management | 4.114 | 0.103 | 10.173 |
| | Let the consultant do it attitude | 2.292 | 0.076 | 11.888 |
| | Not focused on strategic value-added processes | 1.577 | 0.061 | 13.187 |
| | Reengineering scaled back due to politics | 2.404 | 0.053 | 14.223 |
| | Adequate training/workshops conducted | 1.951 | 0.040 | 16.369 |
| | Project under-financed and/or under-staffed | 3.242 | 0.023 | 21.623 |
| | Extensive use of cross-functional memberships on projects teams | 2.078 | 0.019 | 23.539 |
| 14 | Financial condition of firm not sound | 1.819 | 0.652 | 4.195 |
| | Pilot project prior to full implementation | 1.775 | 0.171 | 8.189 |
| | Animosity towards Information Systems and Human Resources | 1.602 | 0.150 | 8.760 |
| | Too many projects for key team members | 1.912 | 0.115 | 10.002 |
| | Management by consensus (lack of strong management | 4.236 | 0.104 | 10.529 |
| | Let the consultant do it attitude | 2.294 | 0.078 | 12.137 |
| | Not focused on strategic value-added processes | 1.577 | 0.066 | 13.189 |
| | Reengineering scaled back due to politics | 2.419 | 0.056 | 14.296 |
| | Adequate training/workshops conducted | 2.049 | 0.048 | 15.420 |
| | Project under-financed and/or under-staffed | 3.522 | 0.038 | 17.390 |
| | Extensive use of cross-functional memberships on projects teams | 2.692 | 0.023 | 22.483 |
| | Extensive user involvement in design | 3.323 | 0.019 | 24.768 |

**Table A-26 Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED15, PREREQ03, PREREQ09, PREREQ05, IMPED14, IMPED09, IMPED12, IMPED11, PREREQ14, IMPED18, IMPED08, IMPED02, IMPED10, PREREQ10, PREREQ04, IMPED16, IMPED17, PREREQ01, PREREQ07, PREREQ02, IMPED04, IMPED06[c,d] | . | .856 | .733 | .683 | .76 |

a. Dependent Variable: Project Success

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED15, PREREQ03, PREREQ09, PREREQ05, IMPED14, IMPED09, IMPED12, IMPED11, PREREQ14, IMPED18, IMPED08, IMPED02, IMPED10, PREREQ10, PREREQ04, IMPED16, IMPED17, PREREQ01, PREREQ07, PREREQ02, IMPED04, IMPED06

d. All requested variables entered.

**Table A-27 Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 266.678 | 31 | 8.603 | 14.777 | .000[b] |
| | Residual | 97.221 | 167 | .582 | | |
| | Total | 363.899 | 198 | | | |

a. Dependent Variable: Project Success

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, PREREQ11, IMPED01, IMPED15, PREREQ03, PREREQ09, PREREQ05, IMPED14, IMPED09, IMPED12, IMPED11, PREREQ14, IMPED18, IMPED08, IMPED02, IMPED10, PREREQ10, PREREQ04, IMPED16, IMPED17, PREREQ01, PREREQ07, PREREQ02, IMPED04, IMPED06

**Table A-28 Regression Analysis Project Budget All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06[c,d] | . | .752 | .565 | .485 | .77 |

a. Dependent Variable: Project Budget

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-29 Regression Analysis Project Budget All Variables Less First Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 130.372 | 31 | 4.206 | 7.011 | .000[b] |
| | Residual | 100.181 | 167 | .600 | | |
| | Total | 230.553 | 198 | | | |

a. Dependent Variable: Project Budget

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06

**Table A-30 Regression Analysis Project Schedule All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06[c,d] | . | .687 | .472 | .374 | .87 |

a. Dependent Variable: Project Schedule

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-31 Regression Analysis Project Schedule All Variables Less First Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 112.088 | 31 | 3.616 | 4.811 | .000[b] |
| | Residual | 125.510 | 167 | .752 | | |
| | Total | 237.598 | 198 | | | |

a. Dependent Variable: Project Schedule

b. Independent Variables: (Constant), PREREQ16, PREREQ15, IMPED05, PREREQ06, PREREQ13, IMPED03, PREREQ12, IMPED01, PREREQ11, IMPED12, PREREQ03, PREREQ09, PREREQ05, IMPED09, IMPED14, IMPED11, PREREQ14, IMPED17, IMPED08, IMPED15, PREREQ04, IMPED02, PREREQ10, IMPED16, IMPED10, IMPED18, PREREQ07, PREREQ02, IMPED04, PREREQ01, IMPED06

**Table A-32 Stepwise Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ13 | . | .319 | .102 | .097 | 1.29 |
| 2 | PREREQ07 | . | .553 | .305 | .298 | 1.14 |
| 3 | IMPED02 | . | .596 | .355 | .345 | 1.10 |
| 4 | IMPED16 | . | .627 | .393 | .381 | 1.07 |
| 5 | PREREQ14 | . | .653 | .426 | .411 | 1.04 |
| 6 | PREREQ02 | . | .696 | .485 | .469 | .99 |
| 7 | IMPED04 | . | .723 | .523 | .505 | .95 |
| 8 | IMPED05 | . | .756 | .572 | .554 | .91 |
| 9 | PREREQ05 | . | .767 | .588 | .569 | .89 |
| 10 | IMPED15 | . | .778 | .605 | .584 | .87 |
| 11 | PREREQ03 | . | .788 | .622 | .599 | .86 |
| 12 | PREREQ12 | . | .800 | .640 | .617 | .84 |
| 13 | IMPED10 | . | .807 | .652 | .627 | .83 |
| 14 | IMPED03 | . | .815 | .665 | .639 | .81 |
| 15 | IMPED14 | . | .822 | .675 | .649 | .80 |
| 16 | PREREQ15 | . | .829 | .688 | .660 | .79 |
| 17 | PREREQ10 | . | .834 | .696 | .667 | .78 |
| 18 | . | IMPED05 | .831 | .691 | .664 | .79 |
| 19 | . | IMPED05 | .831 | .691 | .664 | .79 |

a. Dependent Variable: Project Success

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

## Table A-33 Stepwise Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 1 | Significant portion of CEO's time committed to project | 1.000 | 0.064 | 5.498 |
| 2 | Significant portion of CEO's time committed to project | 1.153 | 0.106 | 5.161 |
| | Sound proactive senior management already in place | 1.153 | 0.064 | 6.654 |
| 3 | Significant portion of CEO's time committed to project | 1.199 | 0.217 | 4.106 |
| | Sound proactive senior management already in place | 1.165 | 0.098 | 6.117 |
| | Not focused on strategic value-added processes | 1.076 | 0.035 | 10.188 |
| 4 | Significant portion of CEO's time committed to project | 1.232 | 0.277 | 4.030 |
| | Sound proactive senior management already in place | 1.298 | 0.120 | 6.129 |
| | Not focused on strategic value-added processes | 1.230 | 0.068 | 8.112 |
| | Failure to measure performance (before, during, and after project) | 1.289 | 0.032 | 11.826 |
| 5 | Significant portion of CEO's time committed to project | 1.235 | 0.344 | 3.919 |
| | Sound proactive senior management already in place | 1.407 | 0.152 | 5.900 |
| | Not focused on strategic value-added processes | 1.255 | 0.120 | 6.641 |
| | Failure to measure performance (before, during, and after project) | 1.290 | 0.068 | 8.828 |
| | Senior executive responsible for the project | 1.190 | 0.030 | 13.221 |
| 6 | Significant portion of CEO's time committed to project | 1.242 | 0.421 | 3.807 |
| | Sound proactive senior management already in place | 2.107 | 0.154 | 6.303 |
| | Not focused on strategic value-added processes | 1.268 | 0.122 | 7.066 |
| | Failure to measure performance (before, during, and after project) | 1.366 | 0.114 | 7.319 |
| | Senior executive responsible for the project | 1.421 | 0.054 | 10.663 |
| | Strong senior management commitment/sponsorship | 2.223 | 0.028 | 14.723 |
| 7 | Significant portion of CEO's time committed to project | 1.261 | 0.492 | 3.757 |
| | Sound proactive senior management already in place | 2.108 | 0.157 | 6.645 |
| | Not focused on strategic value-added processes | 1.269 | 0.140 | 7.042 |
| | Failure to measure performance (before, during, and after project) | 1.833 | 0.115 | 7.765 |
| | Senior executive responsible for the project | 1.427 | 0.072 | 9.843 |
| | Strong senior management commitment/sponsorship | 2.289 | 0.047 | 12.153 |
| | Project under-financed and/or under-staffed | 1.528 | 0.027 | 15.896 |
| 8 | Significant portion of CEO's time committed to project | 1.281 | 0.553 | 3.757 |
| | Sound proactive senior management already in place | 2.124 | 0.159 | 7.013 |
| | Not focused on strategic value-added processes | 1.291 | 0.140 | 7.458 |
| | Failure to measure performance (before, during, and after project) | 1.896 | 0.123 | 7.976 |
| | Senior executive responsible for the project | 1.543 | 0.081 | 9.834 |
| | Strong senior management commitment/sponsorship | 2.379 | 0.063 | 11.113 |
| | Project under-financed and/or under-staffed | 1.726 | 0.047 | 12.945 |
| | Wrong sponsor | 1.657 | 0.024 | 17.965 |

## Table A-34 Stepwise Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 9 | Significant portion of CEO's time committed to project | 1.380 | 0.584 | 3.843 |
| | Sound proactive senior management already in place | 2.127 | 0.197 | 6.613 |
| | Not focused on strategic value-added processes | 1.471 | 0.159 | 7.377 |
| | Failure to measure performance (before, during, and after project) | 1.905 | 0.125 | 8.303 |
| | Senior executive responsible for the project | 1.544 | 0.096 | 9.459 |
| | Strong senior management commitment/sponsorship | 2.406 | 0.081 | 10.351 |
| | Project under-financed and/or under-staffed | 1.742 | 0.060 | 11.992 |
| | Wrong sponsor | 1.657 | 0.044 | 13.941 |
| | Project growth-oriented, not cost-cutting | 1.492 | 0.021 | 20.049 |
| 10 | Significant portion of CEO's time committed to project | 1.428 | 0.621 | 3.914 |
| | Sound proactive senior management already in place | 2.131 | 0.215 | 6.645 |
| | Not focused on strategic value-added processes | 1.480 | 0.162 | 7.668 |
| | Failure to measure performance (before, during, and after project) | 2.198 | 0.126 | 8.679 |
| | Senior executive responsible for the project | 1.605 | 0.097 | 9.903 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.082 | 10.795 |
| | Project under-financed and/or under-staffed | 1.763 | 0.067 | 11.949 |
| | Wrong sponsor | 1.660 | 0.057 | 12.911 |
| | Project growth-oriented, not cost-cutting | 1.618 | 0.042 | 15.011 |
| | Average performers assigned to the project | 1.792 | 0.019 | 22.476 |
| 11 | Significant portion of CEO's time committed to project | 1.467 | 0.627 | 4.062 |
| | Sound proactive senior management already in place | 2.388 | 0.217 | 6.913 |
| | Not focused on strategic value-added processes | 1.531 | 0.214 | 6.963 |
| | Failure to measure performance (before, during, and after project) | 2.346 | 0.140 | 8.594 |
| | Senior executive responsible for the project | 1.605 | 0.112 | 9.594 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.096 | 10.390 |
| | Project under-financed and/or under-staffed | 1.765 | 0.070 | 12.140 |
| | Wrong sponsor | 1.722 | 0.057 | 13.466 |
| | Project growth-oriented, not cost-cutting | 1.676 | 0.052 | 14.117 |
| | Average performers assigned to the project | 1.799 | 0.042 | 15.737 |
| | Project expectations were realistic | 1.406 | 0.019 | 23.510 |
| 12 | Significant portion of CEO's time committed to project | 1.468 | 0.647 | 4.163 |
| | Sound proactive senior management already in place | 2.450 | 0.243 | 6.796 |
| | Not focused on strategic value-added processes | 1.532 | 0.217 | 7.191 |
| | Failure to measure performance (before, during, and after project) | 2.493 | 0.140 | 8.935 |
| | Senior executive responsible for the project | 1.663 | 0.116 | 9.818 |
| | Strong senior management commitment/sponsorship | 2.561 | 0.111 | 10.068 |
| | Project under-financed and/or under-staffed | 1.780 | 0.096 | 10.810 |
| | Wrong sponsor | 1.722 | 0.069 | 12.700 |
| | Project growth-oriented, not cost-cutting | 1.725 | 0.056 | 14.085 |
| | Average performers assigned to the project | 2.023 | 0.047 | 15.369 |
| | Project expectations were realistic | 1.538 | 0.035 | 17.795 |
| | Aggressive target(s) set | 1.689 | 0.019 | 24.506 |

## Table A-35 Stepwise Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | Condition Number |
|---|---|---|---|---|
| | | VIF | Eigenvalue | |
| 13 | Significant portion of CEO's time committed to project | 1.488 | 0.726 | 4.080 |
| | Sound proactive senior management already in place | 2.561 | 0.244 | 7.042 |
| | Not focused on strategic value-added processes | 1.551 | 0.218 | 7.450 |
| | Failure to measure performance (before, during, and after project) | 2.497 | 0.140 | 9.277 |
| | Senior executive responsible for the project | 1.706 | 0.116 | 10.190 |
| | Strong senior management commitment/sponsorship | 2.656 | 0.115 | 10.235 |
| | Project under-financed and/or under-staffed | 2.387 | 0.100 | 10.981 |
| | Wrong sponsor | 2.034 | 0.070 | 13.173 |
| | Project growth-oriented, not cost-cutting | 1.753 | 0.059 | 14.258 |
| | Average performers assigned to the project | 2.192 | 0.051 | 15.354 |
| | Project expectations were realistic | 1.547 | 0.041 | 17.248 |
| | Aggressive target(s) set | 1.702 | 0.025 | 21.885 |
| | Management by consensus (lack of strong management | 3.021 | 0.019 | 25.454 |
| 14 | Significant portion of CEO's time committed to project | 1.488 | 0.755 | 4.143 |
| | Sound proactive senior management already in place | 3.075 | 0.244 | 7.293 |
| | Not focused on strategic value-added processes | 1.739 | 0.218 | 7.718 |
| | Failure to measure performance (before, during, and after project) | 2.698 | 0.149 | 9.339 |
| | Senior executive responsible for the project | 1.709 | 0.134 | 9.819 |
| | Strong senior management commitment/sponsorship | 2.744 | 0.116 | 10.582 |
| | Project under-financed and/or under-staffed | 2.904 | 0.107 | 11.029 |
| | Wrong sponsor | 2.043 | 0.073 | 13.334 |
| | Project growth-oriented, not cost-cutting | 1.792 | 0.069 | 13.704 |
| | Average performers assigned to the project | 2.234 | 0.053 | 15.585 |
| | Project expectations were realistic | 1.617 | 0.048 | 16.495 |
| | Aggressive target(s) set | 1.706 | 0.031 | 20.345 |
| | Management by consensus (lack of strong management | 3.074 | 0.022 | 24.190 |
| | Not following detailed methodology | 2.220 | 0.019 | 26.471 |
| 15 | Significant portion of CEO's time committed to project | 1.602 | 0.761 | 4.273 |
| | Sound proactive senior management already in place | 3.119 | 0.245 | 7.537 |
| | Not focused on strategic value-added processes | 1.767 | 0.220 | 7.944 |
| | Failure to measure performance (before, during, and after project) | 2.719 | 0.149 | 9.659 |
| | Senior executive responsible for the project | 1.745 | 0.135 | 10.138 |
| | Strong senior management commitment/sponsorship | 2.822 | 0.118 | 10.833 |
| | Project under-financed and/or under-staffed | 3.201 | 0.110 | 11.255 |
| | Wrong sponsor | 2.234 | 0.075 | 13.607 |
| | Project growth-oriented, not cost-cutting | 1.833 | 0.070 | 14.059 |
| | Average performers assigned to the project | 2.369 | 0.056 | 15.769 |
| | Project expectations were realistic | 1.617 | 0.049 | 16.915 |
| | Aggressive target(s) set | 1.761 | 0.048 | 17.078 |
| | Management by consensus (lack of strong management | 3.083 | 0.031 | 21.141 |
| | Not following detailed methodology | 2.228 | 0.021 | 25.479 |
| | Animosity towards Information Systems and Human Resources | 2.050 | 0.016 | 29.374 |

## Table A-36 Stepwise Regression Analysis Project Success All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 16 | Significant portion of CEO's time committed to project | 1.629 | 0.779 | 4.346 |
| | Sound proactive senior management already in place | 3.187 | 0.263 | 7.476 |
| | Not focused on strategic value-added processes | 1.767 | 0.220 | 8.171 |
| | Failure to measure performance (before, during, and after project) | 2.964 | 0.200 | 8.585 |
| | Senior executive responsible for the project | 1.765 | 0.138 | 10.316 |
| | Strong senior management commitment/sponsorship | 2.855 | 0.129 | 10.688 |
| | Project under-financed and/or under-staffed | 3.205 | 0.112 | 11.475 |
| | Wrong sponsor | 2.255 | 0.092 | 12.622 |
| | Project growth-oriented, not cost-cutting | 1.868 | 0.074 | 14.079 |
| | Average performers assigned to the project | 2.376 | 0.070 | 14.467 |
| | Project expectations were realistic | 1.781 | 0.056 | 16.224 |
| | Aggressive target(s) set | 1.777 | 0.049 | 17.403 |
| | Management by consensus (lack of strong management | 3.241 | 0.045 | 18.130 |
| | Not following detailed methodology | 2.236 | 0.030 | 22.121 |
| | Animosity towards Information Systems and Human Resources | 2.074 | 0.021 | 26.781 |
| | Pilot project prior to full implementation | 1.556 | 0.016 | 30.222 |
| 17 | Significant portion of CEO's time committed to project | 1.630 | 0.802 | 4.406 |
| | Sound proactive senior management already in place | 3.422 | 0.309 | 7.098 |
| | Not focused on strategic value-added processes | 1.904 | 0.226 | 8.293 |
| | Failure to measure performance (before, during, and after project) | 2.995 | 0.200 | 8.828 |
| | Senior executive responsible for the project | 1.822 | 0.139 | 10.594 |
| | Strong senior management commitment/sponsorship | 2.855 | 0.129 | 10.983 |
| | Project under-financed and/or under-staffed | 3.225 | 0.112 | 11.794 |
| | Wrong sponsor | 2.348 | 0.098 | 12.624 |
| | Project growth-oriented, not cost-cutting | 1.953 | 0.083 | 13.681 |
| | Average performers assigned to the project | 2.378 | 0.074 | 14.548 |
| | Project expectations were realistic | 1.814 | 0.065 | 15.484 |
| | Aggressive target(s) set | 1.819 | 0.052 | 17.227 |
| | Management by consensus (lack of strong management | 3.265 | 0.045 | 18.566 |
| | Not following detailed methodology | 2.244 | 0.042 | 19.150 |
| | Animosity towards Information Systems and Human Resources | 2.079 | 0.030 | 22.809 |
| | Pilot project prior to full implementation | 1.838 | 0.020 | 27.553 |
| | Adequate training/workshops conducted | 2.196 | 0.016 | 31.661 |
| 18 | Significant portion of CEO's time committed to project | 1.619 | 0.748 | 4.430 |
| | Sound proactive senior management already in place | 3.137 | 0.306 | 6.925 |
| | Not focused on strategic value-added processes | 1.891 | 0.226 | 8.064 |
| | Failure to measure performance (before, during, and after project) | 2.918 | 0.199 | 8.596 |
| | Senior executive responsible for the project | 1.730 | 0.133 | 10.523 |
| | Strong senior management commitment/sponsorship | 2.635 | 0.121 | 11.024 |
| | Project under-financed and/or under-staffed | 3.217 | 0.111 | 11.503 |
| | Project growth-oriented, not cost-cutting | 1.924 | 0.098 | 12.269 |
| | Average performers assigned to the project | 2.336 | 0.080 | 13.521 |
| | Project expectations were realistic | 1.755 | 0.070 | 14.468 |
| | Aggressive target(s) set | 1.818 | 0.056 | 16.237 |
| | Management by consensus (lack of strong management | 2.802 | 0.050 | 17.146 |
| | Not following detailed methodology | 2.236 | 0.043 | 18.497 |
| | Animosity towards Information Systems and Human Resources | 1.888 | 0.030 | 22.147 |
| | Pilot project prior to full implementation | 1.788 | 0.023 | 25.017 |
| | Adequate training/workshops conducted | 2.109 | 0.017 | 29.075 |

**Table A-37 Stepwise Regression Analysis Project Budget All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ05 | . | .283 | .080 | .076 | 1.04 |
| 2 | PREREQ03 | . | .399 | .159 | .151 | .99 |
| 3 | PREREQ09 | . | .449 | .201 | .189 | .97 |
| 4 | IMPED12 | . | .491 | .241 | .225 | .95 |
| 5 | IMPED18 | . | .548 | .301 | .282 | .91 |
| 6 | PREREQ07 | . | .595 | .355 | .334 | .88 |
| 7 | PREREQ12 | . | .632 | .399 | .377 | .85 |
| 8 | . | PREREQ03 | .628 | .395 | .376 | .85 |
| 9 | IMPED08 | . | .649 | .422 | .401 | .84 |
| 10 | IMPED01 | . | .667 | .445 | .422 | .82 |
| 11 | IMPED11 | . | .680 | .463 | .437 | .81 |
| 12 | IMPED17 | . | .689 | .474 | .446 | .80 |
| 13 | PREREQ10 | . | .699 | .489 | .458 | .79 |
| 14 | PREREQ10[p] | . | .699 | .489 | .458 | .79 |

a. Dependent Variable: Project Budget

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

p. Probability of F-to-enter = .050 limits reached.

## Table A-38 Stepwise Regression Analysis Project Budget All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Project growth-oriented, not cost-cutting | 1.000 | 0.107 | 4.213 |
| 2 | Project growth-oriented, not cost-cutting | 1.023 | 0.159 | 4.172 |
| | Project expectations were realistic | 1.023 | 0.075 | 6.059 |
| 3 | Project growth-oriented, not cost-cutting | 1.043 | 0.166 | 4.673 |
| | Project expectations were realistic | 1.056 | 0.142 | 5.053 |
| | Adequate budget | 1.061 | 0.068 | 7.320 |
| 4 | Project growth-oriented, not cost-cutting | 1.083 | 0.218 | 4.511 |
| | Project expectations were realistic | 1.063 | 0.153 | 5.382 |
| | Adequate budget | 1.068 | 0.142 | 5.602 |
| | Too many projects for key team members | 1.051 | 0.041 | 10.461 |
| 5 | Project growth-oriented, not cost-cutting | 1.134 | 0.282 | 4.322 |
| | Project expectations were realistic | 1.063 | 0.169 | 5.592 |
| | Adequate budget | 1.162 | 0.149 | 5.941 |
| | Too many projects for key team members | 1.098 | 0.098 | 7.318 |
| | Failure to involve middle management early in the project | 1.230 | 0.027 | 13.991 |
| 6 | Project growth-oriented, not cost-cutting | 1.205 | 0.317 | 4.398 |
| | Project expectations were realistic | 1.231 | 0.170 | 6.009 |
| | Adequate budget | 1.183 | 0.152 | 6.347 |
| | Too many projects for key team members | 1.125 | 0.123 | 7.075 |
| | Failure to involve middle management early in the project | 1.325 | 0.076 | 8.984 |
| | Sound proactive senior management already in place | 1.498 | 0.026 | 15.364 |
| 7 | Project growth-oriented, not cost-cutting | 1.246 | 0.317 | 4.693 |
| | Project expectations were realistic | 1.309 | 0.192 | 6.033 |
| | Adequate budget | 1.186 | 0.166 | 6.496 |
| | Too many projects for key team members | 1.134 | 0.138 | 7.112 |
| | Failure to involve middle management early in the project | 1.380 | 0.108 | 8.045 |
| | Sound proactive senior management already in place | 1.746 | 0.062 | 10.626 |
| | Aggressive target(s) set | 1.290 | 0.026 | 16.417 |
| 8 | Project growth-oriented, not cost-cutting | 1.243 | 0.311 | 4.444 |
| | Adequate budget | 1.169 | 0.176 | 5.899 |
| | Too many projects for key team members | 1.120 | 0.145 | 6.504 |
| | Failure to involve middle management early in the project | 1.351 | 0.109 | 7.491 |
| | Sound proactive senior management already in place | 1.433 | 0.093 | 8.146 |
| | Aggressive target(s) set | 1.212 | 0.027 | 15.157 |
| 9 | Project growth-oriented, not cost-cutting | 1.485 | 0.428 | 4.039 |
| | Adequate budget | 1.252 | 0.176 | 6.288 |
| | Too many projects for key team members | 1.385 | 0.145 | 6.933 |
| | Failure to involve middle management early in the project | 1.488 | 0.110 | 7.978 |
| | Sound proactive senior management already in place | 1.519 | 0.093 | 8.673 |
| | Aggressive target(s) set | 1.236 | 0.055 | 11.224 |
| | Project too focused on cost-cutting | 2.395 | 0.018 | 19.534 |

## Table A-39 Stepwise Regression Analysis Project Budget All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 10 | Project growth-oriented, not cost-cutting | 1.492 | 0.471 | 4.075 |
| | Adequate budget | 1.256 | 0.194 | 6.342 |
| | Too many projects for key team members | 1.401 | 0.155 | 7.100 |
| | Failure to involve middle management early in the project | 1.534 | 0.119 | 8.099 |
| | Sound proactive senior management already in place | 1.607 | 0.093 | 9.162 |
| | Aggressive target(s) set | 1.269 | 0.083 | 9.722 |
| | Project too focused on cost-cutting | 2.492 | 0.051 | 12.436 |
| | Reengineered functions rather than processes | 1.382 | 0.018 | 21.132 |
| 11 | Project growth-oriented, not cost-cutting | 1.502 | 0.502 | 4.167 |
| | Adequate budget | 1.295 | 0.200 | 6.600 |
| | Too many projects for key team members | 1.401 | 0.159 | 7.400 |
| | Failure to involve middle management early in the project | 1.579 | 0.123 | 8.408 |
| | Sound proactive senior management already in place | 1.607 | 0.100 | 9.351 |
| | Aggressive target(s) set | 1.308 | 0.083 | 10.250 |
| | Project too focused on cost-cutting | 2.585 | 0.060 | 12.083 |
| | Reengineered functions rather than processes | 1.475 | 0.045 | 13.914 |
| | Financial condition of firm not sound | 1.529 | 0.016 | 23.032 |
| 12 | Project growth-oriented, not cost-cutting | 1.503 | 0.520 | 4.301 |
| | Adequate budget | 1.339 | 0.201 | 6.917 |
| | Too many projects for key team members | 1.524 | 0.159 | 7.774 |
| | Failure to involve middle management early in the project | 1.806 | 0.140 | 8.298 |
| | Sound proactive senior management already in place | 1.609 | 0.100 | 9.824 |
| | Aggressive target(s) set | 1.310 | 0.092 | 10.223 |
| | Project too focused on cost-cutting | 2.587 | 0.060 | 12.657 |
| | Reengineered functions rather than processes | 1.511 | 0.055 | 13.276 |
| | Financial condition of firm not sound | 1.553 | 0.044 | 14.773 |
| | Reengineering scaled back due to politics | 1.561 | 0.015 | 25.478 |
| 13 | Project growth-oriented, not cost-cutting | 1.585 | 0.569 | 4.285 |
| | Adequate budget | 1.446 | 0.213 | 6.998 |
| | Too many projects for key team members | 1.559 | 0.165 | 7.946 |
| | Failure to involve middle management early in the project | 1.837 | 0.142 | 8.566 |
| | Sound proactive senior management already in place | 1.873 | 0.115 | 9.515 |
| | Aggressive target(s) set | 1.354 | 0.099 | 10.258 |
| | Project too focused on cost-cutting | 2.621 | 0.082 | 11.258 |
| | Reengineered functions rather than processes | 1.559 | 0.055 | 13.749 |
| | Financial condition of firm not sound | 1.601 | 0.054 | 13.913 |
| | Reengineering scaled back due to politics | 1.599 | 0.041 | 16.011 |
| | Adequate training/workshops conducted | 1.606 | 0.015 | 26.666 |

**Table A-40 Stepwise Regression Analysis Project Schedule All Variables Less First Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED11 | . | .237 | .056 | .051 | 1.07 |
| 2 | PREREQ12 | . | .344 | .119 | .110 | 1.03 |
| 3 | PREREQ15 | . | .393 | .154 | .141 | 1.02 |
| 4 | IMPED14 | . | .442 | .196 | .179 | .99 |
| 5 | IMPED12 | . | .465 | .216 | .196 | .98 |
| 6 | IMPED10 | . | .497 | .247 | .224 | .97 |
| 7 | IMPED02 | . | .516 | .266 | .239 | .96 |
| 8 | IMPED16 | . | .531 | .282 | .252 | .95 |
| 9 | PREREQ02 | . | .546 | .298 | .264 | .94 |
| 10 | PREREQ04 | . | .564 | .318 | .282 | .93 |
| 11 | PREREQ04[m] | . | .564 | .318 | .282 | .93 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

m. Probability of F-to-enter = .050 limits reached.

## Table A-41 Stepwise Regression Analysis Project Schedule All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 1 | Financial condition of firm not sound | 1.000 | 0.055 | 5.973 |
| 2 | Financial condition of firm not sound | 1.018 | 0.166 | 4.105 |
| | Aggressive target(s) set | 1.018 | 0.040 | 8.333 |
| 3 | Financial condition of firm not sound | 1.069 | 0.210 | 4.144 |
| | Aggressive target(s) set | 1.060 | 0.145 | 4.991 |
| | Pilot project prior to full implementation | 1.105 | 0.033 | 10.401 |
| 4 | Financial condition of firm not sound | 1.163 | 0.214 | 4.602 |
| | Aggressive target(s) set | 1.111 | 0.146 | 5.581 |
| | Pilot project prior to full implementation | 1.167 | 0.071 | 7.989 |
| | Animosity towards Information Systems and Human Resources | 1.176 | 0.033 | 11.719 |
| 5 | Financial condition of firm not sound | 1.180 | 0.215 | 5.030 |
| | Aggressive target(s) set | 1.111 | 0.156 | 5.897 |
| | Pilot project prior to full implementation | 1.241 | 0.103 | 7.263 |
| | Animosity towards Information Systems and Human Resources | 1.310 | 0.066 | 9.062 |
| | Too many projects for key team members | 1.273 | 0.033 | 12.826 |
| 6 | Financial condition of firm not sound | 1.231 | 0.243 | 5.105 |
| | Aggressive target(s) set | 1.212 | 0.170 | 6.097 |
| | Pilot project prior to full implementation | 1.241 | 0.103 | 7.836 |
| | Animosity towards Information Systems and Human Resources | 1.438 | 0.071 | 9.420 |
| | Too many projects for key team members | 1.407 | 0.058 | 10.469 |
| | Management by consensus (lack of strong management | 1.514 | 0.032 | 14.150 |
| 7 | Financial condition of firm not sound | 1.252 | 0.280 | 5.066 |
| | Aggressive target(s) set | 1.236 | 0.170 | 6.496 |
| | Pilot project prior to full implementation | 1.268 | 0.104 | 8.333 |
| | Animosity towards Information Systems and Human Resources | 1.442 | 0.098 | 8.559 |
| | Too many projects for key team members | 1.493 | 0.069 | 10.198 |
| | Management by consensus (lack of strong management | 1.547 | 0.058 | 11.181 |
| | Not focused on strategic value-added processes | 1.281 | 0.029 | 15.633 |
| 8 | Financial condition of firm not sound | 1.392 | 0.329 | 4.955 |
| | Aggressive target(s) set | 1.236 | 0.172 | 6.847 |
| | Pilot project prior to full implementation | 1.397 | 0.106 | 8.710 |
| | Animosity towards Information Systems and Human Resources | 1.490 | 0.103 | 8.836 |
| | Too many projects for key team members | 1.529 | 0.069 | 10.806 |
| | Management by consensus (lack of strong management | 1.745 | 0.058 | 11.765 |
| | Not focused on strategic value-added processes | 1.306 | 0.054 | 12.244 |
| | Failure to measure performance (before, during, and after project) | 2.004 | 0.029 | 16.600 |

## Table A-42 Stepwise Regression Analysis Project Schedule All Variables Less First Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 9 | Financial condition of firm not sound | 1.512 | 0.455 | 4.399 |
| | Aggressive target(s) set | 1.432 | 0.209 | 6.495 |
| | Pilot project prior to full implementation | 1.414 | 0.132 | 8.155 |
| | Animosity towards Information Systems and Human Resources | 1.491 | 0.106 | 9.100 |
| | Too many projects for key team members | 1.615 | 0.093 | 9.708 |
| | Management by consensus (lack of strong management | 1.940 | 0.068 | 11.351 |
| | Not focused on strategic value-added processes | 1.325 | 0.058 | 12.325 |
| | Failure to measure performance (before, during, and after project) | 2.108 | 0.050 | 13.251 |
| | Strong senior management commitment/sponsorship | 1.684 | 0.024 | 19.010 |
| 10 | Financial condition of firm not sound | 1.552 | 0.576 | 4.070 |
| | Aggressive target(s) set | 1.509 | 0.227 | 6.490 |
| | Pilot project prior to full implementation | 1.476 | 0.182 | 7.231 |
| | Animosity towards Information Systems and Human Resources | 1.494 | 0.106 | 9.474 |
| | Too many projects for key team members | 1.798 | 0.095 | 10.008 |
| | Management by consensus (lack of strong management | 1.970 | 0.080 | 10.944 |
| | Not focused on strategic value-added processes | 1.328 | 0.068 | 11.871 |
| | Failure to measure performance (before, during, and after project) | 2.214 | 0.058 | 12.840 |
| | Strong senior management commitment/sponsorship | 2.323 | 0.042 | 14.985 |
| | Extensive use of cross-functional memberships on projects teams | 2.203 | 0.024 | 20.127 |

**Table A-43 Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ01, PREREQ13, IMPED03, IMPED09, PREREQ12, PREREQ09, PREREQ03, PREREQ06, IMPED05, PREREQ05, IMPED01, IMPED14, PREREQ11, IMPED15, PREREQ14, IMPED12, IMPED11, IMPED18, IMPED08, IMPED10, IMPED02, IMPED16, PREREQ07, PREREQ04, IMPED17, IMPED04, PREREQ02, IMPED06[c,d] | . | .847 | .718 | .669 | .78 |

a. Dependent Variable: Project Success

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ01, PREREQ13, IMPED03, IMPED09, PREREQ12, PREREQ09, PREREQ03, PREREQ06, IMPED05, PREREQ05, IMPED01, IMPED14, PREREQ11, IMPED15, PREREQ14, IMPED12, IMPED11, IMPED18, IMPED08, IMPED10, IMPED02, IMPED16, PREREQ07, PREREQ04, IMPED17, IMPED04, PREREQ02, IMPED06

d. All requested variables entered.

**Table A-44 Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 261.220 | 29 | 9.008 | 14.826 | .000[b] |
| | Residual | 102.679 | 169 | .608 | | |
| | Total | 363.899 | 198 | | | |

a. Dependent Variable: Project Success

b. Independent Variables: (Constant), PREREQ16, PREREQ01, PREREQ13, IMPED03, IMPED09, PREREQ12, PREREQ09, PREREQ03, PREREQ06, IMPED05, PREREQ05, IMPED01, IMPED14, PREREQ11, IMPED15, PREREQ14, IMPED12, IMPED11, IMPED18, IMPED08, IMPED10, IMPED02, IMPED16, PREREQ07, PREREQ04, IMPED17, IMPED04, PREREQ02, IMPED06

**Table A-45 Regression Analysis Project Budget All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06[c,d] | . | .735 | .540 | .461 | .79 |

a. Dependent Variable: Project Budget

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-46 Regression Analysis Project Budget All Variables Less First and Second Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 124.477 | 29 | 4.292 | 6.839 | .000[b] |
| | Residual | 106.075 | 169 | .628 | | |
| | Total | 230.553 | 198 | | | |

a. Dependent Variable: Project Budget

b. Independent Variables: (Constant), PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06

**Table A-47 Regression Analysis Project Schedule All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06[c,d] | . | .654 | .428 | .330 | .90 |

a. Dependent Variable: Project Schedule

b. Method: Enter

c. Independent Variables: (Constant), PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06

d. All requested variables entered.

**Table A-48 Regression Analysis Project Schedule All Variables Less First and Second Group of Intercorrelated Variables continued**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 101.700 | 29 | 3.507 | 4.361 | .000[b] |
| | Residual | 135.898 | 169 | .804 | | |
| | Total | 237.598 | 198 | | | |

a. Dependent Variable: Project Schedule

b. Independent Variables: (Constant), PREREQ16, PREREQ11, PREREQ13, IMPED03, PREREQ12, IMPED09, PREREQ06, PREREQ09, IMPED01, IMPED14, PREREQ03, PREREQ05, IMPED05, IMPED12, IMPED11, IMPED18, PREREQ14, IMPED15, IMPED08, IMPED17, IMPED02, PREREQ04, IMPED16, PREREQ07, IMPED10, PREREQ02, IMPED04, PREREQ01, IMPED06

**Table A-49 Stepwise Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ13 | . | .319 | .102 | .097 | 1.29 |
| 2 | PREREQ07 | . | .553 | .305 | .298 | 1.14 |
| 3 | IMPED02 | . | .596 | .355 | .345 | 1.10 |
| 4 | IMPED16 | . | .627 | .393 | .381 | 1.07 |
| 5 | PREREQ14 | . | .653 | .426 | .411 | 1.04 |
| 6 | PREREQ02 | . | .696 | .485 | .469 | .99 |
| 7 | IMPED04 | . | .723 | .523 | .505 | .95 |
| 8 | IMPED05 | . | .756 | .572 | .554 | .91 |
| 9 | PREREQ05 | . | .767 | .588 | .569 | .89 |
| 10 | IMPED15 | . | .778 | .605 | .584 | .87 |
| 11 | PREREQ03 | . | .788 | .622 | .599 | .86 |
| 12 | PREREQ12 | . | .800 | .640 | .617 | .84 |
| 13 | IMPED10 | . | .807 | .652 | .627 | .83 |
| 14 | IMPED03 | . | .815 | .665 | .639 | .81 |
| 15 | IMPED14 | . | .822 | .675 | .649 | .80 |
| 16 | IMPED14 | . | .822 | .675 | .649 | .80 |

a. Dependent Variable: Project Success

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

r. Probability of F-to-enter = .050 limits reached.

## Table A-50 Stepwise Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostics

| | | Collinearity Statistics | | |
|---|---|---|---|---|
| Model | Variable | VIF | Eigenvalue | Condition Number |
| 1 | Significant portion of CEO's time committed to project | 1.000 | 0.064 | 5.498 |
| 2 | Significant portion of CEO's time committed to project | 1.153 | 0.106 | 5.161 |
| | Sound proactive senior management already in place | 1.153 | 0.064 | 6.654 |
| 3 | Significant portion of CEO's time committed to project | 1.199 | 0.217 | 4.106 |
| | Sound proactive senior management already in place | 1.165 | 0.098 | 6.117 |
| | Not focused on strategic value-added processes | 1.076 | 0.035 | 10.188 |
| 4 | Significant portion of CEO's time committed to project | 1.232 | 0.277 | 4.030 |
| | Sound proactive senior management already in place | 1.298 | 0.120 | 6.129 |
| | Not focused on strategic value-added processes | 1.230 | 0.068 | 8.112 |
| | Failure to measure performance (before, during, and after project) | 1.289 | 0.032 | 11.826 |
| 5 | Significant portion of CEO's time committed to project | 1.235 | 0.344 | 3.919 |
| | Sound proactive senior management already in place | 1.407 | 0.152 | 5.900 |
| | Not focused on strategic value-added processes | 1.255 | 0.120 | 6.641 |
| | Failure to measure performance (before, during, and after project) | 1.290 | 0.068 | 8.828 |
| | Senior executive responsible for the project | 1.190 | 0.030 | 13.221 |
| 6 | Significant portion of CEO's time committed to project | 1.242 | 0.421 | 3.807 |
| | Sound proactive senior management already in place | 2.107 | 0.154 | 6.303 |
| | Not focused on strategic value-added processes | 1.268 | 0.122 | 7.066 |
| | Failure to measure performance (before, during, and after project) | 1.366 | 0.114 | 7.319 |
| | Senior executive responsible for the project | 1.421 | 0.054 | 10.663 |
| | Strong senior management commitment/sponsorship | 2.223 | 0.028 | 14.723 |
| 7 | Significant portion of CEO's time committed to project | 1.261 | 0.492 | 3.757 |
| | Sound proactive senior management already in place | 2.108 | 0.157 | 6.645 |
| | Not focused on strategic value-added processes | 1.269 | 0.140 | 7.042 |
| | Failure to measure performance (before, during, and after project) | 1.833 | 0.115 | 7.765 |
| | Senior executive responsible for the project | 1.427 | 0.072 | 9.843 |
| | Strong senior management commitment/sponsorship | 2.289 | 0.047 | 12.153 |
| | Project under-financed and/or under-staffed | 1.528 | 0.027 | 15.896 |
| 8 | Significant portion of CEO's time committed to project | 1.281 | 0.553 | 3.757 |
| | Sound proactive senior management already in place | 2.124 | 0.159 | 7.013 |
| | Not focused on strategic value-added processes | 1.291 | 0.140 | 7.458 |
| | Failure to measure performance (before, during, and after project) | 1.896 | 0.123 | 7.978 |
| | Senior executive responsible for the project | 1.543 | 0.081 | 9.834 |
| | Strong senior management commitment/sponsorship | 2.379 | 0.063 | 11.113 |
| | Project under-financed and/or under-staffed | 1.726 | 0.047 | 12.945 |
| | Wrong sponsor | 1.657 | 0.024 | 17.965 |

## Table A-51 Stepwise Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 9 | Significant portion of CEO's time committed to project | 1.380 | 0.584 | 3.843 |
| | Sound proactive senior management already in place | 2.127 | 0.197 | 6.613 |
| | Not focused on strategic value-added processes | 1.471 | 0.159 | 7.377 |
| | Failure to measure performance (before, during, and after project) | 1.905 | 0.125 | 8.303 |
| | Senior executive responsible for the project | 1.544 | 0.096 | 9.459 |
| | Strong senior management commitment/sponsorship | 2.406 | 0.081 | 10.351 |
| | Project under-financed and/or under-staffed | 1.742 | 0.060 | 11.992 |
| | Wrong sponsor | 1.657 | 0.044 | 13.941 |
| | Project growth-oriented, not cost-cutting | 1.492 | 0.021 | 20.049 |
| 10 | Significant portion of CEO's time committed to project | 1.428 | 0.621 | 3.914 |
| | Sound proactive senior management already in place | 2.131 | 0.215 | 6.645 |
| | Not focused on strategic value-added processes | 1.480 | 0.162 | 7.668 |
| | Failure to measure performance (before, during, and after project) | 2.198 | 0.126 | 8.679 |
| | Senior executive responsible for the project | 1.605 | 0.097 | 9.903 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.082 | 10.795 |
| | Project under-financed and/or under-staffed | 1.763 | 0.067 | 11.949 |
| | Wrong sponsor | 1.660 | 0.057 | 12.911 |
| | Project growth-oriented, not cost-cutting | 1.618 | 0.042 | 15.011 |
| | Average performers assigned to the project | 1.792 | 0.019 | 22.476 |
| 11 | Significant portion of CEO's time committed to project | 1.467 | 0.627 | 4.062 |
| | Sound proactive senior management already in place | 2.388 | 0.217 | 6.913 |
| | Not focused on strategic value-added processes | 1.531 | 0.214 | 6.963 |
| | Failure to measure performance (before, during, and after project) | 2.346 | 0.140 | 8.594 |
| | Senior executive responsible for the project | 1.605 | 0.112 | 9.594 |
| | Strong senior management commitment/sponsorship | 2.446 | 0.096 | 10.390 |
| | Project under-financed and/or under-staffed | 1.765 | 0.070 | 12.140 |
| | Wrong sponsor | 1.722 | 0.057 | 13.466 |
| | Project growth-oriented, not cost-cutting | 1.676 | 0.052 | 14.117 |
| | Average performers assigned to the project | 1.799 | 0.042 | 15.737 |
| | Project expectations were realistic | 1.406 | 0.019 | 23.510 |
| 12 | Significant portion of CEO's time committed to project | 1.468 | 0.647 | 4.163 |
| | Sound proactive senior management already in place | 2.450 | 0.243 | 6.796 |
| | Not focused on strategic value-added processes | 1.532 | 0.217 | 7.191 |
| | Failure to measure performance (before, during, and after project) | 2.493 | 0.140 | 8.935 |
| | Senior executive responsible for the project | 1.663 | 0.116 | 9.818 |
| | Strong senior management commitment/sponsorship | 2.561 | 0.111 | 10.068 |
| | Project under-financed and/or under-staffed | 1.780 | 0.096 | 10.810 |
| | Wrong sponsor | 1.722 | 0.069 | 12.700 |
| | Project growth-oriented, not cost-cutting | 1.725 | 0.056 | 14.085 |
| | Average performers assigned to the project | 2.023 | 0.047 | 15.369 |
| | Project expectations were realistic | 1.538 | 0.035 | 17.795 |
| | Aggressive target(s) set | 1.689 | 0.019 | 24.506 |

## Table A-52 Stepwise Regression Analysis Project Success All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics VIF | Eigenvalue | Condition Number |
|---|---|---|---|---|
| 13 | Significant portion of CEO's time committed to project | 1.488 | 0.726 | 4.080 |
| | Sound proactive senior management already in place | 2.561 | 0.244 | 7.042 |
| | Not focused on strategic value-added processes | 1.551 | 0.218 | 7.450 |
| | Failure to measure performance (before, during, and after project) | 2.497 | 0.140 | 9.277 |
| | Senior executive responsible for the project | 1.706 | 0.116 | 10.190 |
| | Strong senior management commitment/sponsorship | 2.656 | 0.115 | 10.235 |
| | Project under-financed and/or under-staffed | 2.387 | 0.100 | 10.981 |
| | Wrong sponsor | 2.034 | 0.070 | 13.173 |
| | Project growth-oriented, not cost-cutting | 1.753 | 0.059 | 14.258 |
| | Average performers assigned to the project | 2.192 | 0.051 | 15.354 |
| | Project expectations were realistic | 1.547 | 0.041 | 17.248 |
| | Aggressive target(s) set | 1.702 | 0.025 | 21.885 |
| | Management by consensus (lack of strong management | 3.021 | 0.019 | 25.454 |
| 14 | Significant portion of CEO's time committed to project | 1.488 | 0.755 | 4.143 |
| | Sound proactive senior management already in place | 3.075 | 0.244 | 7.293 |
| | Not focused on strategic value-added processes | 1.739 | 0.218 | 7.718 |
| | Failure to measure performance (before, during, and after project) | 2.698 | 0.149 | 9.339 |
| | Senior executive responsible for the project | 1.709 | 0.134 | 9.819 |
| | Strong senior management commitment/sponsorship | 2.744 | 0.116 | 10.582 |
| | Project under-financed and/or under-staffed | 2.904 | 0.107 | 11.029 |
| | Wrong sponsor | 2.043 | 0.073 | 13.334 |
| | Project growth-oriented, not cost-cutting | 1.792 | 0.069 | 13.704 |
| | Average performers assigned to the project | 2.234 | 0.053 | 15.585 |
| | Project expectations were realistic | 1.617 | 0.048 | 16.495 |
| | Aggressive target(s) set | 1.706 | 0.031 | 20.345 |
| | Management by consensus (lack of strong management | 3.074 | 0.022 | 24.190 |
| | Not following detailed methodology | 2.220 | 0.019 | 26.471 |
| 15 | Significant portion of CEO's time committed to project | 1.602 | 0.761 | 4.273 |
| | Sound proactive senior management already in place | 3.119 | 0.245 | 7.537 |
| | Not focused on strategic value-added processes | 1.767 | 0.220 | 7.944 |
| | Failure to measure performance (before, during, and after project) | 2.719 | 0.149 | 9.659 |
| | Senior executive responsible for the project | 1.745 | 0.135 | 10.138 |
| | Strong senior management commitment/sponsorship | 2.822 | 0.118 | 10.833 |
| | Project under-financed and/or under-staffed | 3.201 | 0.110 | 11.255 |
| | Wrong sponsor | 2.234 | 0.075 | 13.607 |
| | Project growth-oriented, not cost-cutting | 1.833 | 0.070 | 14.059 |
| | Average performers assigned to the project | 2.369 | 0.056 | 15.769 |
| | Project expectations were realistic | 1.617 | 0.049 | 16.915 |
| | Aggressive target(s) set | 1.761 | 0.048 | 17.078 |
| | Management by consensus (lack of strong management | 3.083 | 0.031 | 21.141 |
| | Not following detailed methodology | 2.228 | 0.021 | 25.479 |
| | Animosity towards Information Systems and Human Resources | 2.050 | 0.016 | 29.374 |

**Table A-53 Stepwise Regression Analysis Project Budget All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ05 | . | .283 | .080 | .076 | 1.04 |
| 2 | PREREQ03 | . | .399 | .159 | .151 | .99 |
| 3 | PREREQ09 | . | .449 | .201 | .189 | .97 |
| 4 | IMPED12 | . | .491 | .241 | .225 | .95 |
| 5 | IMPED18 | . | .548 | .301 | .282 | .91 |
| 6 | PREREQ07 | . | .595 | .355 | .334 | .88 |
| 7 | PREREQ12 | . | .632 | .399 | .377 | .85 |
| 8 | . | PREREQ03 | .628 | .395 | .376 | .85 |
| 9 | IMPED08 | . | .649 | .422 | .401 | .84 |
| 10 | IMPED01 | . | .667 | .445 | .422 | .82 |
| 11 | IMPED11 | . | .680 | .463 | .437 | .81 |
| 12 | IMPED17 | . | .689 | .474 | .446 | .80 |
| 13 | IMPED05 | . | .697 | .486 | .456 | .80 |
| 14 | IMPED05[p] | . | .697 | .486 | .456 | .80 |

a. Dependent Variable: Project Budget

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

p. Probability of F-to-enter = .050 limits reached.

## Table A-54 Stepwise Regression Analysis Project Budget All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Project growth-oriented, not cost-cutting | 1.000 | 0.107 | 4.213 |
| 2 | Project growth-oriented, not cost-cutting | 1.023 | 0.159 | 4.172 |
| | Project expectations were realistic | 1.023 | 0.075 | 6.059 |
| 3 | Project growth-oriented, not cost-cutting | 1.043 | 0.166 | 4.673 |
| | Project expectations were realistic | 1.056 | 0.142 | 5.053 |
| | Adequate budget | 1.061 | 0.068 | 7.320 |
| 4 | Project growth-oriented, not cost-cutting | 1.083 | 0.218 | 4.511 |
| | Project expectations were realistic | 1.063 | 0.153 | 5.382 |
| | Adequate budget | 1.068 | 0.142 | 5.602 |
| | Too many projects for key team members | 1.051 | 0.041 | 10.461 |
| 5 | Project growth-oriented, not cost-cutting | 1.134 | 0.282 | 4.322 |
| | Project expectations were realistic | 1.063 | 0.169 | 5.592 |
| | Adequate budget | 1.162 | 0.149 | 5.941 |
| | Too many projects for key team members | 1.098 | 0.098 | 7.318 |
| | Failure to involve middle management early in the project | 1.230 | 0.027 | 13.991 |
| 6 | Project growth-oriented, not cost-cutting | 1.205 | 0.317 | 4.398 |
| | Project expectations were realistic | 1.231 | 0.170 | 6.009 |
| | Adequate budget | 1.183 | 0.152 | 6.347 |
| | Too many projects for key team members | 1.125 | 0.123 | 7.075 |
| | Failure to involve middle management early in the project | 1.325 | 0.076 | 8.984 |
| | Sound proactive senior management already in place | 1.498 | 0.026 | 15.364 |
| 7 | Project growth-oriented, not cost-cutting | 1.246 | 0.317 | 4.693 |
| | Project expectations were realistic | 1.309 | 0.192 | 6.033 |
| | Adequate budget | 1.186 | 0.166 | 6.496 |
| | Too many projects for key team members | 1.134 | 0.138 | 7.112 |
| | Failure to involve middle management early in the project | 1.380 | 0.108 | 8.045 |
| | Sound proactive senior management already in place | 1.746 | 0.062 | 10.626 |
| | Aggressive target(s) set | 1.290 | 0.026 | 16.417 |
| 8 | Project growth-oriented, not cost-cutting | 1.243 | 0.311 | 4.444 |
| | Adequate budget | 1.169 | 0.176 | 5.899 |
| | Too many projects for key team members | 1.120 | 0.145 | 6.504 |
| | Failure to involve middle management early in the project | 1.351 | 0.109 | 7.491 |
| | Sound proactive senior management already in place | 1.433 | 0.093 | 8.146 |
| | Aggressive target(s) set | 1.212 | 0.027 | 15.157 |
| 9 | Project growth-oriented, not cost-cutting | 1.485 | 0.428 | 4.039 |
| | Adequate budget | 1.252 | 0.176 | 6.288 |
| | Too many projects for key team members | 1.385 | 0.145 | 6.933 |
| | Failure to involve middle management early in the project | 1.488 | 0.110 | 7.978 |
| | Sound proactive senior management already in place | 1.519 | 0.093 | 8.673 |
| | Aggressive target(s) set | 1.236 | 0.055 | 11.224 |
| | Project too focused on cost-cutting | 2.395 | 0.018 | 19.534 |

## Table A-55 Stepwise Regression Analysis Project Budget All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 10 | Project growth-oriented, not cost-cutting | 1.492 | 0.471 | 4.075 |
| | Adequate budget | 1.256 | 0.194 | 6.342 |
| | Too many projects for key team members | 1.401 | 0.155 | 7.100 |
| | Failure to involve middle management early in the project | 1.534 | 0.119 | 8.099 |
| | Sound proactive senior management already in place | 1.607 | 0.093 | 9.162 |
| | Aggressive target(s) set | 1.269 | 0.083 | 9.722 |
| | Project too focused on cost-cutting | 2.492 | 0.051 | 12.436 |
| | Reengineered functions rather than processes | 1.382 | 0.018 | 21.132 |
| 11 | Project growth-oriented, not cost-cutting | 1.502 | 0.502 | 4.167 |
| | Adequate budget | 1.295 | 0.200 | 6.600 |
| | Too many projects for key team members | 1.401 | 0.159 | 7.400 |
| | Failure to involve middle management early in the project | 1.579 | 0.123 | 8.408 |
| | Sound proactive senior management already in place | 1.607 | 0.100 | 9.351 |
| | Aggressive target(s) set | 1.308 | 0.083 | 10.250 |
| | Project too focused on cost-cutting | 2.585 | 0.060 | 12.083 |
| | Reengineered functions rather than processes | 1.475 | 0.045 | 13.914 |
| | Financial condition of firm not sound | 1.529 | 0.016 | 23.032 |
| 12 | Project growth-oriented, not cost-cutting | 1.503 | 0.520 | 4.301 |
| | Adequate budget | 1.339 | 0.201 | 6.917 |
| | Too many projects for key team members | 1.524 | 0.159 | 7.774 |
| | Failure to involve middle management early in the project | 1.806 | 0.140 | 8.298 |
| | Sound proactive senior management already in place | 1.609 | 0.100 | 9.824 |
| | Aggressive target(s) set | 1.310 | 0.092 | 10.223 |
| | Project too focused on cost-cutting | 2.587 | 0.060 | 12.657 |
| | Reengineered functions rather than processes | 1.511 | 0.055 | 13.276 |
| | Financial condition of firm not sound | 1.553 | 0.044 | 14.773 |
| | Reengineering scaled back due to politics | 1.561 | 0.015 | 25.478 |
| 13 | Project growth-oriented, not cost-cutting | 1.507 | 0.541 | 4.403 |
| | Adequate budget | 1.339 | 0.202 | 7.208 |
| | Too many projects for key team members | 1.525 | 0.172 | 7.812 |
| | Failure to involve middle management early in the project | 1.809 | 0.153 | 8.295 |
| | Sound proactive senior management already in place | 1.619 | 0.100 | 10.225 |
| | Aggressive target(s) set | 1.330 | 0.099 | 10.320 |
| | Project too focused on cost-cutting | 2.615 | 0.074 | 11.889 |
| | Reengineered functions rather than processes | 1.511 | 0.060 | 13.240 |
| | Financial condition of firm not sound | 1.553 | 0.050 | 14.503 |
| | Reengineering scaled back due to politics | 1.943 | 0.039 | 16.439 |
| | Wrong sponsor | 1.609 | 0.015 | 26.730 |

**Table A-56 Stepwise Regression Analysis Project Schedule All Variables Less First and Second Group of Intercorrelated Variables**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED11 | . | .237 | .056 | .051 | 1.07 |
| 2 | PREREQ12 | . | .344 | .119 | .110 | 1.03 |
| 3 | IMPED01 | . | .391 | .153 | .140 | 1.02 |
| 4 | IMPED10 | . | .421 | .177 | .161 | 1.00 |
| 5 | IMPED12 | . | .469 | .220 | .200 | .98 |
| 6 | IMPED14 | . | .491 | .241 | .217 | .97 |
| 7 | IMPED14 | . | .491 | .241 | .217 | .97 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

i. Probability of F-to-enter = .050 limits reached.

## Table A-57 Stepwise Regression Analysis Project Schedule All Variables Less First and Second Group of Intercorrelated Variables Multicollinearity Diagnostic

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Financial condition of firm not sound | 1.000 | 0.055 | 5.973 |
| 2 | Financial condition of firm not sound | 1.018 | 0.166 | 4.105 |
| | Aggressive target(s) set | 1.018 | 0.040 | 8.333 |
| 3 | Financial condition of firm not sound | 1.262 | 0.186 | 4.450 |
| | Aggressive target(s) set | 1.039 | 0.086 | 6.539 |
| | Reengineered functions rather than processes | 1.246 | 0.040 | 9.596 |
| 4 | Financial condition of firm not sound | 1.356 | 0.205 | 4.723 |
| | Aggressive target(s) set | 1.062 | 0.127 | 5.993 |
| | Reengineered functions rather than processes | 1.246 | 0.064 | 8.430 |
| | Management by consensus (lack of strong management | 1.131 | 0.036 | 11.335 |
| 5 | Financial condition of firm not sound | 1.356 | 0.205 | 5.154 |
| | Aggressive target(s) set | 1.116 | 0.168 | 5.697 |
| | Reengineered functions rather than processes | 1.246 | 0.082 | 8.148 |
| | Management by consensus (lack of strong management | 1.375 | 0.062 | 9.394 |
| | Too many projects for key team members | 1.260 | 0.035 | 12.390 |
| 6 | Financial condition of firm not sound | 1.369 | 0.205 | 5.576 |
| | Aggressive target(s) set | 1.210 | 0.174 | 6.062 |
| | Reengineered functions rather than processes | 1.249 | 0.084 | 8.702 |
| | Management by consensus (lack of strong management | 1.514 | 0.065 | 9.921 |
| | Too many projects for key team members | 1.334 | 0.057 | 10.548 |
| | Animosity towards Information Systems and Human Resources | 1.419 | 0.035 | 13.412 |

**Table A-58 ANOVA Project Success by Group**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Project Success | Between Groups | 17.863 | 3 | 5.954 | 3.356 | .020 |
| | Within Groups | 346.036 | 195 | 1.775 | | |
| | Total | 363.899 | 198 | | | |

**Table A-59 ANOVA Project Budget by Group**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Project Budget | Between Groups | 7.600 | 3 | 2.533 | 2.216 | .088 |
| | Within Groups | 222.953 | 195 | 1.143 | | |
| | Total | 230.553 | 198 | | | |

**Table A-60 ANOVA Project Schedule by Group**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Project Schedule | Between Groups | 13.032 | 3 | 4.344 | 3.772 | .012 |
| | Within Groups | 224.566 | 195 | 1.152 | | |
| | Total | 237.598 | 198 | | | |

**Table A-61 ANOVA Impediments by Group**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| IMPED01 | Between Groups | 2.223 | 3 | .741 | .236 | .871 |
| | Within Groups | 652.078 | 208 | 3.135 | | |
| | Total | 654.302 | 211 | | | |
| IMPED02 | Between Groups | 10.038 | 3 | 3.346 | 1.040 | .376 |
| | Within Groups | 669.410 | 208 | 3.218 | | |
| | Total | 679.448 | 211 | | | |
| IMPED03 | Between Groups | 4.891 | 3 | 1.630 | .557 | .644 |
| | Within Groups | 609.185 | 208 | 2.929 | | |
| | Total | 614.075 | 211 | | | |
| IMPED04 | Between Groups | 45.667 | 3 | 15.222 | 4.249 | .006 |
| | Within Groups | 745.088 | 208 | 3.582 | | |
| | Total | 790.755 | 211 | | | |
| IMPED05 | Between Groups | 10.678 | 3 | 3.559 | .935 | .425 |
| | Within Groups | 791.789 | 208 | 3.807 | | |
| | Total | 802.467 | 211 | | | |
| IMPED06 | Between Groups | 24.378 | 3 | 8.126 | 2.481 | .062 |
| | Within Groups | 681.321 | 208 | 3.276 | | |
| | Total | 705.698 | 211 | | | |

**Table A-62 ANOVA Impediments by Group continued**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| IMPED07 | Between Groups | 58.235 | 3 | 19.412 | 5.039 | .002 |
| | Within Groups | 801.312 | 208 | 3.852 | | |
| | Total | 859.547 | 211 | | | |
| IMPED08 | Between Groups | 13.319 | 3 | 4.440 | 1.304 | .274 |
| | Within Groups | 708.152 | 208 | 3.405 | | |
| | Total | 721.472 | 211 | | | |
| IMPED09 | Between Groups | 15.275 | 3 | 5.092 | 1.217 | .305 |
| | Within Groups | 870.404 | 208 | 4.185 | | |
| | Total | 885.679 | 211 | | | |
| IMPED10 | Between Groups | 19.787 | 3 | 6.596 | 1.995 | .116 |
| | Within Groups | 687.849 | 208 | 3.307 | | |
| | Total | 707.637 | 211 | | | |
| IMPED11 | Between Groups | 14.863 | 3 | 4.954 | 1.425 | .237 |
| | Within Groups | 723.340 | 208 | 3.478 | | |
| | Total | 738.203 | 211 | | | |
| IMPED12 | Between Groups | 15.624 | 3 | 5.208 | 1.982 | .118 |
| | Within Groups | 546.622 | 208 | 2.628 | | |
| | Total | 562.245 | 211 | | | |

**Table A-63 ANOVA Impediments by Group continued**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| IMPED13 | Between Groups | 26.620 | 3 | 8.873 | 3.701 | .013 |
| | Within Groups | 498.663 | 208 | 2.397 | | |
| | Total | 525.283 | 211 | | | |
| IMPED14 | Between Groups | 18.984 | 3 | 6.328 | 2.285 | .080 |
| | Within Groups | 576.092 | 208 | 2.770 | | |
| | Total | 595.075 | 211 | | | |
| IMPED15 | Between Groups | 36.626 | 3 | 12.209 | 4.099 | .007 |
| | Within Groups | 619.506 | 208 | 2.978 | | |
| | Total | 656.132 | 211 | | | |
| IMPED16 | Between Groups | 10.256 | 3 | 3.419 | .925 | .429 |
| | Within Groups | 768.574 | 208 | 3.695 | | |
| | Total | 778.830 | 211 | | | |
| IMPED17 | Between Groups | 15.442 | 3 | 5.147 | 1.710 | .166 |
| | Within Groups | 626.195 | 208 | 3.011 | | |
| | Total | 641.637 | 211 | | | |
| IMPED18 | Between Groups | 11.518 | 3 | 3.839 | 1.087 | .355 |
| | Within Groups | 734.308 | 208 | 3.530 | | |
| | Total | 745.825 | 211 | | | |

## Table A-64 ANOVA Prerequisites by Group

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| PREREQ01 | Between Groups | 9.340 | 3 | 3.113 | 1.236 | .298 |
| | Within Groups | 523.962 | 208 | 2.519 | | |
| | Total | 533.302 | 211 | | | |
| PREREQ02 | Between Groups | 2.630 | 3 | .877 | .505 | .679 |
| | Within Groups | 361.295 | 208 | 1.737 | | |
| | Total | 363.925 | 211 | | | |
| PREREQ03 | Between Groups | 2.898 | 3 | .966 | .483 | .694 |
| | Within Groups | 415.645 | 208 | 1.998 | | |
| | Total | 418.542 | 211 | | | |
| PREREQ04 | Between Groups | .602 | 3 | .201 | .073 | .974 |
| | Within Groups | 573.190 | 208 | 2.756 | | |
| | Total | 573.792 | 211 | | | |
| PREREQ05 | Between Groups | 5.056 | 3 | 1.685 | .502 | .681 |
| | Within Groups | 698.151 | 208 | 3.356 | | |
| | Total | 703.208 | 211 | | | |
| PREREQ06 | Between Groups | 3.642 | 3 | 1.214 | .689 | .559 |
| | Within Groups | 366.226 | 208 | 1.761 | | |
| | Total | 369.868 | 211 | | | |
| PREREQ07 | Between Groups | 5.793 | 3 | 1.931 | .888 | .448 |
| | Within Groups | 452.207 | 208 | 2.174 | | |
| | Total | 458.000 | 211 | | | |
| PREREQ08 | Between Groups | 3.342 | 3 | 1.114 | .372 | .773 |
| | Within Groups | 622.526 | 208 | 2.993 | | |
| | Total | 625.868 | 211 | | | |

**Table A-65 ANOVA Prerequisites by Group continued**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| PREREQ09 | Between Groups | 7.674 | 3 | 2.558 | 1.160 | .326 |
| | Within Groups | 458.529 | 208 | 2.204 | | |
| | Total | 466.203 | 211 | | | |
| PREREQ10 | Between Groups | 4.039 | 3 | 1.346 | .487 | .691 |
| | Within Groups | 574.729 | 208 | 2.763 | | |
| | Total | 578.769 | 211 | | | |
| PREREQ11 | Between Groups | 6.499 | 3 | 2.166 | .996 | .396 |
| | Within Groups | 452.293 | 208 | 2.174 | | |
| | Total | 458.792 | 211 | | | |
| PREREQ12 | Between Groups | 4.129 | 3 | 1.376 | .952 | .417 |
| | Within Groups | 300.829 | 208 | 1.446 | | |
| | Total | 304.958 | 211 | | | |
| PREREQ13 | Between Groups | 13.808 | 3 | 4.603 | 1.712 | .166 |
| | Within Groups | 559.225 | 208 | 2.689 | | |
| | Total | 573.033 | 211 | | | |
| PREREQ14 | Between Groups | 9.222 | 3 | 3.074 | 1.488 | .219 |
| | Within Groups | 429.703 | 208 | 2.066 | | |
| | Total | 438.925 | 211 | | | |
| PREREQ15 | Between Groups | 12.063 | 3 | 4.021 | .992 | .397 |
| | Within Groups | 842.748 | 208 | 4.052 | | |
| | Total | 854.811 | 211 | | | |
| PREREQ16 | Between Groups | 10.887 | 3 | 3.629 | 1.048 | .372 |
| | Within Groups | 720.227 | 208 | 3.463 | | |
| | Total | 731.113 | 211 | | | |

## Table A-66 Correlation Analysis -- All Variables

| | IMPED01 | IMPED02 | IMPED03 | IMPED04 | IMPED05 | IMPED06 | IMPED07 | IMPED08 |
|---|---|---|---|---|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | 1.000 | .559 | .279 | .292 | .135 | .321 | .243 | 0.382 |
| IMPED02 Not focused on strategic value-added processes | .559 | 1.000 | .436 | .214 | .329 | .487 | .436 | 0.416 |
| IMPED03 Not following detailed methodology | .279 | .436 | 1.000 | .537 | .340 | .500 | .330 | 0.358 |
| IMPED04 Project under-financed and/or under-staffed | .292 | .214 | .537 | 1.000 | .482 | .635 | .516 | 0.448 |
| IMPED05 Wrong sponsor | .135 | .329 | .340 | .482 | 1.000 | .749 | .504 | 0.375 |
| IMPED06 Project lacks senior executive sponsorship | .321 | .487 | .500 | .635 | .749 | 1.000 | .738 | 0.620 |
| IMPED07 Let the consultant do it attitude | .243 | .436 | .330 | .516 | .504 | .738 | 1.000 | 0.508 |
| IMPED08 Project too focused on cost-cutting | .382 | .416 | .358 | .448 | .375 | .620 | .508 | 1.000 |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | .288 | .242 | .158 | .479 | .324 | .346 | .388 | 0.382 |
| IMPED10 Management by consensus (lack of strong management | .136 | .382 | .409 | .693 | .634 | .744 | .641 | 0.416 |
| IMPED11 Financial condition of firm not sound | .440 | .295 | .441 | .531 | .261 | .512 | .204 | 0.358 |
| IMPED12 Too many projects for key team members | .084 | .331 | .275 | .379 | .238 | .297 | .252 | 0.448 |
| IMPED13 Staff driven by fear, lacks optimism | .366 | .581 | .438 | .479 | .520 | .585 | .573 | 0.375 |
| IMPED14 Animosity towards Information Systems and Human Resources | .157 | .212 | .400 | .534 | .427 | .383 | .363 | 0.620 |
| IMPED15 Average performers assigned to the project | .242 | .360 | .248 | .353 | .358 | .458 | .392 | 0.508 |
| IMPED16 Failure to measure performance (before, during, and after project) | .384 | .393 | .511 | .554 | .505 | .588 | .391 | 1.000 |
| IMPED17 Reengineering scaled back due to politics | .122 | .359 | .339 | .452 | .553 | .529 | .369 | 0.276 |
| IMPED18 Failure to involve middle management early in the project | .378 | .329 | .316 | .591 | .379 | .484 | .456 | 0.449 |
| PREREQ01 Extensive user involvement in design | -.367 | -.056 | -.172 | -.228 | .114 | -.044 | .004 | 0.435 |
| PREREQ02 Strong senior management commitment/sponsorship | -.226 | -.233 | -.138 | -.258 | -.086 | -.284 | -.216 | 0.419 |
| PREREQ03 Project expectations were realistic | -.191 | .014 | -.162 | -.173 | .028 | .004 | .064 | 0.526 |
| PREREQ04 Extensive use of cross-functional memberships on projects teams | -.398 | -.151 | -.064 | -.247 | .023 | -.122 | -.126 | 0.335 |
| PREREQ05 Project growth-oriented, not cost-cutting | -.163 | -.440 | -.260 | -.152 | -.181 | -.348 | -.296 | 0.525 |
| PREREQ06 Firm has a clear vision of project goals | -.134 | -.092 | -.074 | -.257 | .005 | -.097 | -.126 | 0.426 |
| PREREQ07 Sound proactive senior management already in place | -.367 | -.217 | -.032 | -.304 | -.221 | -.294 | -.239 | 0.350 |
| PREREQ08 Full-time participation of key practitioners | -.132 | -.101 | -.242 | -.270 | -.102 | -.160 | -.056 | 0.517 |
| PREREQ09 Adequate budget | -.248 | -.104 | -.076 | -.384 | -.201 | -.282 | -.174 | -0.298 |
| PREREQ10 Adequate training/workshops conducted | -.136 | .037 | -.102 | -.160 | .036 | .044 | .107 | -0.164 |
| PREREQ11 Communications with employees | -.131 | .015 | -.075 | -.141 | .034 | .101 | .064 | -0.055 |
| PREREQ12 Aggressive target(s) set | .077 | -.129 | .028 | -.063 | -.071 | -.155 | .008 | 0.038 |
| PREREQ13 Significant portion of CEO's time committed to project | -.095 | -.237 | .031 | .041 | -.129 | -.271 | -.168 | -0.208 |
| PREREQ14 Senior executive responsible for the project | -.046 | -.250 | -.173 | -.162 | -.285 | -.330 | -.082 | -0.223 |
| PREREQ15 Pilot project prior to full implementation | -.299 | -.106 | -.059 | .045 | -.007 | -.091 | .038 | -0.088 |
| PREREQ16 Crisis as a key driver of the project | .310 | .363 | .162 | .183 | .134 | .222 | .084 | 0.461 |

| | IMPED09 | IMPED10 | IMPED11 | IMPED12 | IMPED13 | IMPED14 | IMPED15 | IMPED16 |
|---|---|---|---|---|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | .288 | .136 | .440 | .084 | .366 | .157 | .242 | .384 |
| IMPED02 Not focused on strategic value-added processes | .242 | .382 | .295 | .331 | .581 | .212 | .360 | .393 |
| IMPED03 Not following detailed methodology | .158 | .409 | .441 | .275 | .438 | .400 | .248 | .511 |
| IMPED04 Project under-financed and/or under-staffed | .479 | .693 | .531 | .379 | .479 | .534 | .353 | .554 |
| IMPED05 Wrong sponsor | .324 | .634 | .261 | .238 | .520 | .427 | .358 | .505 |
| IMPED06 Project lacks senior executive sponsorship | .346 | .744 | .512 | .297 | .585 | .383 | .458 | .588 |
| IMPED07 Let the consultant do it attitude | .388 | .641 | .204 | .252 | .573 | .363 | .392 | .391 |
| IMPED08 Project too focused on cost-cutting | .276 | .449 | .435 | .419 | .526 | .335 | .525 | .426 |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | 1.000 | .479 | .244 | .305 | .340 | .319 | .394 | .376 |
| IMPED10 Management by consensus (lack of strong management | .479 | 1.000 | .334 | .441 | .504 | .413 | .447 | .529 |
| IMPED11 Financial condition of firm not sound | .244 | .334 | 1.000 | .162 | .494 | .219 | .321 | .484 |
| IMPED12 Too many projects for key team members | .305 | .441 | .162 | 1.000 | .442 | .410 | .445 | .335 |
| IMPED13 Staff driven by fear, lacks optimism | .340 | .504 | .494 | .442 | 1.000 | .568 | .442 | .468 |
| IMPED14 Animosity towards Information Systems and Human Resources | .319 | .413 | .219 | .410 | .568 | 1.000 | .392 | .368 |
| IMPED15 Average performers assigned to the project | .394 | .447 | .321 | .445 | .442 | .392 | 1.000 | .541 |
| IMPED16 Failure to measure performance (before, during, and after project) | .376 | .529 | .484 | .335 | .468 | .368 | .541 | 1.000 |
| IMPED17 Reengineering scaled back due to politics | .373 | .698 | .322 | .373 | .463 | .330 | .446 | .553 |
| IMPED18 Failure to involve middle management early in the project | .379 | .457 | .398 | .233 | .483 | .463 | .547 | .667 |
| PREREQ01 Extensive user involvement in design | .079 | -.004 | -.414 | .291 | -.117 | .088 | .040 | -.287 |
| PREREQ02 Strong senior management commitment/sponsorship | .034 | -.348 | -.334 | .026 | -.154 | .023 | .006 | -.122 |
| PREREQ03 Project expectations were realistic | -.277 | -.117 | -.256 | -.141 | -.169 | .001 | -.061 | -.253 |
| PREREQ04 Extensive use of cross-functional memberships on projects teams | -.122 | -.114 | -.366 | .271 | -.111 | .033 | -.102 | -.290 |
| PREREQ05 Project growth-oriented, not cost-cutting | .066 | -.232 | -.203 | -.190 | -.258 | .007 | -.373 | -.163 |
| PREREQ06 Firm has a clear vision of project goals | -.184 | -.346 | -.153 | -.138 | .030 | .008 | -.108 | -.246 |
| PREREQ07 Sound proactive senior management already in place | -.190 | -.311 | -.320 | -.073 | -.139 | .010 | -.193 | -.342 |
| PREREQ08 Full-time participation of key practitioners | .062 | -.248 | -.214 | .025 | -.002 | .043 | -.073 | -.179 |
| PREREQ09 Adequate budget | -.113 | -.321 | -.339 | -.029 | -.110 | -.042 | -.144 | -.287 |
| PREREQ10 Adequate training/workshops conducted | -.046 | -.045 | -.267 | .122 | -.078 | .074 | -.060 | -.232 |
| PREREQ11 Communications with employees | -.138 | -.117 | -.230 | .114 | -.123 | .044 | -.114 | -.292 |
| PREREQ12 Aggressive target(s) set | .170 | -.139 | -.085 | .121 | .096 | .253 | .204 | -.064 |
| PREREQ13 Significant portion of CEO's time committed to project | .181 | -.150 | .033 | -.041 | -.016 | .204 | -.249 | -.053 |
| PREREQ14 Senior executive responsible for the project | .130 | -.355 | -.304 | -.042 | -.161 | .075 | .017 | -.212 |
| PREREQ15 Pilot project prior to full implementation | .102 | .045 | -.231 | .246 | -.028 | .219 | .013 | -.225 |
| PREREQ16 Crisis as a key driver of the project | .205 | .229 | .403 | .401 | .513 | .263 | .252 | .144 |

**Table A-67 Correlation Analysis -- All Variables continued**

## Table A-68 Correlation Analysis -- All Variables continued

| | IMPED17 | IMPED18 | PREREQ01 | PREREQ02 | PREREQ03 | PREREQ04 |
|---|---|---|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | .122 | .378 | -.367 | -.226 | -.191 | -.398 |
| IMPED02 Not focused on strategic value-added processes | .359 | .329 | -.056 | -.233 | .014 | -.151 |
| IMPED03 Not following detailed methodology | .339 | .316 | -.172 | -.138 | -.162 | -.064 |
| IMPED04 Project under-financed and/or under-staffed | .452 | .591 | -.228 | -.258 | -.173 | -.247 |
| IMPED05 Wrong sponsor | .553 | .379 | .114 | -.086 | .028 | .023 |
| IMPED06 Project lacks senior executive sponsorship | .529 | .484 | -.044 | -.284 | .004 | -.122 |
| IMPED07 Let the consultant do it attitude | .369 | .456 | .004 | -.216 | .064 | -.126 |
| IMPED08 Project too focused on cost-cutting | .350 | .517 | -.080 | -.267 | -.110 | -.252 |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | .373 | .379 | .079 | .034 | -.277 | -.122 |
| IMPED10 Management by consensus (lack of strong management | .698 | .457 | -.004 | -.348 | -.117 | -.114 |
| IMPED11 Financial condition of firm not sound | .322 | .398 | -.414 | -.334 | -.256 | -.366 |
| IMPED12 Too many projects for key team members | .373 | .233 | .291 | .026 | -.141 | .271 |
| IMPED13 Staff driven by fear, lacks optimism | .463 | .483 | -.117 | -.154 | -.169 | -.111 |
| IMPED14 Animosity towards Information Systems and Human Resources | .330 | .463 | .088 | .023 | .001 | .033 |
| IMPED15 Average performers assigned to the project | .446 | .547 | .040 | .006 | -.061 | -.102 |
| IMPED16 Failure to measure performance (before, during, and after project) | .553 | .667 | -.287 | -.122 | -.253 | -.230 |
| IMPED17 Reengineering scaled back due to politics | 1.000 | .489 | .059 | -.237 | -.208 | -.036 |
| IMPED18 Failure to involve middle management early in the project | .489 | 1.000 | -.301 | -.148 | -.119 | -.401 |
| PREREQ01 Extensive user involvement in design | .059 | -.301 | 1.000 | .530 | .384 | .716 |
| PREREQ02 Strong senior management commitment/sponsorship | -.237 | -.148 | .530 | 1.000 | .309 | .598 |
| PREREQ03 Project expectations were realistic | -.208 | -.119 | .384 | .309 | 1.000 | .405 |
| PREREQ04 Extensive use of cross-functional memberships on projects teams | -.036 | -.401 | .716 | .598 | .405 | 1.000 |
| PREREQ05 Project growth-oriented, not cost-cutting | -.214 | -.269 | .231 | .322 | .143 | .271 |
| PREREQ06 Firm has a clear vision of project goals | -.191 | -.197 | .446 | .637 | .345 | .477 |
| PREREQ07 Sound proactive senior management already in place | -.242 | -.347 | .459 | .701 | .439 | .628 |
| PREREQ08 Full-time participation of key practitioners | -.234 | -.191 | .476 | .549 | .522 | .473 |
| PREREQ09 Adequate budget | -.282 | -.317 | .324 | .333 | .267 | .337 |
| PREREQ10 Adequate training/workshops conducted | -.058 | -.267 | .573 | .382 | .521 | .567 |
| PREREQ11 Communications with employees | -.151 | -.289 | .574 | .359 | .458 | .501 |
| PREREQ12 Aggressive target(s) set | -.028 | .026 | .206 | .468 | .006 | .226 |
| PREREQ13 Significant portion of CEO's time committed to project | -.152 | -.003 | -.032 | .286 | -.027 | .123 |
| PREREQ14 Senior executive responsible for the project | -.354 | -.028 | .237 | .551 | .140 | .274 |
| PREREQ15 Pilot project prior to full implementation | -.055 | -.222 | .497 | .279 | .374 | .443 |
| PREREQ16 Crisis as a key driver of the project | .403 | .166 | -.043 | -.174 | -.137 | -.056 |

## Table A-69 Correlation Analysis -- All Variables continued

| | PREREQ05 | PREREQ06 | PREREQ07 | PREREQ08 | PREREQ09 | PREREQ10 |
|---|---|---|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | -.163 | -.134 | -.367 | -.132 | -.248 | -.136 |
| IMPED02 Not focused on strategic value-added processes | -.440 | -.092 | -.217 | -.101 | -.104 | .037 |
| IMPED03 Not following detailed methodology | -.260 | -.074 | -.032 | -.242 | -.076 | -.102 |
| IMPED04 Project under-financed and/or under-staffed | -.152 | -.257 | -.304 | -.270 | -.364 | -.160 |
| IMPED05 Wrong sponsor | -.181 | .005 | -.221 | -.102 | -.201 | .036 |
| IMPED06 Project lacks senior executive sponsorship | -.348 | -.097 | -.294 | -.160 | -.282 | .044 |
| IMPED07 Let the consultant do it attitude | -.296 | -.126 | -.239 | -.056 | -.174 | .107 |
| IMPED08 Project too focused on cost-cutting | -.513 | -.185 | -.324 | -.286 | -.298 | -.164 |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | .066 | -.184 | -.190 | .062 | -.113 | -.046 |
| IMPED10 Management by consensus (lack of strong management | -.232 | -.346 | -.311 | -.248 | -.321 | -.045 |
| IMPED11 Financial condition of firm not sound | -.203 | -.153 | -.320 | -.214 | -.339 | -.267 |
| IMPED12 Too many projects for key team members | -.190 | -.138 | -.073 | .025 | -.029 | .122 |
| IMPED13 Staff driven by fear, lacks optimism | -.258 | .030 | -.139 | -.002 | -.110 | -.078 |
| IMPED14 Animosity towards Information Systems and Human Resources | .007 | .008 | .010 | .043 | -.042 | .074 |
| IMPED15 Average performers assigned to the project | -.373 | -.108 | -.193 | -.073 | -.144 | -.060 |
| IMPED16 Failure to measure performance (before, during, and after project) | -.163 | -.246 | -.342 | -.179 | -.287 | -.232 |
| IMPED17 Reengineering scaled back due to politics | -.214 | -.191 | -.242 | -.234 | -.282 | -.058 |
| IMPED18 Failure to involve middle management early in the project | -.269 | -.197 | -.347 | -.191 | -.317 | -.267 |
| PREREQ01 Extensive user involvement in design | .231 | .446 | .459 | .476 | .324 | .573 |
| PREREQ02 Strong senior management commitment/sponsorship | .322 | .637 | .701 | .549 | .333 | .382 |
| PREREQ03 Project expectations were realistic | .143 | .345 | .439 | .522 | .267 | .521 |
| PREREQ04 Extensive use of cross-functional memberships on projects teams | .271 | .477 | .628 | .473 | .337 | .567 |
| PREREQ05 Project growth-oriented, not cost-cutting | 1.000 | .209 | .310 | .471 | .144 | .260 |
| PREREQ06 Firm has a clear vision of project goals | .209 | 1.000 | .559 | .578 | .344 | .361 |
| PREREQ07 Sound proactive senior management already in place | .310 | .559 | 1.000 | .478 | .359 | .470 |
| PREREQ08 Full-time participation of key practitioners | .471 | .578 | .478 | 1.000 | .408 | .573 |
| PREREQ09 Adequate budget | .144 | .344 | .359 | .408 | 1.000 | .414 |
| PREREQ10 Adequate training/workshops conducted | .260 | .361 | .470 | .573 | .414 | 1.000 |
| PREREQ11 Communications with employees | .223 | .350 | .449 | .354 | .337 | .723 |
| PREREQ12 Aggressive target(s) set | .195 | .248 | .351 | .245 | .182 | .122 |
| PREREQ13 Significant portion of CEO's time committed to project | .424 | .055 | .351 | .136 | .202 | .109 |
| PREREQ14 Senior executive responsible for the project | .263 | .390 | .417 | .418 | .381 | .278 |
| PREREQ15 Pilot project prior to full implementation | .250 | .157 | .260 | .386 | .505 | .524 |
| PREREQ16 Crisis as a key driver of the project | -.224 | -.091 | -.069 | .031 | -.138 | .023 |

## Table A-70 Correlation Analysis -- All Variables continued

| | PREREQ11 | PREREQ12 | PREREQ13 | PREREQ14 | PREREQ15 | PREREQ16 |
|---|---|---|---|---|---|---|
| IMPED01 Reengineered functions rather than processes | -.131 | .077 | -.095 | -.046 | -.299 | .310 |
| IMPED02 Not focused on strategic value-added processes | .015 | -.129 | -.237 | -.250 | -.106 | .363 |
| IMPED03 Not following detailed methodology | -.075 | .028 | .031 | -.173 | -.059 | .162 |
| IMPED04 Project under-financed and/or under-staffed | -.141 | -.063 | .041 | -.162 | .045 | .183 |
| IMPED05 Wrong sponsor | .034 | -.071 | -.129 | -.285 | -.007 | .134 |
| IMPED06 Project lacks senior executive sponsorship | .101 | -.155 | -.271 | -.330 | -.091 | .222 |
| IMPED07 Let the consultant do it attitude | .064 | .008 | -.168 | -.082 | .038 | .084 |
| IMPED08 Project too focused on cost-cutting | -.055 | .038 | -.208 | -.223 | -.088 | .451 |
| IMPED09 Information Management (IT) viewed as driver of project, not the enabler | -.138 | .170 | .181 | .130 | .102 | .205 |
| IMPED10 Management by consensus (lack of strong management | -.117 | -.139 | -.150 | -.355 | .045 | .229 |
| IMPED11 Financial condition of firm not sound | -.230 | -.085 | .033 | -.304 | -.231 | .403 |
| IMPED12 Too many projects for key team members | .114 | .121 | -.041 | -.042 | .246 | .401 |
| IMPED13 Staff driven by fear, lacks optimism | -.123 | .096 | -.016 | -.161 | -.028 | .513 |
| IMPED14 Animosity towards Information Systems and Human Resources | .044 | .253 | .204 | .075 | .219 | .263 |
| IMPED15 Average performers assigned to the project | -.114 | .204 | -.249 | .017 | .013 | .252 |
| IMPED16 Failure to measure performance (before, during, and after project) | -.292 | -.064 | -.053 | -.212 | -.225 | .144 |
| IMPED17 Reengineering scaled back due to politics | -.151 | -.028 | -.152 | -.354 | -.055 | .403 |
| IMPED18 Failure to involve middle management early in the project | -.269 | .026 | -.003 | -.028 | -.222 | .166 |
| PREREQ01 Extensive user involvement in design | .574 | .206 | -.032 | .237 | .497 | -.043 |
| PREREQ02 Strong senior management commitment/sponsorship | .359 | .468 | .286 | .551 | .279 | -.174 |
| PREREQ03 Project expectations were realistic | .458 | .006 | -.027 | .140 | .374 | -.137 |
| PREREQ04 Extensive use of cross-functional memberships on projects teams | .501 | .226 | .123 | .274 | .443 | -.056 |
| PREREQ05 Project growth-oriented, not cost-cutting | .223 | .195 | .424 | .263 | .250 | -.224 |
| PREREQ06 Firm has a clear vision of project goals | .350 | .248 | .055 | .390 | .157 | -.091 |
| PREREQ07 Sound proactive senior management already in place | .449 | .351 | .351 | .417 | .280 | -.069 |
| PREREQ08 Full-time participation of key practitioners | .354 | .245 | .136 | .418 | .386 | .031 |
| PREREQ09 Adequate budget | .337 | .182 | .202 | .381 | .505 | -.138 |
| PREREQ10 Adequate training/workshops conducted | .723 | .122 | .109 | .278 | .524 | .023 |
| PREREQ11 Communications with employees | 1.000 | .152 | .025 | .353 | .434 | -.027 |
| PREREQ12 Aggressive target(s) set | .152 | 1.000 | .159 | .436 | .273 | .196 |
| PREREQ13 Significant portion of CEO's time committed to project | .025 | .159 | 1.000 | .207 | .196 | -.032 |
| PREREQ14 Senior executive responsible for the project | .353 | .436 | .207 | 1.000 | .285 | -.181 |
| PREREQ15 Pilot project prior to full implementation | .434 | .273 | .196 | .285 | 1.000 | -.012 |
| PREREQ16 Crisis as a key driver of the project | -.027 | .196 | -.032 | -.181 | -.012 | 1.000 |

**Table A-71 Stepwise Regression Analysis Impediments Project Success**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED09 | . | .287 | .082 | .078 | 1.30 |
| 2 | IMPED11 | . | .344 | .118 | .109 | 1.28 |
| 3 | IMPED06 | . | .428 | .183 | .171 | 1.23 |
| 4 | IMPED02 | . | .463 | .215 | .198 | 1.21 |
| 5 | IMPED04 | . | .496 | .246 | .227 | 1.19 |
| 6 | IMPED03 | . | .532 | .283 | .261 | 1.17 |
| 7 | IMPED18 | . | .559 | .313 | .288 | 1.14 |
| 8 | IMPED18 | . | .559 | .313 | .288 | 1.14 |

a. Dependent Variable: Project Success

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

j. Probability of F-to-enter = .050 limits reached.

## Table A-72 Stepwise Regression Analysis Impediments Project Success Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Information Management (IT) viewed as driver of project, not the enabler | 1.000 | 0.076 | 5.026 |
| 2 | Information Management (IT) viewed as driver of project, not the enabler | 1.086 | 0.096 | 5.449 |
| | Financial condition of firm not sound | 1.086 | 0.054 | 7.259 |
| 3 | Information Management (IT) viewed as driver of project, not the enabler | 1.168 | 0.101 | 6.126 |
| | Financial condition of firm not sound | 1.392 | 0.061 | 7.893 |
| | Project lacks senior executive sponsorship | 1.478 | 0.051 | 8.576 |
| 4 | Information Management (IT) viewed as driver of project, not the enabler | 1.181 | 0.112 | 6.475 |
| | Financial condition of firm not sound | 1.393 | 0.094 | 7.051 |
| | Project lacks senior executive sponsorship | 1.706 | 0.060 | 8.805 |
| | Not focused on strategic value-added processes | 1.301 | 0.047 | 10.007 |
| 5 | Information Management (IT) viewed as driver of project, not the enabler | 1.377 | 0.132 | 6.508 |
| | Financial condition of firm not sound | 1.519 | 0.100 | 7.485 |
| | Project lacks senior executive sponsorship | 2.265 | 0.073 | 8.781 |
| | Not focused on strategic value-added processes | 1.383 | 0.048 | 10.779 |
| | Project under-financed and/or under-staffed | 2.244 | 0.035 | 12.632 |
| 6 | Information Management (IT) viewed as driver of project, not the enabler | 1.444 | 0.135 | 6.961 |
| | Financial condition of firm not sound | 1.540 | 0.116 | 7.515 |
| | Project lacks senior executive sponsorship | 2.268 | 0.074 | 9.395 |
| | Not focused on strategic value-added processes | 1.564 | 0.065 | 10.057 |
| | Project under-financed and/or under-staffed | 2.654 | 0.047 | 11.847 |
| | Not following detailed methodology | 1.745 | 0.031 | 14.588 |
| 7 | Information Management (IT) viewed as driver of project, not the enabler | 1.461 | 0.142 | 7.235 |
| | Financial condition of firm not sound | 1.549 | 0.116 | 8.007 |
| | Project lacks senior executive sponsorship | 2.270 | 0.081 | 9.570 |
| | Not focused on strategic value-added processes | 1.631 | 0.074 | 10.067 |
| | Project under-financed and/or under-staffed | 3.101 | 0.062 | 10.931 |
| | Not following detailed methodology | 1.773 | 0.046 | 12.726 |
| | Failure to involve middle management early in the project | 1.686 | 0.028 | 16.409 |

**Table A-73 Stepwise Regression Analysis Impediments Project Budget**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED11 | . | .237 | .056 | .051 | 1.07 |
| 2 | IMPED10 | . | .305 | .093 | .084 | 1.05 |
| 3 | IMPED07 | . | .401 | .161 | .148 | 1.01 |
| 4 | IMPED12 | . | .472 | .223 | .207 | .98 |
| 5 | IMPED02 | . | .550 | .303 | .285 | .93 |
| 6 | IMPED04 | . | .580 | .337 | .316 | .91 |
| 7 | IMPED17 | . | .599 | .359 | .336 | .89 |
| 8 | IMPED18 | . | .615 | .379 | .353 | .88 |
| 9 | IMPED06 | . | .632 | .399 | .370 | .87 |
| 10 | . | IMPED04 | .625 | .390 | .365 | .87 |
| 11 | IMPED16 | . | .641 | .410 | .382 | .86 |
| 12 | IMPED16[n] | . | .641 | .410 | .382 | .86 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

n. Probability of F-to-enter = .050 limits reached.

## Table A-74 Stepwise Regression Analysis Impediments Project Budget Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Financial condition of firm not sound | 1.000 | 0.055 | 5.973 |
| 2 | Financial condition of firm not sound | 1.106 | 0.083 | 5.863 |
| | Management by consensus (lack of strong management | 1.106 | 0.052 | 7.417 |
| 3 | Financial condition of firm not sound | 1.106 | 0.107 | 5.961 |
| | Management by consensus (lack of strong management | 1.872 | 0.053 | 8.455 |
| | Let the consultant do it attitude | 1.773 | 0.040 | 9.728 |
| 4 | Financial condition of firm not sound | 1.107 | 0.120 | 6.255 |
| | Management by consensus (lack of strong management | 2.058 | 0.104 | 6.709 |
| | Let the consultant do it attitude | 1.774 | 0.052 | 9.471 |
| | Too many projects for key team members | 1.199 | 0.037 | 11.262 |
| 5 | Financial condition of firm not sound | 1.151 | 0.121 | 6.807 |
| | Management by consensus (lack of strong management | 2.060 | 0.104 | 7.323 |
| | Let the consultant do it attitude | 1.951 | 0.099 | 7.531 |
| | Too many projects for key team members | 1.249 | 0.051 | 10.472 |
| | Not focused on strategic value-added processes | 1.344 | 0.036 | 12.519 |
| 6 | Financial condition of firm not sound | 1.546 | 0.135 | 6.944 |
| | Management by consensus (lack of strong management | 2.546 | 0.120 | 7.374 |
| | Let the consultant do it attitude | 2.077 | 0.104 | 7.910 |
| | Too many projects for key team members | 1.292 | 0.059 | 10.527 |
| | Not focused on strategic value-added processes | 1.455 | 0.036 | 13.369 |
| | Project under-financed and/or under-staffed | 2.628 | 0.030 | 14.766 |
| 7 | Financial condition of firm not sound | 1.581 | 0.135 | 7.420 |
| | Management by consensus (lack of strong management | 4.051 | 0.120 | 7.881 |
| | Let the consultant do it attitude | 2.136 | 0.105 | 8.431 |
| | Too many projects for key team members | 1.300 | 0.072 | 10.161 |
| | Not focused on strategic value-added processes | 1.489 | 0.059 | 11.284 |
| | Project under-financed and/or under-staffed | 2.657 | 0.030 | 15.695 |
| | Reengineering scaled back due to politics | 2.329 | 0.020 | 19.193 |

## Table A-75 Stepwise Regression Analysis Impediments Project Budget Multicollinearity Diagnostics continued

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 8 | Financial condition of firm not sound | 1.591 | 0.144 | 7.622 |
| | Management by consensus (lack of strong management | 4.271 | 0.123 | 8.254 |
| | Let the consultant do it attitude | 2.228 | 0.105 | 8.935 |
| | Too many projects for key team members | 1.304 | 0.075 | 10.602 |
| | Not focused on strategic value-added processes | 1.513 | 0.071 | 10.900 |
| | Project under-financed and/or under-staffed | 3.116 | 0.058 | 12.045 |
| | Reengineering scaled back due to politics | 2.600 | 0.030 | 16.720 |
| | Failure to involve middle management early in the project | 1.911 | 0.017 | 21.941 |
| 9 | Financial condition of firm not sound | 1.946 | 0.146 | 7.991 |
| | Management by consensus (lack of strong management | 4.757 | 0.123 | 8.699 |
| | Let the consultant do it attitude | 2.833 | 0.112 | 9.144 |
| | Too many projects for key team members | 1.309 | 0.079 | 10.891 |
| | Not focused on strategic value-added processes | 1.570 | 0.073 | 11.289 |
| | Project under-financed and/or under-staffed | 3.127 | 0.059 | 12.595 |
| | Reengineering scaled back due to politics | 2.604 | 0.034 | 16.465 |
| | Failure to involve middle management early in the project | 1.920 | 0.020 | 21.859 |
| | Project lacks senior executive sponsorship | 4.152 | 0.016 | 23.827 |
| 10 | Financial condition of firm not sound | 1.712 | 0.143 | 8.069 |
| | Management by consensus (lack of strong management | 3.966 | 0.115 | 8.993 |
| | Let the consultant do it attitude | 2.880 | 0.111 | 9.178 |
| | Too many projects for key team members | 1.275 | 0.089 | 10.251 |
| | Not focused on strategic value-added processes | 1.450 | 0.068 | 11.680 |
| | Reengineering scaled back due to politics | 2.502 | 0.064 | 12.100 |
| | Failure to involve middle management early in the project | 2.085 | 0.039 | 15.443 |
| | Project lacks senior executive sponsorship | 4.343 | 0.021 | 21.327 |
| | Failure to measure performance (before, during, and after project) | 2.458 | 0.018 | 22.645 |

**Table A-76 Stepwise Regression Analysis Impediments Project Schedule**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | IMPED11 | . | .237 | .056 | .051 | 1.07 |
| 2 | IMPED10 | . | .305 | .093 | .084 | 1.05 |
| 3 | IMPED07 | . | .401 | .161 | .148 | 1.01 |
| 4 | IMPED12 | . | .472 | .223 | .207 | .98 |
| 5 | IMPED02 | . | .550 | .303 | .285 | .93 |
| 6 | IMPED04 | . | .580 | .337 | .316 | .91 |
| 7 | IMPED17 | . | .599 | .359 | .336 | .89 |
| 8 | IMPED18 | . | .615 | .379 | .353 | .88 |
| 9 | IMPED06 | . | .632 | .399 | .370 | .87 |
| 10 | . | IMPED04 | .625 | .390 | .365 | .87 |
| 11 | IMPED16 | . | .641 | .410 | .382 | .86 |
| 12 | IMPED16[n] | . | .641 | .410 | .382 | .86 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

n. Probability of F-to-enter = .050 limits reached.

## Table A-77 Stepwise Regression Analysis Impediments Project Schedule Multicollinearity Diagnostics

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Failure to involve middle management early in the project | 1.000 | 0.074 | 5.097 |
| 2 | Failure to involve middle management early in the project | 1.180 | 0.093 | 5.513 |
| | Reengineered functions rather than processes | 1.180 | 0.073 | 6.248 |
| 3 | Failure to involve middle management early in the project | 1.241 | 0.152 | 4.929 |
| | Reengineered functions rather than processes | 1.181 | 0.086 | 6.548 |
| | Too many projects for key team members | 1.055 | 0.058 | 7.971 |
| 4 | Failure to involve middle management early in the project | 1.246 | 0.156 | 5.436 |
| | Reengineered functions rather than processes | 1.628 | 0.104 | 6.672 |
| | Too many projects for key team members | 1.168 | 0.064 | 8.468 |
| | Not focused on strategic value-added processes | 1.641 | 0.054 | 9.278 |
| 5 | Failure to involve middle management early in the project | 1.560 | 0.166 | 5.785 |
| | Reengineered functions rather than processes | 1.716 | 0.112 | 7.023 |
| | Too many projects for key team members | 1.216 | 0.072 | 8.759 |
| | Not focused on strategic value-added processes | 1.775 | 0.064 | 9.322 |
| | Reengineering scaled back due to politics | 1.562 | 0.038 | 12.075 |
| 6 | Failure to involve middle management early in the project | 1.620 | 0.166 | 6.250 |
| | Reengineered functions rather than processes | 1.734 | 0.116 | 7.491 |
| | Too many projects for key team members | 1.224 | 0.080 | 9.012 |
| | Not focused on strategic value-added processes | 1.856 | 0.064 | 10.080 |
| | Reengineering scaled back due to politics | 1.791 | 0.051 | 11.320 |
| | Project lacks senior executive sponsorship | 1.791 | 0.038 | 13.139 |

**Table A-78 Stepwise Regression Analysis Impediments Project Schedule Multicollinearity Diagnostics continued**

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 7 | Failure to involve middle management early in the project | 1.694 | 0.167 | 6.672 |
| | Reengineered functions rather than processes | 1.755 | 0.122 | 7.810 |
| | Too many projects for key team members | 1.228 | 0.092 | 8.985 |
| | Not focused on strategic value-added processes | 1.905 | 0.067 | 10.545 |
| | Reengineering scaled back due to politics | 1.813 | 0.064 | 10.783 |
| | Project lacks senior executive sponsorship | 2.754 | 0.042 | 13.248 |
| | Let the consultant do it attitude | 2.298 | 0.026 | 16.867 |
| 8 | Failure to involve middle management early in the project | 1.744 | 0.167 | 7.085 |
| | Reengineered functions rather than processes | 1.769 | 0.122 | 8.289 |
| | Too many projects for key team members | 1.338 | 0.092 | 9.548 |
| | Not focused on strategic value-added processes | 2.048 | 0.067 | 11.208 |
| | Reengineering scaled back due to politics | 1.847 | 0.064 | 11.463 |
| | Project lacks senior executive sponsorship | 2.769 | 0.044 | 13.838 |
| | Let the consultant do it attitude | 2.372 | 0.032 | 16.244 |
| | Staff driven by fear, lacks optimism | 2.254 | 0.026 | 17.935 |
| 9 | Failure to involve middle management early in the project | 2.177 | 0.167 | 7.464 |
| | Reengineered functions rather than processes | 1.812 | 0.137 | 8.248 |
| | Too many projects for key team members | 1.367 | 0.102 | 9.544 |
| | Not focused on strategic value-added processes | 2.048 | 0.074 | 11.236 |
| | Reengineering scaled back due to politics | 1.906 | 0.067 | 11.821 |
| | Project lacks senior executive sponsorship | 3.123 | 0.054 | 13.162 |
| | Let the consultant do it attitude | 2.452 | 0.036 | 15.997 |
| | Staff driven by fear, lacks optimism | 2.254 | 0.032 | 17.123 |
| | Failure to measure performance (before, during, and after proje | 2.458 | 0.024 | 19.874 |

**Table A-79 Stepwise Regression Analysis Prerequisites Project Success**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ13 | . | .319 | .102 | .097 | 1.29 |
| 2 | PREREQ07 | . | .553 | .305 | .298 | 1.14 |
| 3 | PREREQ14 | . | .591 | .349 | .339 | 1.10 |
| 4 | PREREQ02 | . | .619 | .383 | .370 | 1.08 |
| 5 | PREREQ15 | . | .635 | .404 | .388 | 1.06 |
| 6 | PREREQ15[h] | . | .635 | .404 | .388 | 1.06 |

a. Dependent Variable: Project Success

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

h. Probability of F-to-enter = .050 limits reached.

**Table A-80 Stepwise Regression Analysis Prerequisites Project Success**
**Multicollinearity Diagnostics**

| | | Collinearity Statistics | | |
|---|---|---|---|---|
| **Model** | **Variable** | **VIF** | **Eigenvalue** | **Condition Number** |
| 1 | Significant portion of CEO's time committed to project | 1.000 | 0.064 | 5.498 |
| 2 | Significant portion of CEO's time committed to project | 1.153 | 0.106 | 5.161 |
| | Sound proactive senior management already in place | 1.153 | 0.064 | 6.654 |
| 3 | Significant portion of CEO's time committed to project | 1.160 | 0.170 | 4.639 |
| | Sound proactive senior management already in place | 1.280 | 0.104 | 5.922 |
| | Senior executive responsible for the project | 1.156 | 0.063 | 7.649 |
| 4 | Significant portion of CEO's time committed to project | 1.177 | 0.191 | 4.874 |
| | Sound proactive senior management already in place | 1.814 | 0.148 | 5.538 |
| | Senior executive responsible for the project | 1.369 | 0.073 | 7.890 |
| | Strong senior management commitment/sponsorship | 2.099 | 0.057 | 8.912 |
| 5 | Significant portion of CEO's time committed to project | 1.189 | 0.223 | 4.900 |
| | Sound proactive senior management already in place | 1.830 | 0.163 | 5.734 |
| | Senior executive responsible for the project | 1.405 | 0.132 | 6.362 |
| | Strong senior management commitment/sponsorship | 2.099 | 0.072 | 8.618 |
| | Pilot project prior to full implementation | 1.111 | 0.056 | 9.763 |

**Table A-81 Stepwise Regression Analysis Prerequisites Project Budget**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ05 | . | .283 | .080 | .076 | 1.04 |
| 2 | PREREQ03 | . | .399 | .159 | .151 | .99 |
| 3 | PREREQ09 | . | .449 | .201 | .189 | .97 |
| 4 | PREREQ01 | . | .490 | .240 | .225 | .95 |
| 5 | PREREQ06 | . | .541 | .293 | .274 | .92 |
| 6 | PREREQ13 | . | .556 | .309 | .287 | .91 |
| 7 | PREREQ12 | . | .569 | .324 | .299 | .90 |
| 8 | PREREQ12[j] | . | .569 | .324 | .299 | .90 |

a. Dependent Variable: Project Budget

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

j. Probability of F-to-enter = .050 limits reached.

**Table A-82 Stepwise Regression Analysis Prerequisites Project Budget Multicollinearity Diagnostics**

| Model | Variable | Collinearity Statistics | | |
|---|---|---|---|---|
| | | VIF | Eigenvalue | Condition Number |
| 1 | Project growth-oriented, not cost-cutting | 1.000 | 0.107 | 4.213 |
| 2 | Project growth-oriented, not cost-cutting | 1.023 | 0.159 | 4.172 |
| | Project expectations were realistic | 1.023 | 0.075 | 6.059 |
| 3 | Project growth-oriented, not cost-cutting | 1.043 | 0.166 | 4.673 |
| | Project expectations were realistic | 1.056 | 0.142 | 5.053 |
| | Adequate budget | 1.061 | 0.068 | 7.320 |
| 4 | Project growth-oriented, not cost-cutting | 1.070 | 0.186 | 4.889 |
| | Project expectations were realistic | 1.165 | 0.155 | 5.353 |
| | Adequate budget | 1.123 | 0.138 | 5.673 |
| | Extensive user involvement in design | 1.260 | 0.067 | 8.150 |
| 5 | Project growth-oriented, not cost-cutting | 1.091 | 0.188 | 5.331 |
| | Project expectations were realistic | 1.190 | 0.156 | 5.852 |
| | Adequate budget | 1.141 | 0.139 | 6.203 |
| | Extensive user involvement in design | 1.376 | 0.120 | 6.659 |
| | Firm has a clear vision of project goals | 1.294 | 0.065 | 9.070 |
| 6 | Project growth-oriented, not cost-cutting | 1.349 | 0.241 | 5.072 |
| | Project expectations were realistic | 1.197 | 0.157 | 6.297 |
| | Adequate budget | 1.207 | 0.139 | 6.681 |
| | Extensive user involvement in design | 1.405 | 0.120 | 7.184 |
| | Firm has a clear vision of project goals | 1.294 | 0.087 | 8.456 |
| | Significant portion of CEO's time committed to project | 1.327 | 0.047 | 11.463 |
| 7 | Project growth-oriented, not cost-cutting | 1.366 | 0.246 | 5.357 |
| | Project expectations were realistic | 1.250 | 0.181 | 6.247 |
| | Adequate budget | 1.207 | 0.153 | 6.795 |
| | Extensive user involvement in design | 1.465 | 0.134 | 7.245 |
| | Firm has a clear vision of project goals | 1.333 | 0.114 | 7.880 |
| | Significant portion of CEO's time committed to project | 1.338 | 0.078 | 9.489 |
| | Aggressive target(s) set | 1.181 | 0.043 | 12.854 |

**Table A-83 Stepwise Regression Analysis Prerequisites Project Schedule**

**Model Summary[a,b]**

| Model | Variables Entered | Variables Removed | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|---|---|
| 1 | PREREQ12 | . | .215 | .046 | .042 | 1.07 |
| 2 | PREREQ12[d] | . | .215 | .046 | .042 | 1.07 |

a. Dependent Variable: Project Schedule

b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

d. Probability of F-to-enter = .050 limits reached.

**Table A-84 Stepwise Regression Analysis Prerequisites Project Schedule Multicollinearity Diagnostics**

| | | Collinearity Statistics | | |
|---|---|---|---|---|
| Model | Variable | VIF | Eigenvalue | Condition Number |
| 1 | Aggressive target(s) set | 1.000 | 0.094 | 4.507 |

**Table A-85 Correlation Analysis – Independent Variables versus Project Success**

| Independent Variable | Project Success | |
|---|---|---|
| Reengineered functions rather than processes | -.216 | ** |
| Not focused on strategic value-added processes | -.182 | * |
| Not following detailed methodology | .010 | |
| Project under-financed and/or under-staffed | -.219 | ** |
| Wrong sponsor | .022 | |
| Project lacks senior executive sponsorship | .023 | |
| Let the consultant do it attitude | -.031 | |
| Project too focused on cost-cutting | -.045 | |
| Information Management (IT) viewed as driver of project, not the enabler | -.287 | ** |
| Management by consensus (lack of strong management | -.041 | |
| Financial condition of firm not sound | -.262 | ** |
| Too many projects for key team members | -.087 | |
| Staff driven by fear, lacks optimism | -.191 | ** |
| Animosity towards Information Systems and Human Resources | -.022 | |
| Average performers assigned to the project | -.031 | |
| Failure to measure performance (before, during, and after project) | -.040 | |
| Reengineering scaled back due to politics | -.076 | |
| Failure to involve middle management early in the project | -.065 | |
| Extensive user involvement in design | .108 | |
| Strong senior management commitment/sponsorship | .084 | |
| Project expectations were realistic | .244 | ** |
| Extensive use of cross-functional memberships on projects teams | .190 | ** |
| Project growth-oriented, not cost-cutting | -.070 | |
| Firm has a clear vision of project goals | .207 | ** |
| Sound proactive senior management already in place | .304 | ** |
| Full-time participation of key practitioners | .187 | ** |
| Adequate budget | .120 | |
| Adequate training/workshops conducted | .158 | * |
| Communications with employees | .197 | ** |
| Aggressive target(s) set | .138 | |
| Significant portion of CEO's time committed to project | -.319 | ** |
| Senior executive responsible for the project | .270 | ** |
| Pilot project prior to full implementation | -.083 | |
| Crisis as a key driver of the project | -.078 | |

**Table A-86 Correlation Analysis – Independent Variables versus Budget Performance**

| Independent Variable | Project Budget | |
|---|---|---|
| Reengineered functions rather than processes | -.152 | * |
| Not focused on strategic value-added processes | .093 | |
| Not following detailed methodology | .125 | |
| Project under-financed and/or under-staffed | .088 | |
| Wrong sponsor | .077 | |
| Project lacks senior executive sponsorship | .165 | * |
| Let the consultant do it attitude | .025 | |
| Project too focused on cost-cutting | .108 | |
| Information Management (IT) viewed as driver of project, not the enabler | -.104 | |
| Management by consensus (lack of strong management | .042 | |
| Financial condition of firm not sound | .107 | |
| Too many projects for key team members | -.144 | * |
| Staff driven by fear, lacks optimism | .126 | |
| Animosity towards Information Systems and Human Resources | .056 | |
| Average performers assigned to the project | .004 | |
| Failure to measure performance (before, during, and after project) | .011 | |
| Reengineering scaled back due to politics | -.043 | |
| Failure to involve middle management early in the project | .194 | ** |
| Extensive user involvement in design | -.104 | |
| Strong senior management commitment/sponsorship | .000 | |
| Project expectations were realistic | .236 | ** |
| Extensive use of cross-functional memberships on projects teams | -.045 | |
| Project growth-oriented, not cost-cutting | -.283 | ** |
| Firm has a clear vision of project goals | .192 | ** |
| Sound proactive senior management already in place | .163 | * |
| Full-time participation of key practitioners | -.004 | |
| Adequate budget | .201 | ** |
| Adequate training/workshops conducted | .095 | |
| Communications with employees | -.035 | |
| Aggressive target(s) set | -.186 | ** |
| Significant portion of CEO's time committed to project | .030 | |
| Senior executive responsible for the project | .030 | |
| Pilot project prior to full implementation | .006 | |
| Crisis as a key driver of the project | -.035 | |

**Table A-87 Correlation Analysis Independent Variables versus Schedule Perfromance**

| Independent Variable | Project Schedule | |
|---|---|---|
| Reengineered functions rather than processes | .034 | |
| Not focused on strategic value-added processes | .116 | |
| Not following detailed methodology | -.040 | |
| Project under-financed and/or under-staffed | -.006 | |
| Wrong sponsor | .059 | |
| Project lacks senior executive sponsorship | .008 | |
| Let the consultant do it attitude | -.125 | |
| Project too focused on cost-cutting | -.102 | |
| Information Management (IT) viewed as driver of project, not the enabler | -.066 | |
| Management by consensus (lack of strong management | .109 | |
| Financial condition of firm not sound | -.237 | ** |
| Too many projects for key team members | -.186 | ** |
| Staff driven by fear, lacks optimism | -.088 | |
| Animosity towards Information Systems and Human Resources | .037 | |
| Average performers assigned to the project | -.055 | |
| Failure to measure performance (before, during, and after project) | -.084 | |
| Reengineering scaled back due to politics | -.015 | |
| Failure to involve middle management early in the project | .033 | |
| Extensive user involvement in design | .026 | |
| Strong senior management commitment/sponsorship | -.046 | |
| Project expectations were realistic | .138 | |
| Extensive use of cross-functional memberships on projects teams | -.105 | |
| Project growth-oriented, not cost-cutting | -.006 | |
| Firm has a clear vision of project goals | -.048 | |
| Sound proactive senior management already in place | -.023 | |
| Full-time participation of key practitioners | .020 | |
| Adequate budget | .019 | |
| Adequate training/workshops conducted | .049 | |
| Communications with employees | -.003 | |
| Aggressive target(s) set | -.215 | ** |
| Significant portion of CEO's time committed to project | -.127 | |
| Senior executive responsible for the project | -.091 | |
| Pilot project prior to full implementation | -.171 | * |
| Crisis as a key driver of the project | -.075 | |

## VITA

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