

An Empirical Study on the Evolutionary Phase of Industry Vis-À-Vis Evolutionary Phase of Management Education in India

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Abstract:

There are several skills that are desired among the students for working in the industry 4.0 environments but the question that arises is whether the management education that is being offered to the students has evolved in line with the industrial evolutions. This research paper analyzes the evolution of industry in terms of technology and the skills desired by the industry among the management education students for working in the environment of Industry 4.0. This research paper also analyzes whether management education has evolved along the lines of Industry 4.0 and provides recommendations for the same.

Keywords: Industry 4.0, Management education, industrial evolutions.

Introduction:

The progression of technology requires the similar evolution in the skills that are being inculcated among the students who would be the future managers of such companies. If the students would lack the needed skills, it would be difficult for them to work in the environment of Industry 4.0. For this, it is very necessary that the management curriculum should be designed in accordance with the skills that are necessary in the scenario of industry 4.0. The current management education is aligned in accordance with the second and third industrial revolutions and is inadequate in imparting the skills along the lines of industry 4.0 scenario. Specifically, the management education should focus on providing the training to the students for the technologies that are being introduced in the present scenario.

Objectives:

1. To analyze the skills desired by the industries among the management education students for working in the environment of Industry 4.0
2. To analyze the evolution of management education
3. To determine whether the management education is imparting the skills along the lines of industry 4.0

Hypothesis:

First hypothesis:

H0: Management education is yet to match the standards required to impart the skills along the lines of Industry 4.0

H1: Management education has evolved along the lines of Industry 4.0

Second hypothesis:

H0: Management education failed to impart the skills along the lines of industry 4.0

H1: Management education is imparting the skills along the lines of industry 4.0

Research methodology:

In this research paper, secondary data has been used to determine the evolution of the management education and the primary data has been considered for determining the skills that are desired by the industries among the future management students.

Primary data has been collected from the industry experts such as managers. The industries that have been taken into consideration belong to the manufacturing sector. These companies are located in different cities of India and data has been collected from them through the questionnaire which was mailed to them in the Google form. Data from 90 managers from 20 different manufacturing industries were collected from the various departments of various industries. The industries were located in the prime cities such as Mumbai, Delhi, Nagpur, Chennai and Pune. Judgemental sampling technique has been used while selecting the industries and the managers of the departments of the industries. The managers from the top level management and the middle level management have been taken into consideration for the study. The top level managers considered as the respondents were 40 in numbers and the middle level managers considered as the respondents were 50 in numbers.

Data Interpretation:

Industry 4.0 includes the expanding trend in the field of automation, data exchange in technology, and processes within the manufacturing industry, including:

1. The internet of things (IoT), The industrial internet of things (IIoT)
2. Cyber-physical systems (CPS), Cloud computing, Block chain, Artificial intelligence
3. Smart factories, Smart manufacturing

Various skill sets required in a management graduate to successfully handle the quality management process in the company operating with industry 4.0 principles are as follows:

1. A manager should have the intellectual abilities to work in the environment of Industry 4.0 for quality management in the processes and the products and/or services. These abilities include cognitive thinking, reasoning and remembering and flexibility abilities, creativity, problem identification, logical and mathematical reasoning and visualisation abilities.
2. A manager should have the physical abilities including strength, manual dexterity and precision.
3. A manager should have the content skills such as active learning, oral expression, reading and written comprehension and the awareness about the ICT abilities.
4. A manager should have the process skills such as active listening, critical thinking, self analysis and behavioural study.
5. A manager should have the cross functional skills such as social skills, team work and team building skills, emotional intelligence, negotiation and service orientation skills.
6. A manager should have the resource management skills such as maximum utilisation of the available resources, waste management, time management, human resource management and finance management.
7. A manager should have the complex problem solving skills and system skills including judgement and decision making skills and system analysis skills.
8. A manager should be well versed with the technical skills such as manufacturing activities and processes, equipment maintenance, repair, operation and control skills, programming skills, quality control, trouble shooting, technology and user experience skills.

Apart from the above mentioned skill set, an MBA graduate is supposed to understand the communication between the machineries and the equipments; he/she should have the basic knowledge of IT security and the data processing and protection.

Findings:

As per the data collected from the managers of 20 different industries, following data have been obtained:

1. Do you think that the students graduating from the management institutions in India possess the skills necessary for working in Industry 4.0 scenario?

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	2 (5%)	8 (20%)	4 (10%)	16 (40%)	10 (25%)

Middle level Managers	6 (12%)	5 (10%)	7 (14%)	8 (16%)	24 (48%)
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Table1: Perspective of Industry 4.0 managers on skill sets possessed by management students in accordance to Industry 4.0

From the above table, it is clear that sufficiently high percentage of top level and middle level managers disagree that the students graduating from the management institutions possess the skills necessary for working in Industry 4.0 scenario.

2. Views of managers whether institutions should develop their curriculum in collaboration with the industry experts:

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	21 (52.5%)	12 (30%)	2 (5%)	4 (10%)	1 (2.5%)
Middle level Managers	29 (58%)	14 (28%)	1 (2%)	5 (10%)	1 (2%)

Table2: Views of managers whether institutions should develop their curriculum in collaboration with the industry experts

From the above table, it is clear that sufficiently high percentage of top level and middle level managers agree that the institutions should develop their curriculum in collaboration with the industry experts.

3. Do you agree that University's willingness (or agreement) can play a significant role in the development of skills among the students in lines with the Industry 4.0?

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	17 (42.5%)	13 (32.5%)	7 (17.5%)	2 (5%)	1 (2.5%)
Middle level Managers	23 (46%)	21 (42%)	5 (10%)	1 (2%)	0 (0%)

Table3: Views of managers on the university's role in the development of skills among the students in lines with the Industry 4.0

From the above table, it is clear that sufficiently high percentage of top level and middle level managers agree that the University's willingness (or agreement) can play a significant role in the development of skills among the students in lines with the Industry 4.0.

4. Do you believe that the management educational institutions should apply innovative pedagogy for imparting management education to the students?

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	18 (45%)	16 (40%)	6 (15%)	0 (0%)	0 (0%)
Middle level Managers	29 (58%)	19 (38%)	1 (2%)	1 (2%)	0 (0%)

Table4: views of managers on the role of management institutions in developing skills amongst the students in lines with industry 4.0

From the above table, it is clear that sufficiently high percentage of top level and middle level managers agree that the management educational institutions should apply innovative pedagogy for imparting management education to the students.

5. Do you agree that inadequate educational programs/seminars specialized in digitalization and automation in the university is a disadvantage?

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	24 (60%)	13 (32.5%)	1 (2.5%)	1 (2.5%)	1 (2.5%)
Middle level Managers	36 (72%)	10 (20%)	2 (4%)	2 (4%)	0 (0%)

Table5: views of managers on the role of educational programs/seminars in developing skills amongst the students in lines with industry 4.0

From the above table, it is clear that sufficiently high percentage of top level and middle level managers agree that the inadequate educational programs/seminars specialized in digitalization and automation in the university is a disadvantage.

6. Do you think that the university staff is not inclined to develop their own system or retrofit the existing one?

Level of Managers	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Top level Managers	19 (47.5%)	17 (42.5%)	1 (2.5%)	2 (5%)	1 (2.5%)
Middle level Managers	21 (42%)	17 (34%)	3 (6%)	5 (10%)	4 (8%)

Table6: views of managers on the relationship between the efforts of university staff & the development of skills amongst the students in lines with industry 4.0

From the above table, it is clear that sufficiently high percentage of top level and middle level managers agree that the university staff is not inclined to develop their own system or retrofit the existing one.

Analysis and Hypothesis Testing:

For testing the hypothesis, one way ANOVA test has been applied over the data that has been presented above.

Testing First Hypothesis:

For testing the first hypothesis, 1st, 3rd and 10th question has been taken into consideration. The result of the analysis is shown below:

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Do you think that the students graduating from	137.818	4	34.454	126.876	.063
Between Groups					
Within Groups	23.082	85	.272		

the management institutions in India possess the skills necessary for working in Industry 4.0 scenario?	Total	160.900	89			
Do you agree that University's willingness (or agreement) can play a significant role in the development of skills among the students in lines with the Industry 4.0?	Between Groups	43.342	4	10.835	35.911	.132
	Within Groups	25.647	85	.302		
	Total	68.989	89			

From the above analysis, it is clear that the value of P is greater than 0.05. Therefore, the null hypothesis will be accepted. Hence, it is concluded that the Management education is yet to match the standards required to impart the skills along the lines of Industry 4.0.

Testing Second Hypothesis:

For testing the second hypothesis, 8th question has been taken into consideration. The result of the analysis is shown below:

ANOVA

Do you agree that inadequate educational programs/seminars specialized in digitalization and automation in the university is a disadvantage?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.614	4	7.904	25.081	.236
Within Groups	26.786	85	.315		
Total	58.400	89			

From the above analysis, it is clear that the value of P is greater than 0.05. Therefore, the null hypothesis will be accepted. Hence, it is concluded that the Management education failed to impart the skills along the lines of industry 4.0.

Recommendations:

1. The University of Pretoria, South Africa has already synced their curriculum with the requirements of the skills desired for Industry 4.0 and they have coined the term Education 4.0. The Universities in India are also required to work on the similar principle and should impart the skills that are in line with the Industry 4.0.
2. At present, management education is grouped along with engineering, technology, pharmacy and architectural education all of which come under the classification of 'technical education.' This does not appear to be a logical grouping. In the early 50s, when there were hardly four or five management schools, this arrangement might have been appropriate. But in the current scenario, management education deserves to be seen, handled and directed as a separate system as lot more is expected from these students in the scenario of Industry 4.0 by the management of the organizations.
3. The AICTE norms which are currently in vogue have grown out of the criteria which were developed way back in 1964. While the norms are good in parts, certain key sections need to be reviewed and revised. In this context, I would like to submit to the AICTE to take a look at the norms and standards recommended by the

AIMS in October 1989. A 'greenfield' educational effort and a down-town business school cannot be equated when it comes to areas of land, hostels, faculty housing, etc.

4. The approval authority for the colleges should conduct regular audits so as to ensure that the colleges are updating their curriculum in equilibrium with the current trends and the demands in the industrial scenario.
5. Institutions would be required to invest in the infrastructure required to impart the skills associated with the industry 4.0.
6. The Institutions should merge their curriculum with the learning of latest technologies such as cyber risk management, internet of things, smart manufacturing, digital supply chain network, artificial intelligence, virtual reality, augmented reality, big data, etc.
7. The institutions should also provide practical training to the students on the subjects such as e-HRM, Robotic Process Automation, Edge computing and Quantum computing.
8. The institution are also required to provide training to the students on how they would be able convert the manual work into smart work with the help of ERP and SAP implementation.

Conclusion:

A discussion on the function of new company managers in the industry 4.0 environments has been sparked by concerns about job loss and reduced managerial involvement. What kind of managerial abilities, work ethics, and skill set new MBAs should have in order to contribute strategically to business decision-making? The next generation of managers must advance to a higher and greater understanding and application of business if the routine and dull labour is being handled by computers. The managers of industry 4.0 will need to possess transdisciplinary knowledge, abilities, and skills through adaptive and cognitive learning, design thinking, teamwork, and increased problem-solving aptitude. For managerial decision-making to be effective, the current domain-centric MBA program must undergo a significant transition and incorporate knowledge from science, technology, engineering, art, and mathematics.

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