FRAMEWORK FORMULATION OF BUSINESS PERFORMANCE IMPROVEMENT FACTORS OF ISO CERTIFIED COMPANIES AND PILOT TESTING OF ITS SURVEY QUESTIONNAIRE IN PAKISTAN

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Abstract: A comprehensive literature review was done to extract the world ISO Management System (IMS) standards certifications data from the year 2018 to 2021 which also shows the Pakistan shared in it. **Objective**: To design a survey questionnaire and its mock and pilot testing for reliability and validity. **Research Design and Methodology**: The present phase of the mega research study design, formulation and pilot-testing of a survey questionnaire is based on the reviewed Framework of Synthesized Business Performance Improvement Factors of IMS Standards Certification. Based on a synthesized framework of business performance improvement factors, a survey questionnaire is designed and was subjected to extensive mock exercises. **Novelty:** It can be the only national data survey on ISO certification from all chambers of commerce and industry of Pakistan. **Results:** The mock testing results confirm a positive relationship between IMS standards certification and business performance improvement. Pilot testing was done in a provincial and federal chamber of commerce and industry to verify its construct reliability and validity. **Conclusion:** The pilot-tested and validated questionnaire is ready to be used in the national survey for the collection of data from both IMS-certified commercial companies and non-IMS companies **Recommendation:** To use the national data of IMS-certified and Non-IMS companies for performance comparison. **Acknowledgement:** HEC Pakistan has funded this research under NRPU project -12084.

Keywords: ISO Management System Standards, Business Performance Improvement Factors, Mock Exercises, Pilot Testing

Introduction

Literature has reported a positive impact of ISO Management System (IMS) standards certification on commercial Business Performance. Management assurance system act as a working tool to guide the marketing department that creates a win-win situation for both customers and companies (Nawar et al 2022; Fahmi et al., 2021; Khalida, et al, 2014). IMS standards certification yields two main types of benefits viz external and internal (Fonseca and Domingues, 2018). External benefits refer to customer satisfaction, market shares, and an improved company image for quality products (Calvo et al., 2016), while internal benefits mean better communication, effectiveness, production efficiency, employee

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satisfaction, and compelling after-sales services (Boiral, 2003). Such benefits of IMS standards-certified businesses can increase a country's Gross Domestic Product (GDP) covering a range of objectives set under the head of Sustainability by the United Nations UN (2021).

Literature Review

The first part of this mega research study focused on an exhaustive search to identify the journals (and research papers) reporting implementation performance improvement results of IMS standards certification cases. The extant literature review was done to extract the IMS standards certifications population worldwide and Pakistan shared in it from 2018 to 2021 ISOSurvey (2018, 2019, 2020 & 2021). isotc.iso.org.

IMS cases were analyzed to explore the business performance improvement factors. Expert judgemental/contents analysis/thematic analysis technique was used to synthesize the ISO implementation performance improvement factors into a few groups and titles. As already quoted by Nawar et al., (2022) following are the major synthesized groups of business performance improvement factors Financial Performance, Quality Assurance, Customer Satisfaction, Employee Satisfaction, Market Potential, Operational Improvement, Company Performance, Continuous Improvements, Top Management Performance, Communication, Stakeholders Relations, Environmental Improvement, and Competition.

Therefore, mentioned improvement factors were identified and further reviewed by a focus group comprising trainers, users, consultants, experts, trainers and academicians dealing with the IMS standard certification. The national survey questionnaire is based on these identified factors and their elements (Aamer et al., 2021; Adem and Virdi, 2021; Ali et al., 2020; Arocena et al., 2020; Carrillo-Labella et al., 2020; Chen et al., 2019; (Demir, 2021; Dorega, 2021; Fahmi et al., 2021; (Heis et al., 2021; Jannah et al., 2020; Khan et al., 2021; Lyubka, 2019; Said et al., 2021; Saizarbitoria et al., 2021; Silva et al., 2020; Sweis et al., 2019; Waxin & Bartholomew 2019; Zimon et al., 2021).

Research Methodology

A qualitative technique has been used the first part is secondary data which has been used for the ISO certification population and then primary data was used for survey questionnaire pilot testing. This research study is performed using mixed methods i.e. exploratory and qualitative cum quantitative approaches using multi phases. The first and foremost need was to collect comprehensive data from the secondary source. This was done by short-listing the reputed journals reflecting quality publications. Global weightage and indexing agencies like Web of Science, Scopus index, etc were used as selection criteria for journals. Hundreds of publications reported empirical data on ISO Management System Standards (IMS) certified companies were collected. The conclusions drawn in these research papers were critically analyzed to extract important business performance improvement factors. The improvement factors were further reviewed by a Focus Group comprising experts, trainers, consultants, users, and academicians dealing with IMS system standards certifications. A survey questionnaire was designed and developed and then tested on a Pilot scale using two samples of mixed representation from provincial and federal Chambers of Commerce and Industries, academics, consultants, and users as shown in Annex A. The survey questionnaires were distributed among 300 participants from the Rawalpindi Chamber of Commerce and Industry (RCCI) and the

Islamabad Chamber of Commerce and Industry (ICCI). A total of 70 responses were received with a response rate of 23.33%.

Design and Testing of Survey Questionnaire:

The newly designed survey questionnaire to use for the national data collection on ISO certification on commercial business companies is passed through several Mock Tests conducted before the Pilot test. The results of a few major tests of mock exercises are shown in Annex B. Extensive Mock Exercises were conducted on virtual data for both IMS-certified and Non-IMS certified companies to verify the applicability/suitability of software (like SPSS and smartPLS etc) for certain desirable tests/objectives. These practices on virtual data were done to enhance the skills before actual pilot test data and national survey data analysis. This approach gives the team a lot of confidence in using software for desirable tests/outcomes of comparative analysis of IMS-certified and Non – IMS companies. The Mock tests supported the proposition that IMS Standards Certified Businesses Perform Better than non-IMS Companies. Pilot testing of the questionnaire was done for verification/validation using samples of representatives from two Chambers of Commerce and Industries, academics, ISO consultants, trainers, and users in Pakistan. Reliability and Validity results of the pilot testing of the questionnaire are shown in Annex C. Comparative analysis of the Pilot testing data mainly supports the hypothesis that IMS standards-certified commercial businesses perform better than non-IMS commercial businesses.

The final reviewed survey questionnaire shall be served to all the major Chamber of Commerce and Industries of Pakistan to get input from both IMS standards-certified and non-IMS commercial business companies on a mass scale. A comprehensive comparative analysis of the data being collected shall be carried out and results shall be shared in a national conference as well as published at all appropriate forums.

Findings and Results

The business improvement factors identified are associated with the major fields of; Finance, Management, Technical, Social, Environment and communication, etc. This mega literature review was scrutinized by the focus group. A total of 13 business performance improvement factors with 60 elements/items having a cumulative frequency of 740 were identified in the literature from the empirical evidence of IMS standards implementation certification (Nawar et al., 2022).

Originality

This is the first mega and comprehensive research study being carried out under the auspicious HEC of Pakistan. Isolated and individual companies' case studies on IMS standard certification have been reported in different literature from time to time but they did not show a holistic picture and its impact on the business performance at the national level and the economy of the state as GDP.

Also, this research study carried out the comparative performance analysis of both IMS standard certified and non–certified commercial business companies, which was difficult, unique and is not done/reported earlier at the national level.

Contributions

1. This research shall enhance the knowledge boundary related to IMS standards certification.

2. These original results shall inspire the non-IMS business companies to opt for its certification implementation which can lead to a win-win scenario for all the stakeholders; the business commercial companies, customers, employees, stakeholders, and government.

Implications

To attain the accrued benefits, all the stakeholders; the business commercial companies, customers, employees, stakeholders, academicians and the government must make it mandatory for all non-ISO standards local and export-oriented businesses to implement the IMS management system standards certification according to their speciality of businesses.

Conclusion

This mega research study initially focused on the identification and synthesis of business performance improvement factors of IMS standards Certification companies which yield 13 major factors with 60 elements/items of 740 frequency. Mock tests were conducted before pilot tests. The results of both Mock and Pilot testing of the survey questionnaire convincingly supports the proposition that IMS standards-certified commercial companies have a performance edge over non-IMS commercial companies. These results should inspire non-IMS companies to go for the OMS standard certification to attain the expected benefits.

Recommendations

The benefits attained from IMS standard certification of businesses shall contribute to the individual business companies nationally to the achievement of higher GDP and internationally attain the SDGs of the UN. This scenario shall encourage, motivate and facilitate the implementation of IMS standards certification in all public and private companies irrespective of the nature of their businesses and sizes operating all over Pakistan.

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ANNEX A

Comparative Analysis of ISO System Standards Certified and Non-Certified Commercial Companies in Industrial Sectors of Pakistan to investigate the Performance gain by the Certified Companies in terms of Technical, Managerial, Financial and Social aspect "PART A

Please provide the following information by clicking tick ☐marking the most appropriate answers.

Demographics					
Gender		Male		Female	
Age (years)	20 – 30	31 – 40	41- 50	51 – 60	61+
Qualification	Matriculation	Intermediate	Graduate	Postgraduate	PhD
Designation	CEO	Director	QMR	Manager	Other position
Experience (years)	1 – 5	6 – 10	11 – 15	16 – 20	21+
Type and size of Company (Small, Medium, Large – S/M/L) 50-100, 100-300, 300-1000 HR, turnover based *(If not mentioned in the list please fill it in at the end)*	Healthcare (S / M / L)	Manufacturing (S / M / L)	Automotive (S / M / L)	Textile and Garment (S / M / L)	Pharmaceutical (S / M / L)
	Food (S / M / L)	Others – Please Specify (S / M / L)			
National (N) / Multinational Company (MNC) and Location (City)	N / MNC		Location:		
If your company is ISO Management System Standards Certified, please mention the year and name of the standards	Year of certification:		Types of Certifications:		

PART B

Scale: 1 means strongly disagree and scale 5 means strongly agree

ISO Management System (IMS) Standards Certified Companies Questions						
IC01	The top Management of my company likes to implement IMS standards certification.	1	2	3	4	5
IC02	IMS standards certification is positively related to the improvement the Business Performance.	1	2	3	4	5
IC03	IMS standards certified companies have more chances to be sustainable	1	2	3	4	5
IC04	IMS standards certification is beneficial for the customers, stakeholders, society, and the global community.	1	2	3	4	5
IC05	A standardized IMS business is better than a non-standardized IMS business.	1	2	3	4	5

Non-ISO Management System (IMS) Standards Certified Companies Questions						
NC01	The top management of my company will opt for IMS standards certification.	1	2	3	4	5
NC02	Non-IMS standards certification has positive relation to Business Performance.	1	2	3	4	5
NC03	Non-IMS-certified companies have more chances to be sustainable.	1	2	3	4	5

NC04	Non-IMS standards-certified companies are managing benefits for customers, stakeholders, society, and the global community.	1	2	3	4	5
NC05	A non-standardized IMS business performs better than a standardized IMS business.	1	2	3	4	5

NOTE:

1. *Respondents of IMS standards-certified companies should compare the performance of the past few years with the IMS-certified companies of the same business and size*

2. *Respondents of non - IMS standards certified companies should compare the performance of the past few years with the non - IMS certified companies of the same business and size*

Please encircle ☐the appropriate number against each statement, according to the grading scale given below.

1 STRONGLY DISAGREE	2 DISAGREE	3 NEUTRAL	4 AGREE	5 STRONGLY AGREE

1. FINANCIAL PERFORMANCE (FP):

FP01	Our company's **Financial Performance** is much better than the competitors of the same business and size.	1	2	3	4	5

FP02	Our company has a better ability to achieve **sales targets**	1	2	3	4	5
FP03	Our company has a better ability to improve **Business Efficiency.**	1	2	3	4	5
FP04	Our company has a better system for **risk** management	1	2	3	4	5
FP05	Our company has effective **Cost reduction** mechanisms	1	2	3	4	5
FP06	Our company has reduced **manufacturing costs** to its minimal	1	2	3	4	5
Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates						

1. **QUALITY ASSURANCE (QA):**

QA01	Our company has increased the **Quality Awareness** drive.	1	2	3	4	5
QA02	The Q**uality of Products and Services** of our company has improved.	1	2	3	4	5
QA03	Our company has implemented a better**-Quality Management System**	1	2	3	4	5
QA04	**Quality Management Practices** have become a routine in our company.	1	2	3	4	5
Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates						

2. **CUSTOMERS' SATISFACTION (CS):**

CS01	Customers of our company are much more **satisfied**	1	2	3	4	5
CS02	Our company has **Reduced Complaints** to a minimum.	1	2	3	4	5
CS03	Our company has improved **Delivery on-time** of any products or services	1	2	3	4	5
Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates						

4. EMPLOYEES SATISFACTION (ES)

ES01	**Employees Satisfaction** is the main enabler of our company's performance.	1	2	3	4	5
ES02	Our company gives incentives and recognition to employees for better **Job Satisfaction**	1	2	3	4	5
ES03	Our company has established regular **employee's motivation** programs	1	2	3	4	5
ES04	E**mployees Training** is a regular feature in our company.	1	2	3	4	5
ES05	E**mployees' Skills** enhancement has a regular system in our company	1	2	3	4	5
ES06	Our company has developed a much better **Human Resources Management System**.	1	2	3	4	5
Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates						

5. MARKET POTENTIAL (MP):

MP01	Our company has a better **Market Potential**.	1	2	3	4	5
MP02	**The market Efficiency** of our company has increased.	1	2	3	4	5
MP03	Our company works on a systems of **market share** analysis and improvement.	1	2	3	4	5
MP04	**The growth rate** of our company has increased.	1	2	3	4	5
MP05	Our company has **achieved the set challenging Goals.**	1	2	3	4	5
MP06	Our company has successfully deployed a better assurance system as a **Marketing Tool**.	1	2	3	4	5
MP07	Our company has better **Access to the International Market**.	1	2	3	4	5
MP08	Our company performance has enhanced to **Compete in the International Market.**	1	2	3	4	5
MP09	Our company's **Export Share has increased** in the last few years.	1	2	3	4	5
Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates						

6. OPERATIONAL PERFORMANCE (OP):

OP01	Our company's **Operational Performance** has improved.	1	2	3	4	5
OP02	**The operational efficiency** of our company has enhanced in the last few years.	1	2	3	4	5
OP03	**Technical improvement** is the outcome of a better management system in our company.	1	2	3	4	5
OP04	Our company maintains a high **Growth in Production** for the last few years.	1	2	3	4	5
OP05	**Productivity increases** in our company with a better management system.	1	2	3	4	5
OP06	Our company's **Safety Performance** has improved due to stringent management system measures.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

7. COMPANY PERFORMANCE (CP):

CP01	Our **Company Performance** has enhanced in the last few years.	1	2	3	4	5
CP02	**The reputation** of our company has improved due to a better assurance system.	1	2	3	4	5
CP03	Our company has had a better **image** in the market for the last few years.	1	2	3	4	5
CP04	Our **Company's Size** has increased due to better business performance.	1	2	3	4	5

CP05	An effective management system has improved our **Company's Culture.**	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

8. CONTINUOUS IMPROVEMENT (CI):

CI01	**A continuous improvement** cycle is followed in our company.	1	2	3	4	5
CI02	Our company focuses on **Process Improvement.**	1	2	3	4	5
CI03	Our company has implemented a management system to **Reduce Errors.**	1	2	3	4	5
CI04	A better management system has resulted in the **Reduction of Waste** in our company.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

9. TOP MANAGEMENT PERFORMANCE (TP):

TP01	**Top Management Performance** has improved in our company for the last few years.	1	2	3	4	5
TP02	In our company, the **Top Management Commitment** is more readily available to achieve the set goals.	1	2	3	4	5
TP03	**Top Management Support** is more readily available to achieve higher performance	1	2	3	4	5

TP04	The top management has had a clear role to **Improve the Administration** of our company in the last few years.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

10. COMMUNICATION (CM):

CM01	In our company, internal **communications** have improved in the last few years.	1	2	3	4	5
CM02	Our company has had better external **Communications** for the last few years.	1	2	3	4	5
CM03	A better management system has improved the **Documentation** in our company.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

11. STAKEHOLDERS' RELATIONS (SR):

SR01	**Improving relationships with stakeholders** is the major reason for our company's success.	1	2	3	4	5
SR02	A better management system in our company has improved the **relationship with suppliers.**	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

12. ENVIRONMENT IMPROVEMENT (EI):

EI01	**Environmental Improvement** is the major target of our company management system.	1	2	3	4	5
EI02	Our company promotes **Environmental Awareness.**	1	2	3	4	5
EI03	Our company's **Environmental Performance** has Improved.	1	2	3	4	5
EI04	**Environmental Sustainability** is the result of a better management system in our company.	1	2	3	4	5
EI05	Our company has established a standard **Environment Management System.**	1	2	3	4	5
EI06	Our company management system has helped in **Pollution Reduction**.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

13. COMPETITION (CN):

CN01	Our company performed better in the market **Competition.**	1	2	3	4	5
CN02	Better management systems provided **Competitive Advantages** in the market.	1	2	3	4	5

Please add other comments including government initiatives to facilitate the implementation of IMS standards certificates

Thank you for your valuable contribution and time!!

ANNEX B

IMPORTANT RESULTS OF MOCK TESTS

1. R Square

IMS Certified companies	IMS Non Certified companies

R Square

Matrix   R Square   R Square Adjusted

	R Square	R Square Adjusted
Communication	0.764	0.763
Company Performance	0.703	0.701
Competition	0.604	0.603
Continuous Improvement	0.620	0.619
Customer Satisfaction	0.774	0.773
Employee Satisfaction	0.714	0.713
Environmental Improvement	0.736	0.735
Financial Performance	0.739	0.738
Market Potential	0.792	0.791
Operational Performance	0.765	0.764
Quality Assurance	0.710	0.708
Stakeholder Relation	0.686	0.685
Top Management Performance	0.657	0.656

R Square

Matrix   R Square   R Square Adjusted

	R Square	R Square Adjusted
Communication	0.007	0.003
Company Performance	0.006	0.002
Competition	0.008	0.004
Continuous Improvement	0.002	-0.002
Customer Satisfaction	0.008	0.004
Employee Satisfaction	0.008	0.004
Environmental Improvement	0.011	0.007
Financial Performance	0.017	0.014
Market Potential	0.006	0.002
Operational Performance	0.008	0.004
Quality Assurance	0.011	0.008
Stakeholder Relation	0.010	0.006

Comments: r-squared is how well the regression model explains observed data. For example, an r-squared of 60% reveals that 60% of the variability observed in the target variable is explained by the regression model. Generally, a higher r-squared indicates more variability is explained by the model.

2. PATH COEFFICIENTS (P-Values)

IMS Standards Certified Companies

1		Original Sample (O) / Beta	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
2	IMS Certified -> Communication	0.325	0.33	0.056	5.846	0.000
3	IMS Certified -> Company Performance	0.645	0.643	0.043	14.87	0.000
4	IMS Certified -> Competition	0.211	0.212	0.059	3.574	0.000
5	IMS Certified -> Continuous Improvement	0.574	0.574	0.051	11.2	0.000
6	IMS Certified -> Customer Satisfaction	0.646	0.645	0.042	15.549	0.000
7	IMS Certified -> Employee Satisfaction	0.632	0.631	0.048	13.183	0.000
8	IMS Certified -> Environmental Improvement	0.583	0.583	0.052	11.171	0.000
9	IMS Certified -> Financial Performance	0.609	0.611	0.045	13.575	0.000
10	IMS Certified -> Market Potential	0.556	0.558	0.051	10.856	0.000
11	IMS Certified -> Operational Performance	0.46	0.461	0.06	7.678	0.000
12	IMS Certified -> Quality Assurance	0.708	0.707	0.041	17.123	0.000
13	IMS Certified -> Stakeholder Relation	0.382	0.383	0.059	6.481	0.000
14	IMS Certified -> Top Management Performance	0.614	0.612	0.047	13.169	0.000

Non-IMS Companies

1		Original Sample (O) / Beta	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
2	IMS NON Certified -> Communication	-0.081	-0.086	0.061	1.32	0.187
3	IMS NON Certified -> Company Performance	-0.074	-0.093	0.074	1.008	0.314
4	IMS NON Certified -> Competition	-0.087	-0.094	0.051	1.716	0.087
5	IMS NON Certified -> Continuous Improvement	-0.042	-0.024	0.09	0.472	0.637
6	IMS NON Certified -> Customer Satisfaction	-0.088	-0.09	0.053	1.667	0.096
7	IMS NON Certified -> Employee Satisfaction	0.087	0.087	0.119	0.731	0.465
8	IMS NON Certified -> Environmental Improvement	-0.107	-0.136	0.06	1.761	0.079
9	IMS NON Certified -> Financial Performance	-0.132	-0.139	0.099	1.327	0.185
10	IMS NON Certified -> Market Potential	-0.078	-0.084	0.105	0.741	0.459
11	IMS NON Certified -> Operational Performance	-0.09	-0.085	0.103	0.871	0.384
12	IMS NON Certified -> Quality Assurance	-0.107	-0.075	0.125	0.855	0.393
13	IMS NON Certified -> Stakeholder Relation	-0.102	-0.099	0.063	1.623	0.105
14	IMS NON Certified -> Top Management Performance	-0.081	-0.093	0.056	1.467	0.143

Criteria for threshold value of P = 0.05

Comments: The p values in regression help determine whether the relationships that you observe in your sample also exist in the larger population. The P- Values of IMS standards Certified companies is significant as it is less than 0.05 while P-Values for non-IMS standards certified companies is non-significant as it is more than 0.05. In overall analysis, it validates the proposition / hypothesis that in comparative analysis, the IMS certified standards Companies have performed better than the non-IMS standards certified companies. Hence, all hypothesis of IMS Certified organizations are accepted and non-IMS certified organizations are rejected.

3. Two Pair test

Note:

In pair test results of only one factor (financial performance) has been shown here due to paucity of space and word count limitations.

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	I_FP01 - N_FP01	.27626	1.14118	.07118	.13608	.41645	3.881	256	.000
Pair 2	I_FP02 - N_FP02	.61479	1.38753	.08655	.44434	.78523	7.103	256	.000
Pair 3	I_FP03 - N_FP03	.69261	1.43439	.08947	.51641	.86881	7.741	256	.000
Pair 4	I_FP04 - N_FP04	.68872	1.44035	.08985	.51178	.86565	7.665	256	.000
Pair 5	I_FP05 - N_FP05	.70817	1.53235	.09559	.51994	.89640	7.409	256	.000
Pair 6	I_FP06 - N_FP06	.33074	1.40713	.08777	.15789	.50359	3.768	256	.000

Comments: The two pair test of element to element of IMS Certified vs non-IMS Certified is attached. The results shows that P<0.05 so it proves that IMS performs significantly better than Non_IMS.

PILOT TESTING

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1. Confirmatory Factor Analysis (CFA
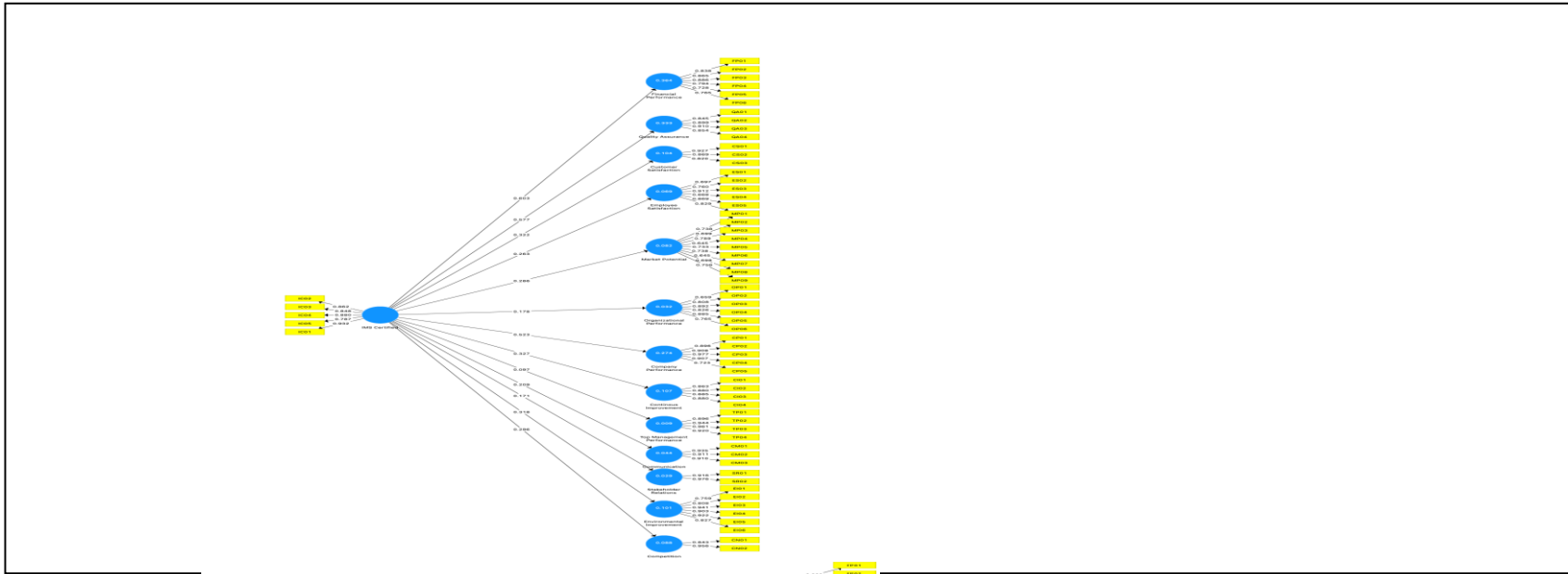
The threshold value of Cronbach alpha is 0.7 or above.

Comments: Cronbach alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The values in both IMS certified data and non-IMS certified data are above the threshold. Hence, we can conclude that our research variables are reliable. The average variance extracted (AVE), is commonly used to validate constructs. In statistics, AVE is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. The range of AVE should be higher than 0.50.

2. Test of Normality Shapiro-Wilk

IMS CERTIFIED COMPANIES				NON-IMS CERTIFIED COMPANIES			
Variable	**Statistics**	**df**	**Sig**	**Variable**	**Statistics**	**df**	**Sig**
I_MeanFP	0.942	41	0.036	N_ MeanFP	0.947	29	0.149
I_MeanQA	0.877	41	0.000	N_ MeanQA	0.946	29	0.142
I_ MeanCS	0.895	41	0.001	N_ MeanCS	0.902	29	0.011
I_ MeanES	0.926	41	0.011	N_ MeanES	0.937	29	0.082
I_ MeanMP	0.956	41	0.115	N_ MeanMP	0.934	29	0.069
I_ MeanOP	0.920	41	0.007	N_ MeanOP	0.904	29	0.012
I_ MeanCP	0.867	41	0.000	N_ MeanCP	0.899	29	0.009
I_ MeanCI	0.889	41	0.001	N_ MeanCI	0.949	29	0.175
I_ MeanTP	0.860	41	0.000	N_ MeanTP	0.939	29	0.094
I_ MeanCM	0.850	41	0.000	N_ MeanCM	0.934	29	0.068
I_ MeanSR	0.844	41	0.000	N_ MeanSR	0.918	29	0.028
I_ MeanEI	0.903	41	0.002	N_ MeanEI	0.921	29	0.033
I_ MeanCN	0.860	41	0.000	N_ MeanCN	0.922	29	0.035

3. Cronbach's Alpha (Reliability Analysis for Questionnaire)

Total Reliability Test

IMS Certified Companies		Non-IMS Certified Companies	
Cronbach's Alpha	**N of items**	**Cronbach's Alpha**	**N of items**
0.976	65	0.974	65

Factor to Factor Reliability Test

Comments: To check the normality of data Shapiro-Wilk test is performed. The number of responses is less than 2000 so we use Shapiro-Wilk test. All the p values are significant and statistics are within the range of 0-1. So, we can conclude that our data is normally distributed.

Variable	Cronbach alpha	Items	Variable	Cronbach alpha	Items
IMS Certified	0.910	5	Non-IMS Certified	0.845	5
Financial Performance	0.898	6	Financial Performance	0.835	6
Quality Assurance	0.898	4	Quality Assurance	0.898	4
Customer Satisfaction	0.859	3	Customer Satisfaction	0.916	3
Employee Satisfaction	0.888	6	Employee Satisfaction	0.916	6
Market Potential	0.878	9	Market Potential	0.915	9
Operational Performance	0.895	6	Operational Performance	0.947	6
Company Performance	0.929	5	Company Performance	0.950	5
Continuous Improvement	0.898	4	Continuous Improvement	0.916	4
Top Management Performance	0.947	4	Top Management Performance	0.913	4
Communication	0.908	3	Communication	0.877	3

The threshold value of Cronbach alpha is 0.7 or above.
Comments: Cronbach alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The values in both IMS certified data and non-IMS certified data are above the threshold. Hence, we can conclude that our research variables are reliable. The average variance extracted (AVE), is commonly used to validate constructs. In statistics, AVE is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. The range of AVE should be higher than 0.50.

4. Correlation Analysis (Validity test for Questionnaire)

	IMS CERTIFIED COMPANIES				NON-IMS CERTIFIED COMPANIES		
Variable	Coefficient	P-Value	Total	Variable	Coefficient	P-Value	Total
IC01	0.436**	0.004	41	NC01	0.029	0.883	29
IC02	0.434**	0.005	41	NC02	0.077	0.690	29
IC03	0.478**	0.002	41	NC03	0.081	0.676	29
IC04	0.354*	0.023	41	NC04	0.182	0.344	29
IC05	0.407**	0.008	41	NC05	0.123	0.526	29
I_FP01	0.559**	0.000	41	N_FP01	0.510**	0.005	29
I_FP02	0.607**	0.000	41	N_FP02	0.663**	0.000	29
I_FP03	0.625**	0.000	41	N_FP03	0.658**	0.000	29
I_FP04	0.585**	0.000	41	N_FP04	0.355	0.059	29
I_FP05	0.631**	0.000	41	N_FP05	0.406*	0.029	29
I_FP06	0.702**	0.000	41	N_FP06	0.628**	0.000	29
I_QA01	0.635**	0.000	41	N_QA01	0.568**	0.001	29
I_QA02	0.713**	0.000	41	N_QA02	0.511**	0.005	29
I_QA03	0.610**	0.000	41	N_QA03	0.511**	0.005	29
I_QA04	0.641**	0.000	41	N_QA04	0.574**	0.001	29
I_CS01	0.740**	0.000	41	N_CS01	0.541**	0.002	29
I_CS02	0.717**	0.000	41	N_CS02	0.690**	0.000	29
I_CS03	0.669**	0.000	41	N_CS03	0.636**	0.000	29
I_ES01	0.537**	0.000	41	N_ES01	0.670**	0.000	29
I_ES02	0.687**	0.000	41	N_ES02	0.494**	0.006	29
I_ES03	0.716**	0.000	41	N_ES03	0.401*	0.031	29
I_ES04	0.627**	0.000	41	N_ES04	0.474**	0.009	29
I_ES05	0.665**	0.000	41	N_ES05	0.673**	0.000	29
I_ES06	0.611**	0.000	41	N_ES06	0.677**	0.000	29
I_MP01	0.724**	0.000	41	N_MP01	0.639**	0.000	29
I_MP02	0.630**	0.000	41	N_MP02	0.818**	0.000	29
I_MP03	0.674**	0.000	41	N_MP03	0.718**	0.000	29
I_MP04	0.594**	0.000	41	N_MP04	0.737**	0.000	29

I_MP05	0.686**	0.000	41	N_MP05	0.878**	0.000	29
I_MP06	0.716**	0.000	41	N_MP06	0.652**	0.000	29
I_MP07	0.546**	0.000	41	N_MP07	0.256	0.256	29
I_MP08	0.654**	0.000	41	N_MP08	0.446*	0.015	29
I_MP09	0.645**	0.000	41	N_MP09	0.203	0.290	29
I_OP01	0.553**	0.000	41	N_OP01	0.879**	0.000	29
I_OP02	0.698**	0.000	41	N_OP02	0.820**	0.000	29
I_OP03	0.712**	0.000	41	N_OP03	0.809**	0.000	29
I_OP04	0.655**	0.000	41	N_OP04	0.696**	0.000	29
I_OP05	0.837**	0.000	41	N_OP05	0.751**	0.000	29
I_OP06	0.709**	0.000	41	N_OP06	0.871**	0.000	29
I_CP01	0.700**	0.000	41	N_CP01	0.882**	0.000	29
I_CP02	0.665**	0.000	41	N_CP02	0.861**	0.000	29
I_CP03	0.734**	0.000	41	N_CP03	0.840**	0.000	29
I_CP04	0.704**	0.000	41	N_CP04	0.793**	0.000	29
I_CP05	0.694**	0.000	41	N_CP05	0.833**	0.000	29
I_CI01	0.802**	0.000	41	N_CI01	0.636**	0.000	29
I_CI02	0.870**	0.000	41	N_CI02	0.663**	0.000	29
I_CI03	0.717**	0.000	41	N_CI03	0.739**	0.000	29
I_CI04	0.763**	0.000	41	N_CI04	0.699**	0.000	29
I_TP01	0.700**	0.000	41	N_TP01	0.733**	0.000	29
I_TP02	0.695**	0.000	41	N_TP02	0.837**	0.000	29
I_TP03	0.619**	0.000	41	N_TP03	0.765**	0.000	29
I_TP04	0.583**	0.000	41	N_TP04	0.722**	0.000	29
I_CM01	0.673**	0.000	41	N_CM01	0.682**	0.000	29
I_CM02	0.754**	0.000	41	N_CM02	0.786**	0.000	29
I_CM03	0.597**	0.000	41	N_CM03	0.730**	0.000	29
I_CN01	0.706**	0.000	41	N_CN01	0.586**	0.001	29
I_CN02	0.777**	0.000	41	N_CN02	0.734**	0.000	29
I_SR02	0.624**	0.000	41	N_SR02	0.732**	0.000	29
I_EI01	0.256	0.107	41	N_EI01	0.728**	0.000	29