S1: Questionnaire/ Survey - Industry 4.0

Section A (Personal Details)

1. **Age**
   - 18 to 24
   - 25 to 34
   - 35 to 44
   - 45 to older

2. **Gender**
   - Female
   - Male

3. **Educational Qualification**
   - Under Graduate
   - Graduate
   - Post-Graduate
   - Prefer not to say

4. **Department and College**

_____

5. **Primary role in the mentioned department**

_____

6. **Research area, main subjects or specialization**

_____

7. **For how long have you been in the current role**
   - Less than a year
   - 1 - 3 years
   - 3 - 5 years
   - 5 – 10 years
   - More than 10 years

8. **How many researchers (or students) are working in the laboratory?**
   - o 1-2
   - o 2-5
   - o 5-10
   - o More than 10

Awareness of the concept of Industry 4.0 and its basics

1. Have you ever come across about the term Industry 4.0?
   - o Yes
   - o No

2. How did you know about Industry 4.0?
   - o Research papers/published books
   - o Surfing/Online advertisements
   - o Seminar/workshop in the department
   - o Course book/from the teacher
   - o Other. If the answer is other, please mention the source (if possible):

3. Have you heard about the following terminologies

A) Sensor	☐	☐	☐	Yes	
No	Well-informed				
B) Additive Manufacturing	☐	☐	Yes	☐	
No	Well-informed				
C) Simulation	☐	☐	☐	Yes	
No	Well-informed				
D) Augmented Reality	☐	☐	Yes	☐	
No	Well-informed				
E) Autonomous Robots	☐	☐	Yes	☐	
No	Well-informed				
F) System Integration	☐	☐	Yes	☐	
No	Well-informed				
G) Big Data	☐	☐	☐	Yes	
No	Well-informed				
H) Cybersecurity	☐	☐	☐	Yes	
No	Well-informed				
I) Cloud Manufacturing	☐	☐	Yes	☐	
No	Well-informed				

J) Internet of Things ☐ ☐ Yes ☐
No Well-informed

K) Cyber-Physical System ☐ ☐ Yes ☐
No Well-informed

L) Smart Factory ☐ ☐ Yes ☐
No Well-informed

M) Modularity ☐ ☐ ☐ Yes
No Well-informed

N) Interoperability ☐ ☐ Yes ☐
No Well-informed

O) Reconfiguration ☐ ☐ Yes ☐
No Well-informed

P) Decentralization ☐ ☐ Yes ☐
No Well-informed

4. Have you ever attended any event or seminar focusing on the Industry 4.0?
   - Yes
   - No

5. **Do you agree that Government/University's willingness (or agreement) can play a significant role in realizing Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

6. **Do you agree that the experts and staff needed to develop the specialized talents have to be in sufficient numbers within the university?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

7. **Do you agree that the possession of the required infrastructure in labs is mandatory to Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

8. **Do you think that the Computer science and Engineering departments needs to be matured and well-established in order to support Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Not at all Very Significantly

9. **How do you rate the significance of internet access and speed for university4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Very poor Very high

10. **Do you agree that the university should support inventions and patent generations?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

11. **Do you admit or consider that the digital transformation to Industry 4.0 could improve university's competitiveness at the international stage?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

12. **Do you consider lesser coordination or collaboration between various working stations is a weakness to attain Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

13. **Are funding or funded projects related to Industry 4.0 important?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

14. **Do you think that a low rate of collaboration between university/academics and industries (lesser number of real-problems) is a limitation?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Do not have — More than sufficient

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

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree — Strongly agree

16. **Do you think projects or tasks with multi-disciplinary teams are mandatory?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Do not have — More than sufficient

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

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree — Strongly agree

18. **Will there be increased dependence on IT or technology as a result of Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Not at all — Very Significantly

19. **Do you agree that the specialized staff with substantial experience in industries is lacking?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree — Strongly agree

20. **Is there a dearth of continuing university strategies to promote, invest and generate awareness regarding Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree — Strongly agree

21. **Do you agree that there will be a scope for domestic market growth if Industry 4.0 is implemented?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree — Strongly agree

22. **As we know that Industry 4.0 is very popular at the world stage lately. Do you agree that universities can establish themselves at the national and international level in implementing the concept of Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

23. **Do you agree that as a result of Industry 4.0, skilled labour force can be produced? The students can work in multi-disciplinary teams outside their native country?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

24. **Do you agree that the implementation of Industry 4.0 will be useful in designing smart factories as well as become the proprietor of intelligent applications"?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

25. **Transformation of labs to Industry 4.0 will result in extensive collaboration with international universities as well as production sectors.**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

26. **Do you agree that the lab staff or the university give preference to technology acquisition/purchase rather than developing their own (lesser emphasis on technology transfer)?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

27. **Are there security issues – Data theft or cyber-security with Industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

28. **Do you agree that intangible roadmap, strategies and framework is a hindrance in the implementation of Industry 4.0 in universities?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

29. **Do you think that the universities can be doubtful about Industry 4.0 owing to large investments and uncertain profitability?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Entirely disagree Strongly agree

30. **Is employee fear and concerns a serious threat to the implementation of industry 4.0?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Entirely disagree Strongly agree

31. **What actions do you think would be most suitable to the implementation of Industry 4.0 in your laboratory? (suggest at least three options from the following)**
    - Information events or seminars in the university
    - Encourage more publications within this area
    - Expert training to some with some initial knowledge and then this group would be utilized to train the rest within the region
    - Online portal (both in English and Arabic) to support knowledge sharing. People can clarify queries and doubts as well as benefits from the available pool of information
    - Increased cooperation between companies and research institutions
    - Others (if any). Please write in the space below

32. **Which technologies and tools related to Industry 4.0 is being used in your laboratory?**
    - 3D Printing
    - Virtual/Augmented Reality
    - Exchange of information or data between machines, computers, etc.
    - Cloud computing (storage and processing of data in networked computers)
    - Processing of big data or big data analysis
    - Autonomous Robots
    - Internet of Things (connecting physical objects to their virtual counterpart)
    - Simulation
    - RFID chips (Radio Frequency Identification for object tracking)
    - Not sure
    - Others (if any). Please write in the space:

33. **What do you think are the three primary hindrances in transforming the current set up in line with Industry 4.0?**
    - Data theft and insecurity
    - Fears and concerns of employees
    - Insufficient employee qualification or expertise
    - Limited finances
    - Absence of suitable business partners or collaboration with industries
    - Lack of management interest

- Unawareness about the benefits of Industry 4.0 among the employees and employers
- Inadequate IT infrastructure
- Others (if any). Please write in the space:

If you have some more suggestions for this survey or would like to write or detail something, please don't hesitate to write your comment below.

S2: Score Sheet

Please rate these aspects on the scale of 1 to 9 (1, 2, 3, 4, 5, 6, 7, 8, 9), where 1 represents least important and 9 represents extremely important. Note that the two aspects can have same rating.

Question 1: Please rate the importance of following factors for the implementation of Industry 4.0 in a University?

Factors	Rating
Government/University willingness to support such programs	
Presence of experts and staff to develop specialized talent	
Understanding of employees and employer for the development of Industry 4.0	
Availability of magnificent infra-structure	
Existence of matured and well-established Computer science and Engineering departments	
Greater access to Internet and higher band-width	
Greater support to inventions and patent generations	

Question 2: Please rate the significance of following constraints in the implementation of Industry 4.0 in a University?

Factors	Rating
Lesser coordination or collaboration between	

various labs

Lack of funded projects

Low rate of collaboration between university/academics and industries (lesser number of real-problems)

Lack of specialized staff with substantial experience in industries

Inadequate educational programs/seminars specialized in digitalization and automation

Meagre projects or tasks with multi-disciplinary teams

Lesser inclination of the staff to develop their own system or retrofit the existing one

Dearth of continuing university strategies to promote, invest and generate awareness regarding Industry 4.0

Increased dependence on IT

Question 3: Please rate the following factors as the benefits of Industry 4.0 in a University?

Factors	Rating
Scope for domestic market growth	
University can establish itself at the national and international level in implementing the concept of Industry 4.0	
Production of skilled labor force	
Smart factories and intelligent applications	
Extensive collaboration with international universities as well as production sectors	

Question 4: Please rate the following factors as the hindrance in the implementation of Industry 4.0 in a University?

Factors	Rating
Security issues – Data theft or cyber-security	
Intangible roadmap, strategies and framework	
Requirements of large investments and uncertain profitability	
Employee fear and concerns	

S3. Decision Matrices (Strengths, Weaknesses, Opportunities and Threats) from Experts (E1, E2, E3, and E4)

E1		W	E	C	I	ED	IA	IP
Willingness	W	1	1	0.5	2	1	0.5	1
Experts	E	1	1	0.5	2	1	0.5	1
Competitiveness	C	2	2	1	3	2	1	2
Infrastructure	I	0.5	0.5	0.3333	1	0.5	0.3333	0.5
Established Departments	ED	1	1	0.5	2	1	0.5	1
Internet Access	IA	2	2	1	3	2	1	2
Inventions & Patents	IP	1	1	0.5	2	1	0.5	1

		LC	F	IC1	SS	EP	M	SDR	PS	IT
Labs collaboration	LC	1	1	0.5	1	2	2	1	2	1
Funded projects	F	1	1	0.5	1	2	2	1	2	1
Industrial collaborations	IC1	2	2	1	2	3	3	2	3	2
Specialized Staff (Industry)	SS	1	1	0.5	1	2	2	1	2	1
Educational programs	EP	0.5	0.5	0.333333	0.5	1	1	0.5	1	0.5
Multi-disciplinary teams	M	0.5	0.5	0.333333	0.5	1	1	0.5	1	0.5
System development & Retrofit	SDR	1	1	0.5	1	2	2	1	2	1
Promoting strategies	PS	0.5	0.5	0.333333	0.5	1	1	0.5	1	0.5
IT dependence	IT	1	1	0.5	1	2	2	1	2	1

		DG	WP	SD	SF	IC2
Domestic growth	DG	1	2	1	1	0.5
Worldwide popularity	WP	0.5	1	0.5	0.5	0.3333
Skill development	SD	1	2	1	1	0.5
Smart factories	SF	1	2	1	1	0.5
International collaborations	IC2	2	3.0003	2	2	1

		SI	IR	HI	EF
Security Issues	SI	1	2	1	1
Intangible roadmap	IR	0.5	1	0.5	0.5
Huge investments	HI	1	2	1	1
Employee fear & concern	EF	1	2	1	1

E2	W	E	C	I	ED	IA	IP
W	1	3	5	7	4	2	6
E	0.333333	1	3	5	2	0.5	4
C	0.2	0.333333	1	3	0.5	0.25	2
I	0.142857	0.2	0.3333	1	0.25	0.1667	0.5
ED	0.25	0.5	2	4	1	0.3333	3

IA	0.5	2	4	5.9988	3.0003	1	5		
IP	0.166667	0.25	0.5	2	0.333333	0.2	1		
	LC	F	IC1	SS	EP	M	SDR	PS	IT
LC	1	0.25	0.3333	0.5	2	1	3	0.3333	5
F	4	1	2	3	5	4	6	2	8
IC1	3.0003	0.5	1	2	4	3	5	1	7
SS	2	0.333333	0.5	1	3	2	4	0.5	6
EP	0.5	0.2	0.25	0.333333	1	0.5	2	0.25	4
M	1	0.25	0.333333	0.5	2	1	3	0.3333	5
SDR	0.333333	0.166667	0.2	0.25	0.5	0.333333	1	0.2	3
PS	3.0003	0.5	1	2	4	3.0003	5	1	7
IT	0.2	0.125	0.142857	0.166667	0.25	0.2	0.333333	0.142857	1
	DG	WP	SD	SF	IC2				
DG	1	2	3	4	0.5				
WP	0.5	1	2	3	0.3333				
SD	0.333333	0.5	1	2	0.25				
SF	0.25	0.333333	0.5	1	0.2				
IC2	2	3.0003	4	5	1				
	SI	IR	HI	EF					
SI	1	0.25	0.1667	1					
IR	4	1	0.3333	4					
HI	5.9988	3.0003	1	6					
EF	1	0.25	0.166667	1					

E3	W	E	C	I	ED	IA	IP		
W	1	1	3	5	5	2	7		
E	1	1	3	5	5	2	7		
C	0.333333	0.333333	1	3	3	0.5	5		
I	0.2	0.2	0.3333	1	1	0.25	3		
ED	0.2	0.2	0.333333	1	1	0.25	3		
IA	0.5	0.5	2	4	4	1	6		
IP	0.142857	0.142857	0.2	0.333333	0.333333	0.166667	1		
	LC	F	IC1	SS	EP	M	SDR	PS	IT
LC	1	0.25	0.25	2	0.25	2	0.3333	1	0.5
F	4	1	1	4	1	6	2	4	3
IC1	4	1	1	4	1	4	4	4	3
SS	0.5	0.25	0.25	1	0.25	3	0.3333	1	0.5
EP	4	1	1	4	1	6	2	4	3
M	0.5	0.166667	0.25	0.333333	0.166667	1	0.2	0.3333	0.25
SDR	3.0003	0.5	0.25	3.0003	0.5	5	1	3	2
PS	1	0.25	0.25	1	0.25	3.0003	0.333333	1	0.5
IT	2	0.333333	0.333333	2	0.333333	4	0.5	2	1
	DG	WP	SD	SF	IC2				
DG	1	0.25	0.25	1	1				
WP	4	1	1	4	4				
SD	4	1	1	4	4				
SF	1	0.25	0.25	1	1				
IC2	1	0.25	0.25	1	1				
	SI	IR	HI	EF					
SI	1	0.2	1	3					
IR	5	1	5	7					
HI	1	0.2	1	3					
EF	0.333333	0.142857	0.333333	1					

E4	W	E	C	I	ED	IA	IP		
W	1	2	3	1	1	1	2		
E	0.5	1	4	2	2	2	3		
C	0.333333	0.25	1	0.3333	0.3333	0.3333	0.5		
I	1	0.5	3.0003	1	1	1	2		
ED	1	0.5	3.0003	1	1	1	2		
IA	1	0.5	3.0003	1	1	1	2		
IP	0.5	0.333333	2	0.5	0.5	0.5	1		
	LC	F	IC1	SS	EP	M	SDR	PS	IT
LC	1	0.5	0.5	0.25	0.3333	0.5	0.5	0.5	0.25
F	2	1	1	0.3333	0.5	1	1	1	0.3333
IC1	2	1	1	0.3333	0.5	1	1	1	0.3333
SS	4	3.0003	3.0003	1	2	3	3	3	1
EP	3.0003	2	2	0.5	1	2	2	2	0.5
M	2	1	1	0.333333	0.5	1	1	1	0.3333
SDR	2	1	1	0.333333	0.5	1	1	1	0.3333
PS	2	1	1	0.333333	0.5	1	1	1	0.3333
IT	4	3.0003	3.0003	1	2	3.0003	3.0003	3.0003	1
	DG	WP	SD	SF	IC2				
DG	1	0.25	0.3333	0.5	0.25				
WP	4	1	2	3	1				
SD	3.0003	0.5	1	2	0.5				
SF	2	0.333333	0.5	1	0.3333				
IC2	4	1	2	3.0003	1				
	SI	IR	HI	EF					
SI	1	1	2	2					
IR	1	1	2	2					
HI	0.5	0.5	1	1					
EF	0.5	0.5	1	1					

S4. Computation of CR (Expert - E1 and Matrix - Strength)

E1/Strength

	W	E	C	I	ED	IA	IP	Product	nth root	Eigen vector	Aw	λ	
W	1	1	0.5	2	1	0.5	1	0.5	0.9057	0.1193	0.8357	7.0053	
E	1	1	0.5	2	1	0.5	1	0.5	0.9057	0.1193	0.8357	7.0053	
C	2	2	1	3	2	1	2	48	1.7388	0.2290	1.6067	7.0151	
I	0.5	0.5	0.3333	1	0.5	0.3333	0.5	0.0069	0.4915	0.0647	0.4560	7.0433	
ED	1	1	0.5	2	1	0.5	1	0.5	0.9057	0.1193	0.8357	7.0053	
IA	2	2	1	3	2	1	2	48	1.7388	0.2290	1.6067	7.0151	
IP	1	1	0.5	2	1	0.5	1	0.5	0.9057	0.1193	0.8357	7.0053	
									7.5919		λmax	7.0135	
											CI	0.0023	
											CR	0.0017	0.17

Calculation steps –

- For each row (R), compute the m^{th} root

  R1 = $(1x1x0.5x2x1x0.5x1)^{1/7}$ = 0.9057 (m = number of factors =7)

R2 = $(1x1x0.5x2x1x0.5x1)^{1/7}$ = 0.9057

R3 = $(2x2x1x3x2x1x2)^{1/7}$ = 1.7388

R4 = $(0.5x0.5x0.3333x1x0.5x0.3333x0.5)^{1/7}$ = 0.4915

R5 = $(1x1x0.5x2x1x0.5x1)^{1/7}$ = 0.9057

R3 = $(2x2x1x3x2x1x2)^{1/7}$ = 1.7388

R7 = $(1x1x0.5x2x1x0.5x1)^{1/7}$ = 0.9057

Sum(n)=0.9057+0.9057+1.7388+0.4915+0.9057+1.7388+0.9057

Sum(n)=7.5919

- Compute Eigen vector for each row

  R1 = 0.9057/Sum(n); R1 = 0.9057/7.5919 = 0.1193

  R2 = 0.9057/7.5919 = 0.1193

  R3 = 1.7388/7.5919 = 0.2290

  R4 = 0.4915/7.5919 = 0.0647

  R5 = 0.9057/7.5919 = 0.1193

  R6 = 1.7388/7.5919 = 0.2290

  R7 = 0.9057/7.5919 = 0.1193

- Compute Aw – Multiplying each row of decision matrix by column matrix (Eigen vector)

$$R1 = \begin{bmatrix} 1 & 1 & 0.5 & 2 & 1 & 0.5 & 1 \end{bmatrix} \begin{bmatrix} 0.1193 \\ 0.1193 \\ 0.2290 \\ 0.0647 \\ 0.1193 \\ 0.2290 \\ 0.1193 \end{bmatrix} = 0.8357$$

  Similarly, R2 = 0.8357; R3 = 1.6067; R4 = 0.4560; R5 = 0.8357; R6 = 1.6067; R7 = 0.8357

- Compute the values of λ (Aw/Eigen vector)

  $\lambda 1$ = 0.8357/0.1193 = 7.0053;

  $\lambda 2$ = 0.8357/0.1193 = 7.0053;

  $\lambda 3$= 1.6067/0.2290 = 7.0151;

  $\lambda 4$= 0.4560/0.0647 = 7.0433;

  $\lambda 5$= 0.8357/0.1193 = 7.0053;

  $\lambda 6$= 1.6067/0.2290 = 7.0151;

  $\lambda 7$ = 0.8357/0.1193 = 7.0053;

  λmax = (7.0053+7.0053+7.0151+7.0433+7.0053+7.0151+7.0053)/7 = 7.0135

- Estimate CI

  CI = (λmax – n)/(n-1) = (7.0135-7)/6 = 0.0023

- Compute CR

  CR = CI/RI = 0.0032/1.32 = 0.17

  Similarly, CR can be computed for other decision matrices.

S5. Computation of weights for each factor (Expert - E1 and Matrix - Strength)

E1

Iteration										
1				I1						
	W	1	1	0.5	2	1	0.5	1		
	E	1	1	0.5	2	1	0.5	1		
	C	2	2	1	3	2	1	2		
	I	0.5	0.5	0.3333	1	0.5	0.3333	0.5		
	ED	1	1	0.5	2	1	0.5	1		
	IA	2	2	1	3	2	1	2		
	IP	1	1	0.5	2	1	0.5	1		

				I2 = I1xI1					Column Sum (CS)	CS/RS
	W	7	7	3.6667	13	7	3.6666	7	48.33326667	0.1191
	E	7	7	3.6667	13	7	3.6666	7	48.33326667	0.1191
	C	13.5	13.5	7	25	13.5	6.9999	13.5	92.9999	0.2293
	I	3.8333	3.8333	2	6.9999	3.8333	1.99993	3.83327	26.33286667	0.0649
	ED	7	7	3.6667	13	7	3.6666	7	48.33326667	0.1191
	IA	13.5	13.5	7	25	13.5	6.9999	13.5	92.9999	0.2293
	IP	7	7	3.6667	13	7	3.6666	7	48.33326667	0.1191
								Row Sum (RS)	405.6657333	

2				I3 = I2xI2					Column Sum (CS)	CS/RS
	W	344.83	344.83	180	638.33	344.83	179.996	344.832	2377.6518	0.1192
	E	344.83	344.83	180	638.33	344.83	179.996	344.832	2377.6518	0.1192
	C	662.83	662.83	346	1227	662.83	345.993	662.83	4570.307367	0.2291
	I	188.16	188.16	98.22	348.326	188.16	98.2185	188.163	1297.414933	0.065
	ED	344.83	344.83	180	638.33	344.83	179.996	344.832	2377.6518	0.1192
	IA	662.83	662.83	346	1227	662.83	345.993	662.83	4570.307367	0.2291
	IP	344.83	344.83	180	638.33	344.83	179.996	344.832	2377.6518	0.1192
								Row Sum (RS)	19948.63687	

3				I4 = I3xI3					Column Sum (CS)	CS/RS

W	834361	834361	435532	1544525	834361	435525	834361	5753025.493	0.1192
E	834361	834361	435532	1544525	834361	435525	834361	5753025.493	0.1192
C	2E+06	2E+06	837179	2968883	2E+06	837165	1603807	11058452.44	0.2291
I	455285	455285	237656	842800	455285	237652	455285	3139248.518	0.065
ED	834361	834361	435532	1544525	834361	435525	834361	5753025.493	0.1192
IA	2E+06	2E+06	837179	2968883	2E+06	837165	1603807	11058452.44	0.2291
IP	834361	834361	435532	1544525	834361	435525	834361	5753025.493	0.1192
							Row Sum (RS)	48268255.37	

As shown in the above table that the values of CS/RS are same in iteration 2 and 3. Therefore, the values of CS/RS represent the weights for each "Strength" factors. Similarly, the weights for other Experts E2, E3, and E4 was estimated.

	Weights					Normalized weight (GM/Sum_{GM})
Factors	E1	E2	E3	E4	GM	
Willingness	0.1192	0.3543	0.2814	0.1959	0.2196	0.2380
Experts	0.1192	0.1587	0.2814	0.2300	0.1870	0.2027
Competitiveness	0.2291	0.0676	0.1200	0.0501	0.0982	0.1064
Infrastructure	0.0650	0.0312	0.0542	0.1479	0.0635	0.0688
Established departments	0.1192	0.1036	0.0542	0.1479	0.0998	0.1081
Internet access	0.2291	0.2399	0.1813	0.1479	0.1960	0.2124
Inventions and patents	0.1192	0.0448	0.0276	0.0801	0.0586	0.0635
Sum_{GM}					0.9227	

GM (Willingness) = $(0.1192 \times 0.3543 \times 0.2814 \times 0.1959)^{1/4}$ = 0.2196. Similarly, the GM for other factors can be estimated.

S6. Computation of Score for SWOT factors

The Value represents the mean of ratings by the respondents in the questionnaires. For the factor "Willingness" the value was 3.4177.

Weight estimated for "Willingness" by AHP was 0.2380.

Score computed for "Willingness" = 3.4177x 0.2380 = 0.8135

Similarly, the scores for the other "Strength" factors were obtained as in the following table. By adding the scores for each "Strength" factor, the score for the Strength group "S" was calculated as 3.4969. Similarly, the scores of other groups were also computed as W = 3.1433; O = 3.7229; and T = 3.3567. Finally, the differences of (S-W) and (O-T) were plotted in the SWOT diagram to obtain the strategic position.

SWOT factors	Value	Weight	Value*Weight

University willingness to support programs pertaining to Industry 4.0	3.4177	0.2380	0.8135
Presence of experts and staff to develop the specialized talents	3.2152	0.2027	0.6517
Availability of the infrastructure, mandatory to Industry 4.0	2.8987	0.0688	0.1995
Matured and well-established Computer science and Engineering departments	3.4051	0.1081	0.3681
Internet accessibility and speed within the university?	3.7975	0.2124	0.8064
Support to inventions and patent generations	3.6709	0.0635	0.2332
Digital transformation could improve competitiveness at the international stage	3.9873	0.1064	0.4244
			3.4969