Factor Analysis of the Performance Indices of Information and Communications Technology Projects in the Public Sector of the Nigerian Economy

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ABSTRACT

Capital investment on Information and Communications Technology (ICT) projects in the public sector of Nigeria economy has been on the increase in the last ten years. This paper proposes fifty three performance indices of ICT projects and a tool for evaluating them. The ICT projects in the public sector of Nigerian economy were surveyed and completed questionnaires were received from forty five Federal Ministries, Departments and Agencies; thirty six States and Federal Capital Territory; one model Local Government for each State; thirty seven Universities; forty two Polytechnics and forty three Colleges of Education. The data collected were subjected to factor analysis by principal components using Statistical Package for Social Scientists (SPSS). Nine factors were extracted and the percentage contribution of each factor to the success of ICT projects was estimated. The results obtained place a high premium on the participation of ICT users in the planning, implementation and management of ICT projects. The total sum of the percentage contributions of all the factors was found to be less than one hundred. This revealed that there were some extraneous factors whose related performance indices were not considered in the administered questionnaire.

Keywords: Conceptualization, Descriptive, Correlation, Communality, Eigenvalue, Variance

INTRODUCTION

Information and Communications Technology (ICT) is the fastest growing technology in the world today. The role of ICT in both the public and private sectors of the world economy has been widely discussed in the literature. The capital investment on ICT projects in both the public and private sectors of the world economy has been on the increase in the last ten years. ICT projects are conceptual in nature, product of pure and intelligent thought, infinitely malleable and invisible; hence, there are often inherent risks and uncertainties associated with them. ICT projects are dynamic and involve the synergy and ideas of groups of experts and professionals where the knowledge of ICT of one group varies from one to another. Hence, ICT projects are subject to the vagaries of group dynamics, interactions, coordination and communications.

The survey of Information Technology (IT) projects attributes the success of IT projects to the Chilean national drive on the development of indigenous application software [5]. The human factors in failed IT projects have been studied by taking a random survey of some selected companies and individuals that are involved in the planning, implementation and management of IT projects [15]. Four types of failure of IT projects which are attributed to many factors among which is the emphasis on technical process rather than on social, political and economic issues of IT system development have been reported [8]. The following factors were found to be responsible for IT projects failure [14]:

a. Poor planning.
b. Lack of top management support.
c. Failure to address risks areas.
d. Inadequate skill and expertise of IT project manager.

A framework for understanding the failure centers and the difference between design ideas and organizational realities of IT projects have been proposed in [7]. The review of the English and Dutch literature on the evaluation of Patient Case Information System has been carried out with a view to identifying the factors that were responsible for the success or failure of such system [10].

It has been reported that major IT projects at key government departments in the United Kingdom have ended in failure [9]. Detailed account of the problems of specific projects and their solutions has been documented as a series of reports by IT watchdog bodies in UK. The efforts of the bodies have so far failed to reduce the casualty rate of IT projects. In an attempt to prevent the failure of IT projects, a team of UK Computing Services and Software Association (CSSA) led by Hughes identified sixteen performance indices of IT projects, evaluated their success and failure factors and reported eight key statements which could serve as a guide to the planners and managers of IT projects.

Some popular capital intensive IT projects of the Federal Government of Nigeria, Oyo State and public Universities of Nigeria were surveyed by administering three hundred copies of the designed questionnaire. Two hundred and twenty respondents returned completed questionnaires. The responses were verified and validated by a follow up with personal interviews and meetings with the principal actors of the selected IT projects. The responses were thereafter subjected to factor analysis by principal components using Statistical Package for Social Scientists (SPSS). Eleven factors were extracted and further statistical analysis was carried out to generate the eigenvalues of the extracted factors which formed the basis for estimating the contributions of the extracted factors to the success of IT projects [2].

The National Information Technology Development Agency (NITDA) of Nigeria is the institution mandated to provide IT standards, guidelines and policy, strategic plan, research and development in Nigeria. NITDA has proposed a national strategic action plan whereby ICT serves as a tool for development in all the sectors of Nigerian economy. The platform for the strategic action plans is the baseline study of ICT in both the private and

public sectors of Nigerian economy. A questionnaire was developed as the instrument for gathering data on the following in the public sector of Nigerian economy:

a. Profile of organization.
b. ICT policy/strategic action plan of organization.
c. Organization budget and ICT budget.
d. ICT infrastructural facilities of organization.
e. Internet facilities of organization.
f. ICT hardware, software and consumable of organization.
g. Population distribution of the personnel of organization.
h. Revenue generated from ICT products and services.
i. ICT projects of organization and their assessment.
j. Assessment of the attitude of public servants to ICT.
k. Impact of ICT on the productivity of organization.

The first phase of the baseline study takes a holistic view of the practical issues of the conceptualization and implementation of ICT projects in the public sector of Nigerian economy. The study developed metrics of the growth of ICT in Nigerian economy which served as the platform for the development of the metrics warehouse and mining the data desirable for planning, policy formulation, decision making and forecasting.

One of the specific and functional objectives of the Baseline Study is to take stock of the ICT projects of corporate organizations in the public sector of Nigeria economy with a view to analyzing their features. Fifty three performance indices of ICT projects were formulated and a questionnaire of the performance indices was designed and administered on the public sector of Nigerian economy. Completed questionnaires were received from forty five Federal Ministries, Departments and Agencies (MDAs); thirty six States and Federal Capital Territory; one model Local Government for each State; thirty seven Universities; forty two Polytechnics and forty three Colleges of Education. The responses were verified and validated by a follow up with personal interviews and meetings with the principal actors of some ICT projects. The responses were thereafter subjected to factor analysis by principal components using Statistical Package for Social Scientists (SPSS). Nine factors were extracted and the percentage contribution of each factor to the success of ICT projects was estimated. The results obtained placed a high premium on the participation of users in the planning, implementation and management of ICT project. The total sum of the percentage contributions of all the factors was found to be less than one hundred. This revealed that there were some extraneous factors whose related performance indices were not considered in the administered questionnaire.

MATERIALS AND METHODS

The performance indices of ICT projects are many and they relate to one another. The general form of the mathematical model for evaluating the performance indices is presented as:

$$Y_{i,} = \sum_{k=1}^{n} a_{i,k}X_k \quad i = 1,2,3,4, \ldots\ldots m \qquad (1)$$

where Y_i represents the ith assessor's observation of kth performance index, $a_{i,k}$ represents the assessment of kth. performance index by ith. Assessor.

The factor analysis by principal components is adopted in the evaluation of the performance indices of ICT projects. The primary goal is to obtain some factors each of which would load on some performance indices of ICT projects with a view to estimating their contributions to the success of ICT projects. The following statistics are generated and used for the purpose of achieving the above stated objective:

a. Descriptive statistics.

b. Correlation matrix.
c. Bartlet's test and Kaiser-Mayer Olkin (KMO).
d. Communality.
e. Initial factor loadings.
f. Rotated factor loadings.
g. Factor score coefficient matrix.
h. Eigenvalue.

The descriptive statistics presents the mean and standard deviation of the raw score of each performance index given by an Assessors. The correlation matrix presents the degree of pair wise relationships of the performance indices. The Bartlett's test of sphericity is used to test the adequacy of the sample population. Another measure of the adequacy of sample population is Kaiser-Mayer Olkin (KMO).

In factor analysis, there is a set of factors which is generally referred to as 'common factors' each of which loads on some performance indices and another set of factors which are extraneous to each of the performance indices. The proportion of variance of a performance index explained by the common factor is called the 'communality' of the performance index. The communality of the performance index ranges between 0 and 1, where 0 indicates that the common factors explains none of the variance and 1 indicates that all the variance is explained by the common factors.

The component matrix presents the initial factor loadings. The factor loadings associated with a specific index is simply the correlation between the factor and the standard score of the index. The degree of generalization found between each index and each factor is referred to as 'factor loading'. The farther away a factor loading is from zero in the positive direction, the more one can conclude the contribution of an index to a factor. The component matrix can be rotated by varimax, promax, equamax or quartimax for the purpose of establishing a high correlation between indices and factors. The factor score coefficient matrix which can be used to evaluate the assessment of each Assessor is generated. The eigenvalues and percentage variance of the factors extracted are generated, as well, for the purpose of evaluating the contributions of each factor to the success of ICT projects.

DATA SURVEY, COLLECTION AND ANALYSIS

The questionnaire which is presented in Appendix A has three parts. The first part provides two columns for registering the description and financial estimate of each ICT project. The second part provides a column for registering the sponsor of ICT projects (public, private, public-private partnership or multinational). The third part provides five columns where a respondent can rank each of the fifty three formulated ICT projects performance indices as 'Excellent', 'Very Good', 'Good', 'Average' or 'Poor'. The questionnaire was administered and completed questionnaires were duly received from forty five Federal MDAs, thirty six States and Federal Capital Territory, one model Local Government from each States, thirty seven Universities, forty two Polytechnics and forty three Colleges of Education in Nigeria. The responses were verified and validated by a follow up with some interviews and meetings with the principal actors of the ICT projects of some selected organizations. Thereafter, the final data were subjected to factor analysis by principal components using SPSS package.

The descriptive statistics of the data collected, which are not presented in an attempt to minimize the volume of the paper, exhibits the mean and standard deviation of the rating of the performance indices of the ICT projects by the assessors or respondents. For example, the mean and standard deviation of the rating on 'project planning' are 3.74 and 0.84 respectively. The mean and standard deviation of the rating of 'user involvement in feasibility study' are 3.68 and 0.99 respectively. The mean and standard deviation of the rating of 'training of users' are 3.01 and 1.12 respectively.

The correlation matrix of the performance indices generated shows that a correlation of 0.91 exists between the 'user involvement in planning' and 'user involvement in feasibility study'. A correlation of 0.94 exists between 'assessment of contribution to growth' and 'assessment of impact on productivity'. The implication is that 'user involvement in planning' is very likely to share the same factor with 'user involvement in feasibility study'. On the other hand, 'assessment of contribution to growth' is likely to share the same factor with 'assessment of impact on productivity'.

Bartlett's test produces a χ^2 of 2582.258, degree of freedom of 1378 and a significance level of 0.000, which indicates the adequacy of the population. The Kaiser-Mayer Olkin (KMO) test produces a measure of 0.879, which confirms the adequacy of the sample population. The results obtained from the Bartlett's test and KMO test are good indicators of the suitability of the application of factor analysis as well.

The communalities of the performance indices generated are not presented because of the attempt to minimize the volume of the paper. The communality of the 'project objectives' is 0.887 (88.70%) which implies that 88.70% of the variance in 'project objectives' can be explained by the extracted factors, while the remaining 11.30% is attributed to extraneous factors.

Applying the Social Science rule, which states that only the performance indices with loadings equal to or greater than 0.4 should be considered meaningful, nine factors were extracted from the initial principal component matrix generated. In order to obtain realistic and meaningful factor loadings, the initial principal component matrix is rotated orthogonally by varimax, promax and quantimax. However, the result obtained from the rotation by varimax which is presented in Appendix B was found to be meaningful and consequently adopted for further analysis. The nine factors extracted and the loaded performance indices are the following:

Factor 01 (User Participation in ICT Project) loads on:
a. Users' Involvement in Planning (UPLANG).
b. Users' Involvement in Feasibility Study (UFSBST).
c. Users' Involvement in Design (UDSIGN).
d. Users' Involvement in Installation (UINSTN).
e. Users' Involvement in Documentation (UDOCTN).
f. Users' Involvement in Operation (UOPRTN).
g. Users' Involvement in Maintenance (UMTNCE).

Factor 02 (Profile of Management Team and Budget of ICT Project) loads on:
a. Academic Qualification of Contractor (ACAQOC).
b. Professional Experience of Contractor (PRFEOC).
c. Performance of Contractor (PERCOT).
d. Budget of Project (BOFPJT).
e. Training of Management Staff (TMNGST).
f. Training of Directorates Staff (TDRTST).
g. Training of Users (TRNGUS).
h. Use of Independent Consultant (UOICLT).
i. Security of ICT Personnel (SOICTF).

Factor 03 (ICT Professional Ethics and Code of Conduct) loads on:
a. Nigerian Computer Society Code of Conduct (NCSCCD).
c. Nigerian Computer Society Professional Ethic (NCSPET).
d. Computer Professional Registration Council of Nigeria Code of Conduct (CPNCCD).
e. Computer Professional Registration Council of Nigeria Ethics (CPNPET).

Factor 04 (Development and Management of ICT Project) loads on:
a. Project planning (PPLANG).
b. Project objectives (POBJCT).
c. Project methodology (PMETDG).
d. Project feasibility study (PRFSBS).
e. Competence of Technical Committee (CPTTCM).
f. Competence of Project Manager (CPMNGR).

Factor 05 (Documentation, Maintenance and Performance of Stakeholders of ICT Project) loads on:
a. Quality of Reference Manual (QORMNL).
b. Quality of User Guide (QOUSGD).
c. Quality of Operational Manual (QOOMNL).
d. Government Policy on ICT (GPOICT).
e. Cooperation of Parties of Project (COPOPT).
f. Performance of Maintenance Service (POMTSV).

Factor 06 (Profile and Orientation of ICT Users) loads on:
a. Users' Professional Experience in ICT (UPRFEX).
b. Users' Awareness of Importance of ICT (UAWAIP).
c. Users' Awareness of ICT as a Partner (UAWAPT).
d. Academic Qualification of Users (UACAQL).

Factor 07 (Requirements of ICT Project) loads on:
a. Hardware Requirements (HRDREQ).
b. Software Requirements (SFTREQ).
c. Human Ware Requirements (HWRREQ).
d. Strategic Plan of Client on ICT (STPLOC).

Factor 08 (Impact on Growth, Development and Wealth Creation) loads on:

a. Assessment of Impact on Productivity (AOIPDT).
b. Assessment of Contribution to Growth (AOCGRT).
c. Assessment of Revenue Generation (AORVGN).

Factor 09 (ICT Personnel Development and Performance of Basic Utilities) loads on:

a. Performance of Public Electricity (PUPELE).
b. Performance of Telecommunications (POTCOM).
c. Training of ICT Personnel (TCOMPS).

The generated factor score coefficient matrix presented in Appendix C can be used to estimate the assessment of each Assessor of ICT projects. This can be achieved by formulating a linear equation of the form:

$$C_{i,j} = \sum_{k=1}^{53} b_{k,j} S_{i,k} \quad i = 1,2,... n; \; j = 1,2,...,9 \qquad (2)$$

where:

$C_{i,j}$ represents the contribution of ith Assessor to jth factor,
$b_{k,j}$ represents the factor score coefficient of kth performance index for jth factor,
$S_{i,k}$ represents the standard score of ith Assessor for kth performance index and
n represents the population of the sampled Assessors.

$S_{i,k}$ is estimated by:

$$S_{i,k} = A + (x_i - y_i)/d_i \quad (3)$$

where:

A represents the allowable minimum raw score for performance index; in this instance, it is 1;
x_i represents the raw score of ith performance index;
y_i represents the mean of the raw scores of ith performance index by the sampled Assessors;
d_i represents the standard deviation of the raw scores of ith performance index by the sampled Assessors;

In an attempt to evaluate the percentage contribution of each factor to the overall success of ICT project, the eigenvalue of each factor is generated. The eigenvalue of jth factor denoted by 'E_j' is calculated by:

$$E_j = \sum_{k=1}^{53} X^2_{i,j} \; ; \; i = 1,2,\ldots 53; \; j = 1,2,\ldots., 9 \quad (4)$$

where $X_{i,j}$ represents the loading of jth factor on ith performance index. The eigenvalue is used to indicate how well each of the extracted factors fits the data from the sample. The percentage contribution of each factor to the overall success of ICT project denoted by 'P' is estimated by:

$$P = 100\, E_j/n \quad (5)$$

where n represents the number of performance indices considered in a study. Table 3.1 presents the eigenvalues, percentage contribution and cumulative percentage contribution of the extracted nine factors. The nine factors contribute a total of 67.74% to the overall success of ICT projects.

The factor described as 'User Participation in ICT Projects' contributes 37.88% out of the 69.51%. This statistics suggest that many ICT projects would fail if their user departments were not encouraged to fully participate in their planning, implementation and management. This finding corroborates the position held in [7]. The human experts of the user departments are often fearful of the threat ICT could pose on their job security. It is, therefore, a common occurrence for the user departments to sabotage the operation and maintenance of any ICT project, especially, when they are conspicuously ignored in the scheme of planning, implementation and management.

	Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	20.077	37.882	37.882
2	3.025	5.707	43.589
3	2.953	5.573	49.162
4	2.730	5.151	54.313
5	1.888	3.563	57.876
6	1.739	3.281	61.156
7	1.521	2.869	64.026
8	1.486	2.803	66.829
9	1.421	2.681	69.510

Table 3.1: Eigenvalues

The factor described as 'Professional Ethics and Code of Conduct' contributes 5.57% out of the 69.51%. This exhibits the impact of NITDA, Nigerian Computer Society (NCS) and Computer Professional (Registration Council) of Nigeria (CPN) on the performance of ICT projects in the public sector of Nigerian economy. The contribution of this factor would have been higher if not for the proliferations of ICT professional bodies in Nigeria. Most of the ICT professional bodies are run by ICT enthusiasts and individuals who are concerned with self interest and economic gains. In Nigerian society, ICT business is for all, thus, while appropriate development practices, project management, risk analysis and standard processes are set by NITDA, NCS and CPN in order to ensure the quality of products and services, their enforcement at the level of the proliferated professional bodies is grossly inadequate.

The remaining 30.49% is thought to be the contributions of some extraneous factors whose related performance indices were not considered in the administered questionnaire. The following are typical performance indices that were not considered:

a. Incentive to ICT personnel and members of staff of user departments.
b. Government and statutory changes.
c. Economic and trade fluctuations.
d. Re-organization and restructuring.
e. Re-ordering of priorities during the life time of ICT project.
f. Social, cultural, economic and political issues such as bureaucratic mindset that may take ICT as a tool for government automation rather than for government transformation.
g. Natural and artificial hazards.
h. Attitudes of hardware manufacturers.
i. Attitudes of the software developers.
j. Coherent cooperation, coexistence and concerted programmes of the hardware and software maintenance engineers.
k. User departments' acceptance and commitment to the life run of ICT projects. For example, user departments' readiness to make accurate and complete operational data available for processing is a typical case.

The following performance indices failed to load on any of the extracted factors:

a. Users' Involvement on Analysis (UANALY).
b. Data Survey and Collection (DSVCTN).
c. Performance of Client (PERCLT).
d. Reliability of ICT Facilities (ROICTF).
e. Competence of Client ICT Personnel (COCICT).
f. Reliability of ICT Personnel (ROICTP).
g. Data Verification and Validation (DVRVDT).

The above listed performance indices are indicators that:

a. User departments are, largely, ignored by the hired Vendors, Consultants or Contractors during the analysis of the requirements (hardware, software, personnel, infrastructure, and budget) of ICT projects in the public sector of Nigerian economy. This confirms the general feeling of Nigerian society that ICT facilities are, in most cases, dumped on the user departments of the public sector by the Chief Executive/Accounting Officer. The competence of ICT personnel, goodness of procured ICT facilities and equitable distribution are not taken as serious practical issues in the development and management of ICT projects.
b. Data survey, collection, verification and validation which are major stages of the life operation of any ICT projects are, often, ignored by the hired Vendors, Consultants or Contractors. This goes to confirm the general feelings of ICT Experts in Nigeria that

the life operation of ICT projects are based on fictitious data or hypothetical data that are not real. The consequences of false data are false planning, decision making, policy formulation and forecasting.

c. The performance of the client of ICT project can be tested and measured from the profile of the members of its Steering Committee and Technical Committee. In the public sector of Nigerian economy, the membership of these important Committees is often characterized by political game, sentiments and subjective feelings of the Chief Executive/Accounting Officer.

CONCLUSION

The huge investment in ICT projects demands that they are planned in the light of overall corporate strategy. The planning and implementation of ICT project requires the break down of a project into stages, each with a control point for estimating timescales, allocating resources and measuring progress against the strategic plan. Tools such as Gantt charts, Networks, Bar-charts, and Checklists can assist in the planning and control process. Control involves measurement of progress (usually via progress meetings and recording of work on timesheets), identification of deviations, taking corrective action and producing performance statistics. The careful planning and control of an ICT project provides the right climate for success.

Factor analysis by principal components has been adopted for the evaluation of ICT projects performance. Nine factors were extracted and each of them adequately loaded on some performance indices. The initial principal component matrix generated was subjected to orthogonal transformations for the purpose of obtaining meaningful factorization of the performance indices of ICT projects. Factor score coefficient matrix was generated which provided the basis for measuring the degree of goodness of the assessment of each assessor or respondent of ICT projects. The eigenvalue of each factor was calculated and used for the evaluation of the percentage contribution of each factor to the success of ICT projects. The fact that the overall percentage contributions of the extracted factors is less than one hundred is an evidence that some latent factors (extraneous factors), whose related performance indices were not considered in the administered questionnaire, play significant roles in the success of ICT projects.

The results obtained place a high premium on the involvement of users in the planning, implementation and management of ICT project. The approach to the planning, implementation and management of ICT project should be evolutionary in the sense that it should allow for the active participation of the traditional staff of the users community. The focus of future research is the enlargement of the performance indices with a view to extracting some hidden factors and perhaps increasing the contributions of the factors extracted in this work.

In principle, there are many ICT professional bodies in both developed and developing countries with clearly defined professional ethics and code of conduct. However, the practice of monitoring, control and policing the professional ethics and code of conduct has left much to be desired in Nigeria [16]. The art, science, engineering and technology of the practice of ICT personnel, freelance ICT practitioners and investors on ICT need to be re-examined and appropriately re-positioned. The driving force of the world knowledge economy is ICT. There is a need, therefore, for a robust firewall to prevent or minimize the drainage of the huge investment on ICT projects in Nigeria and the world at large.

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Appendix A.1: Description of Project and Financial Estimate

Description of Project	Financial Estimate

Appendix A.2: Nature of Sponsorship of Project

Public Fund	
Private Fund	
Public-Private Partnership	
Multinational	
Others	

Appendix A.3: Ranking of Performance Indices of Projects

Performance Index	Excellent	V.Good	Good	Average	Poor
Project Planning					
Project Objectives					
Project Methodology					
Project Feasibility Study					
Competence of Technical Committee					
Competence of Project Manager					
Performance of Contractor					
Performance of Client					
Budget of Project					
Users' Involvement in Planning					
Users' Involvement in Feasibility Study					
Users' Involvement in Analysis					
Users' Involvement in Operation					
Users' Involvement in Design					
Users' Involvement in Documentation					
Users' Involvement in Maintenance					
Users' Involvement in Installation					
Academic Qualifications of Users					
Users' Professional Experience in ICT					
Users' Awareness of Importance of ICT					
Users' Awareness of ICT as a Partner					
Training of Users					
Training of Computer Personnel					
Training of Management Staff					
Training of Directorate Staff					
Academic Qualifications of Contractor					
Professional Experience of Contractor					
Data Survey and Collection					
Data Verification and Validation					
Performance of Maintenance Service					
Reliability of ICT facilities					
Quality of Reference Manual					
Quality of User Guide					
Quality of Operations Manual					
Cooperation of Parties of Project					
Strategic Plan of Client on ICT					
Hardware Requirements					

Software Requirements					
Human ware Requirements					
Use of Independent Consultant					
Reliability of ICT Personnel					
Security of ICT Facilities					
Competence of Clients' ICT Personnel					
Government Policy on ICT					
NCS Code of Conduct					
NCS Professional Ethics					
CPN Code of Conduct					
CPN professional Ethics					
Performance of Public Electricity					
Performance of Telecommunications					
Assessment of Revenue generated					
Assessment of Contribution to growth					
Assessment of impact on Productivity					

Appendix B: Orthogonal Transformation by Varimax

	Component								
Variable	1	2	3	4	5	6	7	8	9
UPLANG	.900								
UDSIGN	.832								
UFSBST	.807								
UDOCTN	.803								
UINSTN	.764								
UOPRTN	.747								
UMTNCE	.611								
UANALY									
ACAQOC		.871							
TDRTST		.858							
TMNGST		.753							
PRFEOC		.656							
BOFPJT		.575							
PERCOT		.567							
TRNGUS		.503							
UOICLT		.446							
SOICTF		.431							
DSVCTN									
PERCLT									
CPNCCD			1.038						
NCSPET			1.035						
CPNPET			1.035						
NCSCCD			.961						
PPLANG				.944					
POBJCT				.841					
PMETDG				.659					
CPTTCM				.654					
PFSBST				.620					
CPMNGR				.482					
QOOMNL					.977				
QOUSGD					.944				
QORMNL					.938				
GPOICT					.530				
POMTSV					.512				
COPOPT					.488				
ROICTF									
UAWAIP						1.037			
UAWAPT						.935			
UPRFEX						.906			
UACAQL						.721			
COCICT									
HRDREQ							1.048		
SFTREQ							.972		
HWRREQ							.828		
STPLOC							.452		
AOIPDT								.765	
AOCGRT								.753	
AORVGN								.696	
POPELE									.886
POTCOM									.831
TCOMPS									.850
ROICTP									
DVRVDT									

Appendix C: Factor Score Coefficient Matrix

	Component								
Variable	1	2	3	4	5	6	7	8	9
PPLANG	.025	-.001	-.139	.072	-.065	.229	.111	-.035	.022
POBJCT	.024	-.052	-.037	.161	-.086	.133	.194	-.076	-.061
PMETDG	.032	-.043	-.047	.048	-.005	.148	.140	.010	.077
PRFSBS	.030	.001	-.054	.090	-.029	.109	.018	.102	.060
CPTTCM	.027	.020	-.063	.119	-.025	.165	.103	-.047	.035
CPMNGR	.031	.033	-.082	.146	-.040	.076	.063	-.060	.050
PERCOT	.035	.024	-.033	.023	.081	-.031	.102	-.140	-.122
PERCLT	.035	-.003	-.002	.026	.051	.041	-.006	-.082	.000
BOFPJT	.029	-.065	.000	-.008	.026	.021	-.049	.008	-.294
UPLANG	.034	.030	-.078	-.177	-.052	.051	.029	.027	-.091
UFSBST	.035	.006	-.055	-.155	-.023	.031	.036	.062	-.051
UANALY	.015	.008	-.006	-.099	.012	-.040	.056	.075	.065
UOPRTN	.035	.060	-.061	-.102	-.021	.073	-.041	.166	-.068
UDSIGN	.035	-.003	-.075	-.168	-.080	-.044	.063	.071	-.056
UDOCTN	.037	.024	-.090	-.150	-.066	-.009	.037	.040	-.090
UMTNCE	.038	.041	-.063	-.109	-.042	.039	-.044	.091	.017
UINSTN	.030	.058	-.057	-.155	-.150	.032	.004	.032	.016
UACAQL	.015	.201	.016	.046	.041	.172	.061	-.004	.134
UPRFEX	.016	.229	.058	-.095	.081	.003	-.010	-.033	.115
UAWAIP	.018	.234	.039	-.018	.081	.033	-.069	-.084	.072
UAWAPT	.022	.221	.027	-.031	.062	-.025	-.073	-.094	.032
TRNGUS	.035	.059	-.079	.052	.033	-.189	-.048	.158	-.043
TCOMPS	.007	.006	-.042	.119	-.009	.031	.024	.418	.215
TMNGST	.036	.010	-.079	.079	.075	-.204	-.054	.021	-.069
TDRTST	.035	-.010	-.076	.069	.090	-.222	-.026	.068	-.112
ACAQOC	.033	-.035	-.029	.034	-.003	-.074	.114	-.134	-.276
PRFEOC	.040	-.017	-.020	.049	-.007	.002	.026	-.098	-.166
DSVCTN	.039	-.041	-.039	.030	-.040	.034	.085	.037	-.011
DVRVDT	.038	-.038	-.011	.046	-.010	.051	.045	.052	.076
POMTSV	.033	.005	-.017	.026	-.023	-.101	-.017	.103	.288
ROICTF	.038	.016	.026	.018	-.069	-.078	-.009	-.043	.032
QORMNL	.035	-.059	-.018	.008	-.158	-.119	-.086	-.185	.178
QOUSGD	.036	-.057	-.044	.023	-.128	-.077	-.128	-.180	.200
QOOMNL	.034	-.077	-.015	.014	-.151	-.077	-.109	-.155	.243
COPOPT	.036	-.060	-.008	-.065	-.050	-.064	-.100	-.121	.019
STPLOC	.034	-.044	.004	-.061	.089	.123	-.086	-.043	-.064
HRDREQ	.033	-.090	-.001	.008	.235	.097	-.113	.089	.011
SFTREQ	.034	-.084	-.003	.012	.178	.125	-.163	.132	.080
HWRREQ	.031	-.022	-.019	.042	.190	-.041	-.136	.182	-.020
UOICLT	.030	-.053	.002	.071	.098	-.107	-.178	-.040	.022
ROICTP	.027	.091	.054	.073	.100	.020	.066	-.161	-.063
SOICTF	.027	.081	.049	.113	.153	-.068	-.049	-.005	-.143
COCICT	.026	.128	.064	.064	-.012	.005	.075	-.122	-.005
GPOICT	.029	-.020	.063	-.013	.067	-.098	-.111	-.126	.136
NCSCCD	.033	-.002	.183	.027	-.153	-.036	.044	.109	-.079
NCSPET	.031	.016	.202	.032	-.166	-.024	.014	.135	-.050
CPNCCD	.032	.001	.205	.037	-.158	-.035	.061	.107	-.071
CPNPET	.028	.022	.198	.059	-.116	-.056	.037	.171	-.071
POPELE	.010	-.040	-.001	-.071	.136	-.252	.399	.003	.153
POTCOM	.016	-.065	.080	-.068	.216	-.065	.375	-.016	.171
AORVGN	.021	-.117	.104	-.117	.130	.074	.109	-.050	.033
AOCGRT	.028	-.094	.155	-.071	.062	.157	-.062	-.069	.066
AOIPDT	.028	-.081	.155	-.066	.073	.183	-.111	-.067	.014