Quality in Management Education: A Structural Model in Indian Context

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Abstract

Management Education in India has emerged as a successful programme in producing professional graduates for business organizations. In the present scenario, corporate requirements and expectations are changing due to constant change in business environment. Consistent with advanced strategic interventions, corporate is not getting the expected output from management institutions and the graduates are facing tough placement challenges. This state of incongruity between demand and supply requires a structured and comprehensive understanding about quality of management education and problems associated with it. The present study explored the dimensions related to quality of management education and proposed 'Management-Education-Quality-Scale' (MEQAS) with reference to Indian Higher Education Management Institutions. Further, the relationships between the identified dimensions were explored and a structural model of management education quality was developed with the help of Partial Least Square Method highlighting the effect of overall quality on education outcome.

Keywords: Management; Education Quality Scale; Indian HEIs; Education Quality Model; Education Outcome

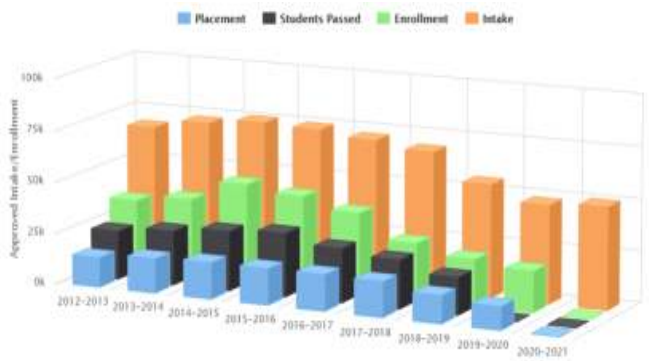
Introduction

Globalization has brought competitive pressure before Indian higher education especially in the area of business management education. There has been rapid growth of academic institutions imparting management education; however, they have not been able to keep pace with imparting desired quality education. Between 2011 and 2013 AICTE received '231 applications' for closure of 'management colleges'. As per 'Times of India', (Lucknow Edition – July 2013), AICTE cleared '80' applications among the received one. The closure of those colleges indicates that there is a declining interest in management programme largely because of lack of quality in management education.

As per database of AICTE (June 2020), there are around 3069 AICTE recognized Management Institutes in India out of which around 390 exists in Uttar Pradesh. With education taking a central role in everyday

life to survive, especially in term of employment prospects, 'Uttar Pradesh' is emerging as an education hub of the country. The state falls at number one position with respect to the highest enrolment of students followed by 'Maharashtra' and 'Andhra Pradesh'. Khatun and Dar (2019) observed that, the quality aspect of B-Schools have not been given adequate consideration as compared to the efforts being done for increasing their numbers. Nagrath and Sidhu (2018) stated that, the number of management colleges and their intake capacity have increased at a massive rate in the country which have raised serious quality concerns as the aim of management colleges is not limited to classroom-teaching but to develop professional leaders and managers while using application based modern teaching methods. The declining performances of B-schools in the recent years have been shown in Fig. 1:

Fig 1: Performance of AICTE approved Management Institutes in Uttar Pradesh



Source: AICTE Database (June 2020)

The hard hit of covid waves in 2020 have forced institutions to inculcate several adjustments in terms of education quality as there was no option left apart from adopting defensive strategies for the sake of survival. Even, in these difficult times, Indian government came up with New Education Policy 2020 for sustained growth of the industry. According to Kapil Viswanathan (Vice - Chairman - Krea University) (2020), the 'NEP' demands an extensive implementation of a magnitude which have never been executed anywhere in the world, presenting considerable execution challenges, both at quantitative as well as qualitative level. This has increased responsibilities of the educational institutions even more as 'change' demands 'maintenance of quality and the process of unfreezing requires good enough precautions . According to Sarangi Subrat (2020), the students now have all the flexibility within the program, with assessment patterns becoming easier and more practical. But where does it lead the student? How does the student stay competitive enough on the global stage? The leadership of the school has to match the demand and supply side and constantly needs to create value to stay afloat in such challenging times. Not just do student expectations need to be met, given the increased career options; the challenge lies in the 'how's' of execution of the programs, given the capability and competencies of the faculty base. How does the school stay relevant when the specializations are no more restricted to finance, marketing, operations and human resources? The problem stares at the governing bodies and administrators of business schools in India and quality becomes more relevant issue in present circumstance. NEP objectives such as 'doubling the gross enrollment ratio in higher education by 2035', 'structural re-design of the curriculum' and 'inter-disciplinary learning' needs to be implemented even more carefully so as to avoid any compromise in the quality of education. Srivastava Rajendra (2020) stated that, the internationalization plan of higher education under NEP 2020 will open up space for a range of innovative approaches to business education. Amidst all these, the major area of concern is the quality of management education which has become more crucial to be focused upon after the reengineering phase of educational policies and lately adopted defensive strategies due to covid crisis. In case of higher education, the 'quality' is viewed through bi-directional lenses, that is, b-schools have to satisfy both students and corporate people. Students hold academic, infrastructural as well as placement based expectation while corporate demands final product in the form of a management graduate equipped with desired professional skills according to their organizational hierarchical positions. The management institutions are required to fulfill expectations of both the stakeholders in a balanced manner.

Review of Literature

The term “Education” deals with a series of learning experiences provided to students so that they can get desired knowledge and inculcate necessary skills, values and attitude in order to become a productive member of society. Ranjitha (2016) described education as “any act or experience that has a formative effect on the mind, character or physical ability of an individual”. Mahajan et.al. (2012), mentioned that roots of management education in India emerged in late 1940s. Education is a service and just as in manufacturing and other service industries, quality is the key factor as strategic option and determines long term success. Service quality is a bundle of attributes that a product or service possesses with a capacity to satisfy the stated needs of its users (Johnson & Winchell 1988). Service quality is one of the old concepts accompanying popular measurement instruments in the literature such as 'service performance' SERVPERF by Cronin & Taylor (1992) and 'service quality' SERVQUAL by Parasuraman et al (1988). These scales were developed to assess service quality in varied context.

Students receive many types of services while undergoing education process in an institution. This includes both within classroom and outside classroom experience like pedagogy, outside classroom interactions, administrative processes, educational facilities etc. Education quality is, students' experience about these services while he/she is undertaking education (Allen and Davis, 1991; Holdford and Reinders, 2001 and Jain, et.al., 2013). Quality of management education depends on a number of dimensions or factors (Mahajan et. al., 2014a). Tsinidou et.al.(2010) described 'currriculum structure', 'academic staff', 'library services' 'administration services', 'career prospects' and 'location, infrastructure' as the important factors determining quality of education. In her attempt to assess quality of management education Sahney (2011) identified five factors/constructs namely, competence, attitude, content, delivery and reliability. Mandal and Banerjee (2012) mentioned that, there are numerous category of stakeholders in higher education such as 'professional bodies', students' and 'government' each of them have their own sets of quality related expectations. The quality of education mainly depends on dimensions such as 'teaching', 'administration', 'campus facilities','physical evidence', 'curriculum', 'reputation', 'recognition' and 'responsiveness'. Mwatsika and Khomba (2013) highlighted seven themes of MBA Service Quality criteria such as syllabus, quality of lecturing, reliability of program, management of the program, academic facilities, outcomes and image. Nagrath and Sidhu (2018) indicated that, there are five factors influencing quality of management education namely 'teaching quality', 'students' readiness & orientation', 'advancement opportunities', 'level of discipline' and 'satisfaction with the system'. With a view to assess service quality in higher education institutions, different education-specific quality scales have been developed such as 'HEDPERF' by Abdullah (2006), 'HETQMEX' by Ho and Wearn (1996), 'EDUQUAL' by Mahapatra and Khan (2007) and 'HESQUAL' by Munshi R (2019). For specifically assessing management education quality, Prasad and Verma (2017) constructed MEQUAL scale, Kumar and Dash (2014) developed INSTAQUAL scale. Different dimensions have been covered in the quality scales developed so far; however, dimensions based on administrative inputs in combination with academic inputs can create synergic effect in ensuring quality management education. Moreover, consistency of the quality scale results with the education output measures will make the instrument more reliable in terms of its implementation.

Quality in education input and process should be ultimately visible in its output. Matorera Douglas (2018) stated that, 'Education Outputs' can be referred to as a fairly immediate or near-tem results of the education-delivery-system. It is based on pertinent quality of the 'in –process or transforming' operations in the presence of available input resources. The ultimate aim of the transformation stage is to produce a desirable output confirming the required quality benchmarks Dwivedi et al., (2014) viewed that, compromising input and process quality in management education leads to deteriorating outputs in the form of examination results, employment, earnings and satisfaction. Anita R (2016) suggested that, with globalization, competition between educational institutes is

increasing and to survive in such an environment, educational institutes need to be concerned about the quality of education to maintain desired output.

Over the period of time, corporate requirements and expectations have changed due to globalisation and change in business environment. This has made demand on management institution for changes in priorities and structure. Merit Trac (2012) reported about the poor state of un-employability of management graduates through employability index. ASSOCHAM (2016) report expressed concerns over the standards of B-schools in India for the last ten decades, which expressed that, only 7% of the pass-outs management graduates are actually employable in the country (excluding the IIMs' graduates). On one hand companies are not getting good talent and on the other hand output of management institution are not getting job. This state of management education requires a comprehensive understanding about quality of management education followed by a structural model.

Research Methodology

Research Premise

In India, the number of management institutes is increasing at a massive rate but they have not been able to keep pace with the education quality needed (Khatun and Dar 2019, Nagrath and Sidhu 2018) as a result, management graduates are facing difficulties in getting job and on the other hand, companies are not getting desired talents (ASSOCHAM Report 2016). Secondly, due to recent world-wide covid crisis, academics have suffered a lot. The educational institutions had been adopting defensive strategies with major change in their teaching process and other academic activities where it was obvious to make adjustments with the quality as survival had become priority. Apart from these, the New Education Policy 2020 demands an extensive implementation of a magnitude which have never been executed anywhere in the world, presenting substantial execution challenges for the educational institutions in terms of managing change and maintaining quality simultaneously (Kapil Viswanathan 2020). Last but not the least, administration forms the base of academic institutions, including it in combination with academics has become crucial in forming quality dimensions for management education while witnessing the consistency of the quality scale with education output.

Research Design

Design of the study is exploratory cum descriptive. Research design is exploratory up to defining the problem, developing hypothesis, gaining insight into the problem and developing approach towards addressing the problem.

The design of the study becomes descriptive where it attempts to find solution to the issues at hand.

Research Objective

1. To identify the determinants effecting quality of management education.
2. To develop and validate Management Education Quality Assessment scale (MEQAS)
3. To develop Management Education Quality Model
   i) To explore the relationship of dimensions constituting quality of management education effecting educational outcome
   ii) To develop and validate Management Education Quality Model in the light of above identified relationships

Hypotheses

H0: There is no significant relationship between each identified dimensions constituting quality of management education and educational output

H1: There is significant relationship between each identified dimensions constituting quality of management education and educational output

Sampling Decision

Universe of the study consisted of Full time post-graduate students of 390 management institutes of Uttar Pradesh (India) approved by AICTE, out of which, the study intended to cover 30 institutions, however 28 institutions could be covered. Sampling frame involved 1st year and 2nd year students of MBA program who had more than 75% attendance in the course and has 60% marks in previous examination. Judgemental Sampling was done for obtaining response from individual respondents. Sampling

Unit consisted of Individual student of post-graduate management course. Comrey and Lee (1992) have stated sample size '100' as poor, '200' as fair, '300' as good, '500' as very good, and '1000' or more as excellent.

Sample size was 713 students, out of 713 students surveyed, 618 returned were usable.

Survey Instrument

Structured Questionnaire was designed in which the items were framed on a five point Likert scale where "1" was representing "strongly disagree" and "5" was representing "strongly agree".

Data Collection

In the study, data collection has been done through both primary and secondary sources. Primary data has been based on the responses of management students obtained from AICTE approved management institutes of Uttar Pradesh (India). The responses were obtained from respondents through closed ended, non-disguised, structured and duly tested questionnaire.

Secondary source accessed for study has been research literature, websites of universities, reports of ministries, newspaper reports and previous research reports available on the subject, relevant books, different databases and websites of different institutions.

Statistical Tools & Techniques

Quantitative analysis of data has been done through various statistical tools. Exploratory Factor Analysis, Confirmatory factor analysis and Regression Analysis has been done for obtaining the results using statistical software R. Finally, Partial least-square (PLS) method was employed under Structural Equation Modeling approach for model development and its validation.

Data Analysis and Findings

To identify the dimensions of quality of management education in the study factor analysis was used. In factor analysis variables are not classified as dependent or independent variable.

Exploratory Factor Analysis

At first, Exploratory Factor Analysis was conducted. In total, 35 variables were there, out of which 3 (V4, V5 and V6) were removed due to weak correlation. Kaiser-Meyer-Olkin (KMO) measure was used for assessing sampling adequacy. Overall Kaiser-Meyer-Olkin (KMO) statistic indicated that the data of the present study had marvellous sampling adequacy ranging from from 0.93 to 0.98.

Principal Component Analysis was done in the present study with varimax rotation. After the varimax rotated principal component analysis of the data, scrutiny of principal components revealed that communality for some variables was less than 0.5 (h2< 0.5). Communality is the amount of variance a variable shares with all the other variables. Three variables V7, V17 and V18 were removed as communality (h2< 0.5) was too low for having sufficient explanation (Hair et al., 1995). A second varimax rotated PCA was computed with the non- loading problem items dropped. A further criterion of factor loading greater than or equal to 0.46 and no cross-factor loading which differed by less than 0.2 was applied to retain items for further analysis, as a result, came six components which accounted for 64 % variance in the variables. V8, V10 and V12 got dropped due to non- fulfilling the criteria. Finally, with 26 variables based six components were found for quality of management education as shown in Table 1:

Table 1: Components of Management Education Quality and their Factor Loadings from Exploratory Factor Analysis

Components	Variables	PC1	PC2	PC3	PC4	PC5	PC6
Course Implementation (CI)	(V11)	0.64					
	(V13)	0.56					
	(V14)	0.82					
	(V15)	0.82					
	(V16)	0.71					

Components	Variables	PC1	PC2	PC3	PC4	PC5	PC6
Education Administration (EA)	(V26)		0.54				
	(V27)		0.58				
	(V28)		0.74				
	(V29)		0.71				
	(V30)		0.66				
	(V31)		0.51				
Course content and Students Involvement (CCSI)	(V19)			0.47			
	(V20)			0.63			
	(V21)			0.67			
	(V23)			0.56			
	(V24)			0.53			
	(V25)			0.46			
Teaching Infrastructure (TI)	(V1)				0.72		
	(V2)				0.79		
	(V3)				0.55		
Industry Inputs (II)	(V9)					0.77	
	(V22)					0.54	
Education Outcome (EO)	(V32)						0.53
	(V33)						0.73
	(V34)						0.58
	(V35)						0.52

First component explain 15% variance, second component 12%, third component 11%, fourth component 9%, fifth component 8% and sixth component explain 9% variance, and thus 6 components together explain 64% variation in the data.

Confirmatory Factor Analysis

The six dimension structure of management education quality assessment scale (MEQAS) obtained by exploratory factor analysis was confirmed by Confirmatory factor analysis. For accuracy, confirmatory factor analysis was done on the other set of the data included responses that were not included in exploratory factor scale. Results of Confirmatory Factor Analysis (CFA) confirmed the six factor structure of management education quality assessment scale. Factor Loadings from Confirmatory Factor Analysis has been shown in Table 2:

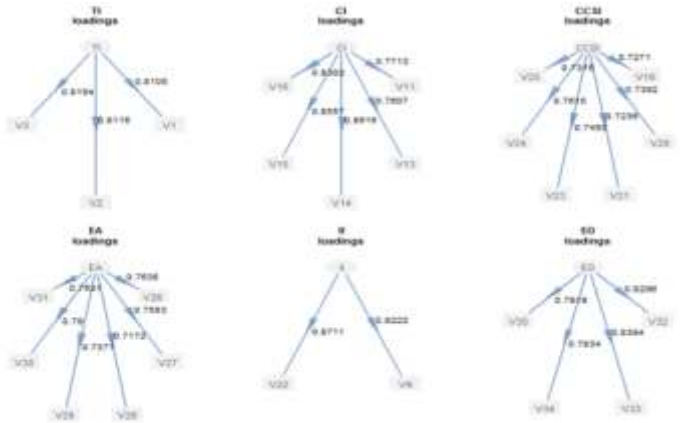
Table 2: Factor Loadings of 'Management Education Quality' components from Confirmatory Factor Analysis

	Weight	Loading	Communality	Redundancy
Teaching Infrastructure (TI)				
1 V1	0.418	0.811	0.657	0.000
1 V2	0.356	0.812	0.659	0.000
1 V3	0.455	0.819	0.671	0.000

	Weight	Loading	Communality	Redundancy
Course Implementation (CI)				
2 V11	0.228	0.771	0.595	0.000
2 V13	0.257	0.761	0.579	0.000
2 V14	0.239	0.862	0.742	0.000
2 V15	0.236	0.856	0.732	0.000
2 V16	0.265	0.830	0.689	0.000
Course Content Students Involvement (CCSI)				
3 V19	0.235	0.727	0.529	0.000
3 V20	0.227	0.739	0.546	0.000
3 V21	0.208	0.724	0.524	0.000
3 V23	0.226	0.749	0.561	0.000
3 V24	0.227	0.761	0.580	0.000
3 V25	0.230	0.731	0.535	0.000
Education Administration (EA)				
4 V26	0.232	0.764	0.583	0.000
4 V27	0.219	0.758	0.575	0.000
4 V28	0.196	0.717	0.514	0.000
4 V29	0.205	0.737	0.543	0.000
4 V30	0.227	0.790	0.624	0.000
4 V31	0.247	0.753	0.567	0.000
Industry Inputs (II)				
5 V9	0.546	0.822	0.676	0.000
5V22	0.633	0.871	0.759	0.000
Education Output (EO)				
6 V32	0.339	0.830	0.688	0.436
6 V33	0.312	0.839	0.705	0.446
6 V34	0.279	0.783	0.614	0.389
6 V35	0.301	0.792	0.627	0.397

Above result contains five columns. The first column is codified as a factor. The second column represents the outer weights. The third column is the loadings which states about correlations between the variable and its indicators. The loadings are very strong as all are greater than 0.7; communalities are also high (>0.5). There was some redundancy among the indicators of EO which means fewer indicators could be used (Sanchez, G. 2013).Factor loadings are visually shown in Figure 2:

Fig 2: Visual representation of Factor loadings obtained through CFA



Management education quality assessment scale proposed in the study has been assessed for its reliability and validity. There are two types of validity:

(i) the convergent validity and (ii) discriminant validity which are examined for assessment of validity.

Convergent validity

Convergent Validity confirms that a set of indicators is representing one and the same particular construct. It can be demonstrated by assessing the 'unidimensionality' of the constructs in question. The indices related to unidimensionality of the measurement model are given in Table 3:

Table 3: Indices related to unidimensionality of the constructs

	Model	MVs	C.alpha	DG.rho	eig.1st	eig.2nd
TI	A	3	0.747	0.885	1.99	0.531
EO	A	5	0.875	0.909	2.64	0.550
CCSI	A	6	0.834	0.878	3.28	0.709
EA	A	6	0.848	0.888	3.41	0.720
II	A	2	0.808	0.836	1.44	0.563
CI	A	4	0.827	0.856	3.34	0.562

In above metrics, the first column signifies the constructs. In the second column, the type of measurement has been displayed. In this case, all the blocks are reflective, hence have been shown as "A". For formative constructs it is shown as "B". The third column indicates the number of manifest-variables in each block. Fourth column shows values of cronbach's alpha, fifth shows greater Dillon-Goldstein's (DG) rho and sixth and seventh Eigen value 1st and 2nd respectively.

Criteria for unidimensionality of constructs which support homogeneity of the indicators are -

- Cronbach's alpha (α) > 0.7
- Dillon-Goldstein's (DG) rho > 0.7
- First Eigen value is greater than 1 and much greater than second Eigen value.

All the constructs well meet the criteria of unidimensionality.

Composite Reliability

Since 'Cronbach's α' usually provide an underestimated result with respect to 'internal consistency reliability' of latent variables, it is appropriate to apply a different measure, the 'composite reliability' (CR) as represented in Table 4:

Table 4: Composite Reliability of the constructs

	CR	AVE	SQRT AVE	MSV	Correlations					
					TI	CI	CSI	EA	II	EO
TI	0.855	0.814	0.902	0.386	1.000					
CI	0.909	0.817	0.903	0.462	0.615	1.000				
CSI	0.878	0.739	0.859	0.521	0.622	0.680	1.000			
EA	0.887	0.754	0.868	0.547	0.507	0.560	0.722	1.000		
II	0.835	0.847	0.920	0.351	0.434	0.465	0.593	0.517	1.000	
EO	0.885	0.811	0.900	0.547	0.520	0.610	0.694	0.740	0.549	1.00

CR values more the 0.8 are considered 'satisfactory' whereas a value below 0.6 indicates absence of reliability (Nunnally and Bernstein 1994). In the above table, value of composite reliability is > 0.8 for all the variables, indicating being satisfactory.

An AVE value of 0.5 or above indicates sufficient convergent validity, confirming that, 'on an average, a latent variable is able to explain more than half of the variance of its indicators' (Gotz et. al. 2010). In the present case values

for AVE is > 0.7 indicating sufficient convergent validity. Secondly, composite reliability of each construct is greater than AVE further assures satisfactory convergent validity.

Discriminant Validity

Fornell–Larcker criterion (Fornell and Larcker, 1981) has been used to assess 'discriminant validity'. The criterion is used to confirm that, a particular latent variable is exhibiting more variance with its assigned indicators than with any other latent variable. In statistical terms, it can be expressed in two ways –

Fornell-Larker Criterion:

1) Square-root of AVE of each latent variable should be greater than that latent variable's highest correlation with all other variables or

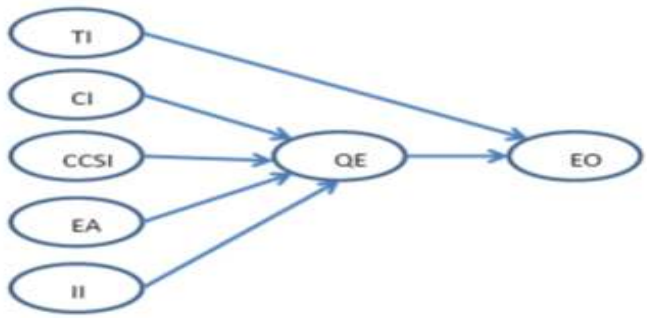
2) The AVE of each latent variable should be greater than MSV (Maximum Shared Variance) i.e. the latent variable's highest squared correlation with any other latent variable.

Comparison of values of AVE and correlations in the table above indicated that the constructs had high discriminant validity.

Model development and Validation:

The present research proposes the model describing structural relationships between different identified constructs. In the proposed model, six constructs obtained from the principal component analysis of the data have been given structural relationships, out of which five dimensions (Teaching Infrastructure, Course Implementation, Course Content and Students Involvement, Education Administration and Industry Inputs) were related to input, teaching-learning or process as part of management education; however, one dimension was related to output i.e. education output. Education output is affected by these five dimensions .Out of five; four dimensions were contributing to quality of management education, a high order latent variable which was at a higher level of abstraction. This latent variable and teaching infrastructure in turn contribute to education outcome. The inter-relationships between constructs have been shown in Fig 3:

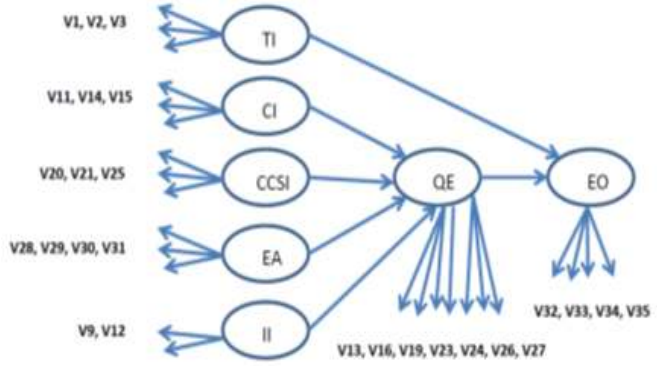
Fig 3: Model for Interrelationship among Constructs



Partial least-square (PLS) solution has been employed for data analysis for SEM. PLS does not make any assumptions about the distribution of data (Sanchez, 2012).

Creativity of proposed model has been defined as a second-order construct on two bases: (1) as a formative construct related to the first-order constructs CI, TI, CCSI, EA, II; these 'manifest variables' are considered to be the cause of the 'latent variable'. and (2) as a reflective construct based on the variables V13, V16, V19, V23, V24, V26 and V27 'given away' by the first-order constructs. It is called “given away” because some of the lower-order indicators are given away to measure the high order latent variable construct. This approach, known as the hybrid approach (Sanchez, 2012), provided more acceptable solution. Here the higher order latent variable QE (Quality of education) is considered as the cause of the variable (EO).The complete hybrid model is visually presented in Figure 4:

Fig 4: Creativity of Model



'PLS Path Model' is developed under two sub models: the 'structural or inner model', and the 'measurement or outer model'.

1. Measurement Model:

Confirmatory Factor Analysis (CFA) was done to test the hypothesis that a relationship existed between the observed or manifest variables and their underlying latent construct(s). 'Measurement model' should be assessed with regard to its 'reliability' and 'validity'. Detail of CFA has been described in table 2 where it has been found to be good.

2. Structural (inner) Model:

Structural model shows relation between latent constructs. In the 'PLS structural model', individual path coefficients are interpreted as standardized beta coefficients of ordinary least squares regressions as visually shown in Figure 5:

Fig 5: Model with Standardized Regression Coefficients

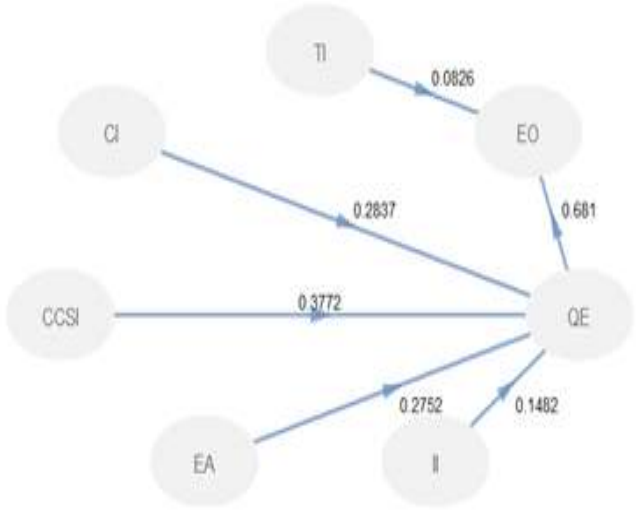


Table 5 presents the structural relationships among the latent constructs obtained on the basis of the hybrid analysis:

Table 5: Structural relationships among the latent constructs

Quality of Education (QE)				
	Estimate	**Std. Error**	**t value**	**Pr (>|t|)**
Intercept	**-4.05e-17**	**0.0197**	**-2.05e-15**	**1.00e+00**
CI	**2.84e -01**	**0.0243**	**1.17e+01**	**1.31e-28**
CCSI	**3.77e-01**	**0.0278**	**1.36e+01**	**7.25e-37**
EA	**2.75e-01**	**0.0251**	**1.10e+01**	**1.19e-25**
II	**1.48e-01**	**0.0242**	**6.12e+00**	**1.69e-09**
Education Outcome				
	Estimate	**Std. Error**	**t value**	**Pr(>|t|)**
Intercept	**-6.36e-17**	**0.0273**	**-2.33e-15**	**1.00e+00**
TI	**8.26e-02**	**0.0356**	**2.32e+00**	**2.06e-02**
QE	**6.81e-01**	**0.0356**	**1.91e+01**	**1.94e-64**

Equation of the model (EO):
QE=-4.05e-17+0.284*CI+0.377 *CCSI+0.275*EA+0.148*II
EO=-6.36e-17+0.082 *TI+0.681*QE

There are two elements for regression (the two endogenous constructs), quality of education and education outcome. In the table, “Estimate” is the coefficient estimate for each corresponding item. The intercept which is also labeled as the constant is the expected mean value of 'Y' when all 'X'= 0.

Third column is of standard error, which is the measure of the variability in the estimate for the coefficient. It is an indicator of the precision with which the regression coefficient is measured.

Fourth column of the table shows t static. Value of “t” told whether or not the coefficient for this variable is meaningful for the model.

The 'p-value' tests the null-hypothesis that the coefficient of each term is equal to zero. A 'p-value' less than 0.05 indicate that the null-hypothesis can be rejected. In the present study, the 'p-values' for constructs in the table are <0.001.This means that the constructs are have some effects on dependent variables.

In addition to the results of regression equations, there are a few more indices to evaluate the quality of structural model. They are as follows:

- R2 determination coefficients' of endogenous latent variables
- Redundancy index
- Average Variance Extracted
- Goodness-of-Fit (GoF)
- Various statistics related to the inner model are presented in Table 6:

Table 6: Summary of Structural Model Indices

INNER MODEL SUMMARY					
	Type	**R^2**	**Block Communality**	**Mean Redundancy**	**AVE**
TI	Exogenous	0.000	0.662	0.000	0.662
CI	Exogenous	0.000	0.752	0.000	0.752
CCSI	Exogenous	0.000	0.634	0.000	0.634
EA	Exogenous	0.000	0.623	0.000	0.623
II	Exogenous	0.000	0.718	0.000	0.718
QE	Endogenous	0.761	0.534	0.407	0.534
EO	Endogenous	0.543	0.658	0.357	0.658

In present case, TI, CI, CCSI, EA, II are exogenous variables and QE and EO are endogenous variables. R2 represents the amount of variance in the endogenous latent variable explained by its independent latent variables. Sanchez (2013) classified R2 value in three categories: 'R<0.30' (low); '0:30 < R < 0:60' (moderate); 'R > 0:60' (high). In table 6, value for QE is high, 0.76 and for EO, it is 0.54 which can be considered as moderate.

Communality measures variance of the given manifest variables which is reproducible from the latent variable. Indicators with low communality tell that they are not appropriate for the model. On an average, we expect to have at least 50% of communality in a reflective block. Here, block communality for each variable is > than 0.5 which means all the variables are relevant.

'Average Redundancy' reflects the ability of the independent latent variables to explain the average variation in the indicators of the dependent latent variable. The average redundancy for education outcome implies that quality of education predicts 35% of the variability in education outcome indicators. There is no cut-off suggested for redundancy.

The last column 'AVE' is the Average Variance Extracted which shows the amount of variance that a latent variable capture from its indicators as compared to the amount of variance occurred due to measurement error. AVE should be > 0.50 indicating 50% or more of the indicator's variance contribution (Sanchez, 2013). In the present model value for AVE is > 0.50 for all the variables.

Next index is Goodness of fit for quality of structural model. It is a 'geometric mean' of the average communalities (outer measurement model) and the average R2 of endogenous latent variables. Its value lies within 0 to 1. If 'GoF' > 0.7, it is considered as “very good" within the PLS-PM model. In the present case, the 'GoF' measure is

0.6422, which indicates that the overall prediction performance of the model is good.

Connection between constructs in the Inner Model

There is effect of one construct on the other as shown in Table 7. These effects can be categorized in two categories- 1) Direct and 2) Indirect. The 'direct effects' are observed by the path coefficients. 'Indirect effects' shows the influence of one construct over another through an indirect path. The 'total effects' is the summation of direct and indirect path effects.

Table 7: Effects on One Construct to other

EFFECTS				
	Relationships	**Direct**	**Indirect**	**Total**
1	TI -> CI	0.0000	0.000	0.0000
2	TI -> CCSI	0.0000	0.000	0.0000
3	TI -> EA	0.0000	0.000	0.0000
4	TI -> II	0.0000	0.000	0.0000
5	TI -> QE	0.0000	0.000	0.0000
6	TI -> EO	0.0826	0.000	0.0826
7	CI -> CCSI	0.0000	0.000	0.0000
8	CI -> EA	0.0000	0.000	0.0000
9	CI -> II	0.0000	0.000	0.0000
10	CI -> QE	0.2837	0.000	0.2837
11	CI -> EO	0.0000	0.193	0.1932
12	CCSI -> EA	0.0000	0.000	0.0000
13	CCSI -> II	0.0000	0.000	0.0000
14	CCSI -> QE	0.3772	0.000	0.3772
15	CCSI -> EO	0.0000	0.257	0.2569
16	EA -> II	0.0000	0.000	0.0000
17	EA -> QE	0.2752	0.000	0.2752
18	EA -> EO	0.0000	0.187	0.1874
19	II -> QE	0.1482	0.000	0.1482
20	II -> EO	0.0000	0.101	0.1009
21	QE -> EO	0.6810	0.000	0.6810

The 'indirect effects' are calculated by taking product of path coefficients of direct paths involved in forming an indirect path. E.g. the value for indirect effect of CI on EO is 0.1932 (0.2837 multiplied with 0.6810). Total effect is sum of 'direct' and 'indirect' effect. The inner model is fine; based on the values of R2, it can be inferred that the exogenous variables explained about 76% of variance in creativity and creativity explained about 54% of the variance in the endogenous variable. This value indicates a strong relationship.

Model Validation:

Bootstrapping is a 'non-parametric' approach for checking the precision of the estimates through standard error. Bootstrapping is re-sampling method where sample becomes population and bootstrap sample becomes sample. The model was validated by bootstrapping 200 random samples.

Results for the bootstrapping are summarized in Table 8 and Table 9 for path coefficients and explained variance (R2) respectively:

Table 8: Results for Path Coefficients Bootstrapping

Path	Original	Mean. Boot	Std. Error	perc.025	perc.975
TI -> EO	0.0826018	0.088077	0.0385332	0.0196898	0.166192
CI -> QE	0.2836828	0.281910	0.0270114	0.2303834	0.3382200
CCSI->QE	0.3771579	0.377927	0.0270028	0.3277146	0.4270930
EA >QE	0.2751655	0.277905	0.0307704	0.22167321	0.3352500
II> QE	0.1481529	0.147897	0.0279367	0.0973260	0.2048332
QE -> EO	0.6810482	0.676320	0.0331644	0.61167602	0.7388269

Table 9: Results for R2 Bootstrapping

	Original	Mean Boot	Std. Error	perc.025	perc.975
QE	0.7612111	0.7630516	0.01642780	0.7309893	0.7938930
EO	0.5429285	0.5429469	0.02743711	0.4895086	0.5941017

First column represents path, Second column is of original parameter, third column shows mean of parameter from bootstrapping, fourth column shows the deviation of these estimates from their respective means (standard error). Lower percentile and upper percentile of the 95% of bootstrap confidence-interval are shown in last two columns.

Further, the PLS parameter estimates which are at least twice the standard error are significantly different from zero and are statistically significant (Hamdollah and Purya, 2016). Table 10 shows the (Original/S.E.) values for R2 :

Table 10: Values (Original/S.E.) for R2

	Original/ Std. Error	Mean. Boot	Value (Original/ Std. Error)	perc.025	perc.975
QE	0.7612111/ 0.01642780	0.7630516	46.33	0.7309893	0.7938930
EO	0.5429285/ 0.02743711	0.5429469	19.788	0.4895086	0.5941017

The 'Bootstrap Analysis' validated the measurement as well as the structural model. The interrelation and strength between the variables marks the robustness of the model and ensues in applicability in improving education outcome and the overall quality of management education.

Conclusion

The present study explored six dimensions of Management Education Quality namely 'Teaching Infrastructure', 'Course Implementation', 'Course Content and Students Involvement', 'Education Administration' 'Industry Inputs' and 'Education Outcome'. The explored dimensions had been successfully used in developing and validating a multi –component scale termed as “management education quality assessment scale” (MEQAS) for assessment of management education especially in the context of Indian Higher-Education Management Institutions. The dimensions of 'Course Implementation', 'Education Administration', 'Course content & Students involvement', 'Teaching infrastructure', 'Industry Inputs' and 'Education Outcome' explained 15%, 12%, 11%, 9%, 8% and 9% variations in the management education quality assessment scale. This suggested that 'course implementation' dimension had greater importance over the other dimensions. The scale developed was duly tested for its reliability and validity. Further, the relationships between the identified dimensions were identified and a Structural

Model of 'Management Education Quality' was formed with the help of Partial Least Square Method. Null Hypothesis was rejected as relationship was found between each dimension of management Quality Education and education outcome. It was found that, 'Teaching Infrastructure', 'Course Implementation', 'Course Content & Students Involvement', 'Education Administration' and 'Industry Inputs' formed the basis of input constructs whereas the sixth dimension namely 'Education Outcome' served as output construct. 'Teaching Infrastructure' was found to directly influence 'Education Outcome', whereas the other four dimensions served as latent constructs of 'Quality Education' affecting 'Education Outcome'. Thus, two endogenous constructs i.e. 'Quality Education' and 'Education Outcome' was found. Value of R2 (i.e. the amount of variance in endogenous latent variable explained by its independent latent variables) for 'Quality Education' was 0.76 and for 'Education Outcome', it was 0.54.

The regression equation formed for 'Quality Education' is as follows:

QE=-4.05e-17+0.284*CI+0.377 *CCSI+0.275*EA+0.148*II

It showed that course content and student involvement has been the most important contributor towards quality of education. Second came course implementation and at third was placed education administration dimension.

The regression equation formed for 'Education Outcome' is as follows:

EO=-6.36e-17+0.082 *TI+0.681*QE

It showed that, 'teaching infrastructure' had lesser role in influencing education outcome as compared to 'Quality Education' dimension which itself is dependent on other four dimensions.

The robustness of the model was validated by bootstrapping technique where the strength between the variables was confirmed.

Limitations of the Study:

The study has not been free from limitations which are as follows:

- The findings are constrained to the information furnished by respondents which may suffer risk of biasness and human errors.
- Applications of management education quality dimensions identified in this study cannot be generalized specially to non -technical subject education.
- This study has been done within the geographical territory of Uttar Pradesh; therefore, generalizations for other states should be done with a caution.

Directions for Future Research:

- Even though there are many scales for assessing education quality, purpose of developing this scale had been to account for rapid changes which has taken place in the business scenario which expects to provide managers a well equipped tool to handle global challenges. Future researchers can do continuous revision and refinement of the scale so that the purpose of scale is served for long time.
- Model showing interrelationship between dimensions and validated in the present study for quality of management education may be refined with identification of new dimensions of quality of education.

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