

Prioritizing the Intangibles among Management Graduates of an Educational Supply Chain: An AHP Approach

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Abstract—Soon after the introduction of liberalization and privatization in India around 1991, people started paying more attention towards management education [1]. If one looks at the statistics, one will be surprised to see that earlier, there were only a handful of public and private sector universities and institutions offering degrees in management/business administration and related field. However, in the past one-decade or so, the educational supply chain is flooded with new institutions coming forward with diverse specializations [2]. It resulted in the waning down of those necessary intangibles that are considered indispensable prerequisites to enter the professional arena. Such intangibles would include the good communication skills, good knowledge of the world economy and its happenings, good command over subjects, good analytical skills, reasonable technical skills, disciplined and a pleasant personality etc. In the view of this problem, this research paper attempts a) to identify those broad intangibles desired by the job market and then, b) to establish priorities among them based on academicians' perception. The first objective related to the identification of broad intangibles was met by extensive literature review and for the second one, the primary data were collected from four academicians and priorities were established using Analytical Hierarchy Process (AHP). Besides enriching the literature, the outcome of this study will help the aspiring management graduates understand a clear-cut hierarchy of the several desired attributes in terms of their perceived importance given.

Keywords—Quality of education, management education, business education, quality of management graduates, AHP.

1. Introduction

Liberalizations opened new doors of opportunities which were otherwise unanticipated particularly by small and medium-sized enterprises. As it brought many opportunities for the nation, it also exposed to many threats as well. Earlier when the majority of the business operations were subject to a number of trade barriers like quotas, tariffs, duties, taxes, levies etc., they were having different kinds of objectives and

challenges. If one counts on the human capital, the pressure was less then, as the accessibility was limited and so, the competition. Thus, the academic institutions, the backbone of educational supply chains and supplier of this human capital, were not many.

Realizing the potential and huge demand for professionally qualified and skilled work force over the next couple of decades, many government and private bodies came forward to strengthen the existing educational supply chain sector with new institutions and universities offering the custom made programs suiting the needs of the industry. In the early years, they grew like anything. During 1980-1995, only 304 new management institutes were added, 1995-2000 another 322 and then, during 2000-2006, another 1017 came into being [3]. However, among the huge number of meritorious and non-meritorious institutions, many became extinct over time.

When one of the main goals of an educational supply chain is to improve the well-being of the end customer or the society, the relevant question is why such established institutes were bound to perish [4]. Despite having 411.4 million people up to 14 years of age (34.9%) of the total population (1210 million) the extinction of institutions shows a serious concern [5]. In fact, one of the major reasons for the waning down of effectiveness for today's Indian educational supply chains seems to be the existence of too many public and private institutions, the focus for many of them seems to have shifted from enriching the intangibles of their products to mere profit generators. As of early 2016, there were 46 Central Universities, 358 State Universities, 123 Deemed Universities, 260 Private Universities, 374 Autonomous Colleges, 172 Colleges for Potential Excellence, and 74 Institutes of national importance comprised of AIIMS, IITs and NITs, 20 IIMs[6]. There are several affiliated colleges (34908 colleges as of 2013), besides and the vibrant distance education machinery addressing to 12.5% of the total population enrolled in higher education. At graduation level, maximum % of students is enrolled in Arts followed by Engineering & Technology whereas, at post- graduation level, it is management succeeded by social sciences (All India Survey on Higher Education, 2013)[7]. In terms of intake as well as enrolment,

Tamil Nadu, Maharashtra, and Uttar Pradesh were holding the first three places respectively in 2015-16 [8]. The researchers attempted to identify and prioritize attributes of work force those are critical to all organizations.

Identification and prioritization of critical attributes may be forward to the business schools for having a healthy review of it in line with their own student learning matrices.

2. Review of Literature

The researcher has attempted to explore the recent and relevant literature from all the possible range of accessible literature and discarded many of the research publications based on either weak conceptual base or duplicities except few exemptions. The key evidences from the relevant literature are summarized in Table1.

Table 1. Evidence from the literature

Ref.	Intangibles studied
[9]	Communication, emotional intelligence, motivation, work related learner, collaboration, teamwork, innovator, critical thinking, ethical
[10]	Learning orientation, extra effort, teamwork, ethics/integrity, communication, professionalism, adaptability, goal-setting, emotional intelligence, intrinsic motivation, self-awareness, initiative, creativity and innovation, influence and sales skills, change management, knowledge breadth, academic qualifications, technical skills, global mind-set, leadership skills
[11]	Communication skills, personal qualities, teamwork skills, critical thinking and problem-solving skills, technology skills, organizational skills, continuously learning
[12]	Communication skills, problem-solving, intrapersonal skills and technical knowledge
[13]	Discipline knowledge and its application, development of disciplinary knowledge, problem-solving, critical thinking, written communication, oral communication, numeracy and quantitative skills, personal planning & organization, teamwork, ethics, flexibility and adaptability, and self-confidence and independence
[14]	Professional accounting skills, computing techniques, written communication, reporting skills, measurement skills, professionalism, functional competencies, oral communication, finance, legal and regulatory, problem solving, strategic and critical thinking, taxation, ethics, risk analysis, broad business perspective, leadership, research skills, international perspective, industry perspective, marketing, overall values.
[15]	Soft skills (communication skills, critical thinking and problem-solving skills, entrepreneurial skills, ethics and professional moral skills, leadership skills, lifelong learning and information management skills, teamwork) and technical skills (financial accounting, management accounting, taxation, auditing, information systems).
[16]	Communication, problem-solving, teamwork, management skills, ICT skills, self-management, time management/prioritizing, independent work, analytical skills, decision making, integrity & honesty, leadership skill, self-confidence.
[17]	Innovative abilities, risk taking, leading skills, communication abilities, conflict management, self-improvement, self-discipline, developed ethical sense, authority, empathy, persuasion, adaptability to change
[18]	Retrieve and handle information, communication, and presentation skills, planning and problem solving, social development and interaction, individual traits or attributes
[19]	Professionalism (competent clinicians with the required level of skills for the workplace, non-clinical, personal attributes such as enthusiasm for the profession, good communication skills, empathy and energy), perspective (who understood and appreciated that they were part of a bigger picture, had an understanding of their responsibilities within the workforce, the community and the wider health context) and confidence

Ref.	Intangibles studied
[20]	Team skills, communication skills, decision-making and problem-solving skills, ability to obtain and process information, management skills, analysing skills, relevant technical knowledge, proficiency with computer software programs, convincing/persuasion skills
[21]	Team working, problem solving, self-management, knowledge of the business, literacy and numeracy relevant to the post, ICT knowledge, good interpersonal and communication skills, ability to use own initiative but also to follow instructions, Leadership skills where necessary, particular attitudes and outlooks including motivation, tenacity, and commitment
[22]	Adaptability, ambitious, ease to fit into culture, emotional intelligence, energetic, enthusiasm, hardworking, independence, initiative, integrity, and honesty, loyalty and commitment, positive attitude toward work, punctuality, receptiveness to training, respect for authority, responsibility, self-awareness, self-confidence, stress tolerance, willingness to learn
[23]	Key skills (teamwork, analytical/thinking skills, communication/presentation skills, interpersonal skills), Personal attributes (motivation/drive, business awareness, independence, creativity/innovation, leadership/management), Other (work experience)
[24]	Generic skills (teamwork, communication skills, problem solving, analytic ability, logical argument, ability to summarize key issues) and Personal attributes (commitment, energy, self-motivation, self-management, reliability, cooperation, flexibility, and adaptability)
[25]	Knowledge (tacit or explicit), skills, competencies, capabilities, ethics, career development programs, etc.

Having a thorough investigation of the above-mentioned studies, the researchers came to know that there is a huge heap of studies focusing upon a general to the very specific account of necessary attributes among graduates. However, they could not come across any particular study, which focused on the *Indian Business Graduates* (Students) as far as their employability treasures were concerned [26]. Also, they didn't find any single study which had prioritized among the broad intangibles of a business graduate. This gave the researchers enough rationale to work in this. Thus, this study includes an identification and prioritization of various intangibles among business graduates in India.

3. Objectives & Methodology

Soundness of any research largely depends on the concreteness of its objectives and appropriateness of perspective. The concreteness of objectives simply means the degree to which objectives are realistic whereas the appropriateness of perspective means selection of suitable research design, adoption of a proper sampling procedure and application of appropriate statistical/non-statistical tools for data processing and analysis.

This study aims to a) identify the broad intangibles (attributes) which a business graduate must possess in order to be employable b) to prioritize these broad attributes based on their perceived importance. As evident from the extensive literature review, there is no dearth of relevant literature in this area. Hence, the descriptive research design suits this study best.

As a qualitative study in nature, the researchers carried out this study in two phases. For the first objectives, they did an extensive literature review in order to find out all the possible graduate attributes, in order to classify them into some internally homogeneous and externally heterogeneous groups. For examining the face validity of the names of these groups, two senior researchers from among the respondents were consulted. And for the second objective, researchers adopted Analytical Hierarchy Process (AHP) which is generally recommended when one is required to prioritize among certain alternatives. For applying it, the researcher has contacted the four experienced academicians working in two different management institutes of India.

4. Analysis and discussion

Education Supply Chain Management is comprised of two supply chains; students' supply chain and the research supply chain. Concerned about the first, students' supply chain considers the students as raw materials, which are processed through various students' services (admissions, classroom training, co-curricular activities, industrial internships, research projects etc.) by the academic and the co-academic staffs (operators) in order to ensure worthy outcome (learned graduates)[27]. Linking the "worthy outcome" with the context of this study requires one to first identify and prioritize those aspects of graduates' personality that make them worthy for business markets.

After a comprehensive and rigorous review of more than twenty relevant research papers, the researchers identified more than sixty dimensions related to the issue under investigation. The homogeneity and heterogeneity classifies these dimensions into six broad groups as following.

- 1) *Communication skills* (reading, writing, speaking)
- 2) *IT skills* (ability to obtain, store, process, generate information, and proficiency with computer software programs etc.)
- 3) *Interpersonal skills* (persuasion skills, team skills, professionalism, courtesy, building trust etc.)
- 4) *analytical skills & decision making* (ability to identify, define, split, research, critically examine and solve the problem, ability to make decisions)
- 5) *Enterprising skills* (creativity, initiative, risk taking, receptivity, global orientation, leadership etc.)
- 6) *Enterprising skills* (creativity, initiative, risk taking, receptivity, global orientation, leadership etc.)

The nomenclature for these groups was done in the light of the broader aspects these groups were indicating. Ref.[28]proposed six steps in implementing AHP that includes:

- a) Choose the requirements to be prioritized.

- b) Set the requirements into the rows and columns of the $n \times n$ AHP matrix.
- c) Perform a pair-wise comparison of the requirements in the matrix according to a set of criteria.
- d) Sum the columns
- e) Normalize the sum of rows
- f) Calculate the row averages.

After these steps, other parameters of AHP like Consistency Index (CI) and Consistency Ratio (CR) etc. are calculated with the help of maximum eigenvalue (λ_{max}) for the matrix. CR of the estimated vector is calculated in order to authenticate whether the pair-wise evaluation matrix provides a consistent evaluation or not.

The nominalratio scale of 1 to 9 is adopted for pairwise comparison of the questionnaires. Four academicians were asked for a pairwise comparison of the five criteria [29]. The results of pair-wise comparisons are filled in positive reciprocal matrices to calculate the eigenvector and eigenvalue (Table 1 to 4). The consistency of the judgments is determined by a measure called consistency ratio (C.R.).

For the purpose of prioritization, researchers have selected all of the broad intangibles (*communication skills (CS)*, *IT skills (ITS)*, *interpersonal skills (IS)*, *analytical & decision-making skills (ADMS)*, *enterprising skills (ES)* except “other personality traits”.

Table 2. Respondent 1

Intangibles	CS	ITS	IS	ADMS	ES
CS	1	5	1	1	3
ITS	1/5	1	1/5	1/5	1
IS	1	3	1	1	3
ADMS	1	3	1	1	5
ES	1/5	1	1/3	1/5	1

Table 3. Respondent 2

Intangibles	CS	ITS	IS	ADMS	ES
CS	1	5	1	1	3
ITS	1/5	1	1/5	1/3	1
IS	1	5	1	1	3
ADMS	1	3	1	1	5
ES	1/3	1	1/3	1/5	1

Table 4. Respondent 3

Intangibles	CS	ITS	IS	ADMS	ES
CS	1	7	3	1/3	3
ITS	1/7	1	1/3	1/3	1
IS	1/3	3	1	1	5
ADMS	3	3	1	1	5
ES	1/3	1	1/5	1/5	1

Table 5. Respondent 4

Intangibles	CS	ITS	IS	ADMS	ES
CS	1	5	3	1/3	3
ITS	1/7	1	1/7	1/3	3
IS	1/3	7	1	1	7
ADMS	3	3	1	1	5
ES	1/3	1/3	1/3	1/3	1

The geometric mean method has been the most applied method in AHP for the consolidation of individual preferences when consulting more than one expert for the decision-making. To find out the ranks of the alternatives, weighted geometric means of each individual opinion is calculated and the final

consolidated matrix is developed. Tables 5 and 6 show the consolidated matrix for the responses. The priorities for individual dimensions are calculated (dividing its row-wise sum by the sum of the column-wise sum). Higher is the priority, higher is the rank.

Table 5. Consolidated Response

Intangibles	CS	ITS	IS	ADMS	ES
CS	1	5.438	1.732	0.577	3
ITS	0.184	1	0.237	0.333	1.316
IS	0.577	4.213	1	1	4.213
ADMS	1.732	3	1	1	5
ES	0.333	0.76	0.237	0.2	1

Table 6. Consolidated Response and Priorities

Intangibles	CS	ITS	IS	ADMS	ES	Row-wise Sum	Priority	Rank
CS	1	5.438	1.732	0.577	3	11.747	0.293	1
ITS	0.184	1	0.237	0.333	1.316	3.07	0.0765	4
IS	0.577	4.213	1	1	4.213	11.003	0.2745	3
ADMS	1.732	3	1	1	5	11.732	0.2927	2
ES	0.333	0.76	0.237	0.2	1	2.53	0.0631	5
Column-wise Sum	3.823	14.411	4.206	3.11	14.529	40.079		

$$=0.2930 \begin{pmatrix} 1 \\ 0.184 \\ 0.577 \\ 1.732 \\ 0.333 \end{pmatrix} + 0.0765 \begin{pmatrix} 5.438 \\ 1 \\ 4.213 \\ 3 \\ 0.760 \end{pmatrix} + 0.2745 \begin{pmatrix} 1.732 \\ 0.237 \\ 1 \\ 1 \\ 0.237 \end{pmatrix} + 0.2927 \begin{pmatrix} 0.577 \\ 0.333 \\ 1 \\ 1 \\ 0.20 \end{pmatrix} + 0.0631 \begin{pmatrix} 3 \\ 1.316 \\ 4.213 \\ 5 \\ 1 \end{pmatrix}$$

$$= \begin{Bmatrix} 0.2930 \\ 0.0539 \\ 0.1690 \\ 0.5074 \\ 0.0975 \end{Bmatrix} + \begin{Bmatrix} 0.4160 \\ 0.0765 \\ 0.3223 \\ 0.2295 \\ 0.0581 \end{Bmatrix} + \begin{Bmatrix} 0.4754 \\ 0.0650 \\ 0.2745 \\ 0.2745 \\ 0.0650 \end{Bmatrix} + \begin{Bmatrix} 0.1689 \\ 0.0974 \\ 0.2927 \\ 0.2927 \\ 0.0585 \end{Bmatrix} + \begin{Bmatrix} 0.1893 \\ 0.0830 \\ 0.2658 \\ 0.3155 \\ 0.0631 \end{Bmatrix}$$

$$\text{Weighted Sum Vector} = \begin{Bmatrix} 1.5426 \\ 0.3758 \\ 1.3243 \\ 1.6196 \\ 0.3422 \end{Bmatrix}$$

Divide the elements of the weighted sum vector obtained above by the corresponding priority for each criterion.

$$CS = (1.5426/0.2930) = 5.2648$$

$$ITS = (0.3758/0.0765) = 4.9124$$

$$IS = (1.3243/0.2745) = 4.8244$$

$$ADMS = (1.6196/0.2927) = 5.5333$$

$$ES = (0.3422/0.0631) = 5.4231$$

The maximum value of eigenvector for the above matrix,

$$\lambda_{max} = (5.2648 + 4.9124 + 4.8244 + 5.5333 + 5.4231) / 5 = 25.9580 / 5 = 5.1916$$

$$C.I. = (\lambda_{max} - n) / (n - 1) \rightarrow$$

$$C.I. = (5.1916 - 5) / (5 - 1) = 0.1916 / 4 = 0.0479$$

To obtain the consistency ratio, one needs to calculate the eigen value for the matrix calculated by multiplying the individual value for each of the columns of the matrix by the respective priorities.

Then, one needs to add the values across the rows to obtain a vector of values labelled “weighted sum”. The computation of this “weighted sum” vector done as under.

Random Index for the matrix of order 5 is R.I. = 1.12

$$C.R. = C.I. / R.I. = 0.0479 / 1.12 = 0.04276$$

Generally, the value of a consistency ratio (CR) is indicative of likely inconsistencies and a CR value of 0.10 or less is acceptable. As the pair-wise comparisons for the selected intangibles show the CR value as 0.04276 (showing only 4.276% chances of inconsistencies), it can be concluded that comparisons are consistent.

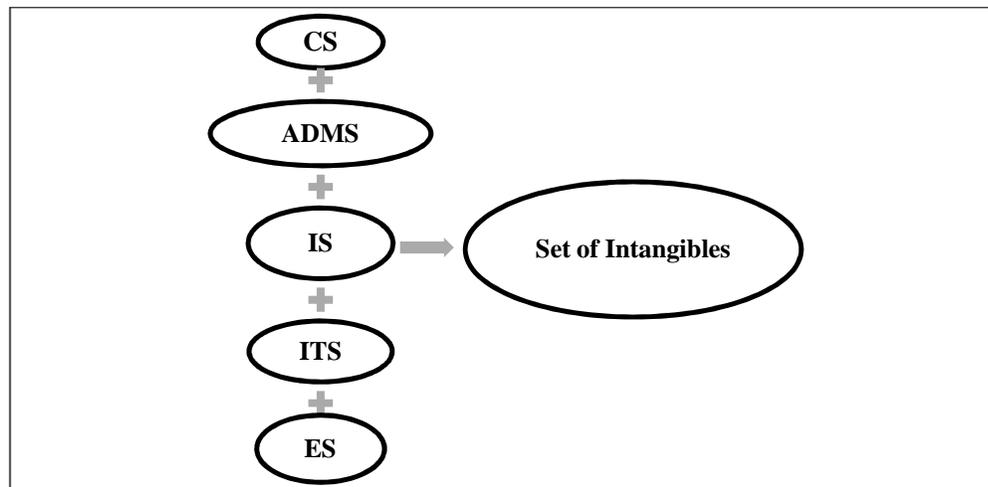


Figure 1. Desirable intangibles among management graduates arranged in terms of their perceived priorities

5. Conclusions and implications

A plethora of research work is available about the graduates’ desirable attributes. Since both the researchers are also from business management field, they did a careful scrutiny and crystallized more than sixty dimensions. Many of these sixty

dimensions were seemingly showing some similarities with each other. Hence, based on their apparent conjunctions, researchers clubbed them into some broad categories that include communication skills, analytical and decision-making skills, IT skills, interpersonal skills, enterprising skills and other personality traits.

With the help of AHP, the researchers found that the communication skills come first, followed by the analytical and decision-making skills, followed by the interpersonal skills. In general, also, this makes a sense. However powerful or skilful one may be, s (he) cannot be an effective contributor if lacks the communication skills.

Hence, the outcome of this research, besides adding value to literature, is useful to the management & business institutions, faculty members, and off course, the students to focus, so that “worthy outcomes” may come out of the educational supply chains.

6. Limitations and direction for future research

Like every other academic research, this study also has the limitations of its own. The major limitation

of this study is its reliance on the responses of only four respondents. Besides, time, budget and accessibility remained the others.

Future researchers may take these limitations as research lead and start extending this work by addressing all or selected limitations of this study. Future researchers may also examine the responses from the HR managers regarding these intangibles. A possible extension may be done by conducting a comparative analysis of the responses received from three stakeholders of an educational supply chain that include the faculty members, students and the HR managers engaged in recruitments and selections.

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