**Appendix A**The number of DMUs in different organizational Posts, work experiment, education Posts and different Industry

Number of DM different organiposts		Number of different wo experiment organization	ork in the	Number of in different education		Number of companies in different industry		
Organizational Posts	Number of DMUs	Work experiment	Number of DMUs	Education	Number of DMUs	Industry	Number of companies	
Senior manager	3	< 5 years	5	Diploma	1	Mining	3	
Middle manager	17	5-10 years	15	Associate Degree	1	Cement	3	
Administrator	13	10-15 years	15	BSc	23	Medicine	10	
Internal auditor	4	15-20years	19	MSc	45	automotive	7	
Staff	37	> 20 years	20	PHD	4	Food	5	
						Metal (copper, aluminum)	4	
						Oil, Gas & petrochemical	9	
						Banking & Insurance	5	
						Machinery	5	
						Financial mediation	1	
						Agriculture & Computer	2	
						Textile & Tile	2	
						Wood & Paper	3	

**Appendix B**Results of sensitivity analysis for each factor

DMU	$M_{\epsilon}$	Re	Le	Αv	Pre	Fle	Sel	Te	Faı	Re	Cre	Kn	Co
$\square$	ınaş	por	arn.	vare	par	xib	f-0	amv	ılt-1	dun	eati	OW	mp
	gem	ting	ng	Awareness	edr.	Flexibility	rga <sub>l</sub>	Teamwork	tole	Redundancy	vity	ledg	etiti
	Management commitment	Reporting culture	Learning culture	Š	Preparedness	~	Self-organization	<b>×</b>	Fault-tolerant	ю	Creativity and innovation	Knowledge management	Competitiveness
	CO	ltur	ture				ıtio		7		d ir	nan	ıess
	mm	Ġ.					n				mo	age	01
	itm										vati	me	
	ent										on	nt	
1	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.55	0.60	0.60	0.60	0.60
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	1.00	1.00	1.00	1.00
3	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79
4	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.77
5	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
6	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.68	0.70	0.70	0.70	0.70	0.70
7	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
8	0.50	0.47	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
9	0.90	0.90	0.90	0.90	0.90	0.90	0.70	0.90	0.90	0.90	0.90	0.90	0.90
10	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.80	0.87	0.87	0.87	0.87	0.87
11	0.55	0.50	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
12	0.80	0.80	0.80	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
13	0.73	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
14	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
15	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
16	0.80	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.81	0.83	0.83	0.83	0.83
17	0.76	0.76	0.76	0.73	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
18	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.66	0.70	0.70	0.70	0.70
19	0.66	0.67	0.67	0.66	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
20	0.58	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
21	0.80	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00
23	0.80	0.87	0.87	0.84	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
24	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
25	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.91	0.93	0.93	0.93	0.93	0.93
26	0.84	0.92	0.92	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
27	0.80	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
28	0.80	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
29	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.80
30	0.90	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
31	0.80	0.82	0.82	0.80	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
33	0.85	0.82	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
34	0.63	0.75	0.75	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
35	0.76	0.86	0.86	0.84	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
36	0.92	0.92	0.92	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92

DMU	Management commitment	Reporting culture	Learning culture	Awareness	Preparedness	Flexibility	Self-organization	Teamwork	Fault-tolerant	Redundancy	Creativity and innovation	Knowledge management	Competitiveness
37	0.84	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
38	0.73	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
39	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95
41	0.92	0.94	0.94	0.90	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
42	0.84	0.92	0.92	0.92	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
43	0.75	0.90	0.90	0.89	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
44	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95
45	0.80	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
46	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.80	0.80	0.80	0.80
47	0.79	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.04
48	0.84	0.84	0.84	0.84	0.80	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
51	0.96	0.96	0.96	0.93	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
52 53	0.84	0.88	0.88	0.88	0.86	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
53	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
54	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.80	0.80	0.80	0.80	0.80	0.80
55 56	0.95 0.84	0.95 0.92	0.95 0.92	0.95 0.92	0.92 0.92	0.95 0.92	0.95 0.92	0.95 0.92	0.95 0.92	0.95 0.92	0.95 0.92	0.95 0.92	0.95 0.92
56 57	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
58	0.80	0.80	0.80	0.80	0.80	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
59	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.80	0.80	0.80	0.80	0.80	0.80
60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
61	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.90	0.90
62	0.80	0.87	0.87	0.86	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
63	0.76	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
64	0.80	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
66	0.84	0.92	0.92	0.92	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
67	0.89	0.93	0.93	0.93	0.91	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
68	0.90	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
70	0.53	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
71	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
72	0.80	0.96	0.96	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
73	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72
74	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.80

# **Appendix C**

## Questionnaire

## Management commitment:

1. Does your organization, in times of environmental and economic crisis show its continuous commitment to the values of the organization?

- 2. Do you think that the organization managers have the proper leadership capability in face of environmental and economic crisis?
- 3. Do higher managers commit lower managers to resolve the problems during the occurrence of crisis?
- 4. Do managers pay attention to safety program in strategies formulation?

## Reporting culture:

- 1. Do you always report your environmental and economic problems and issues to the managers/higher officials?
- 2. Do you speak with higher authorities about environmental and economic problems of different industries?
- 3. Does your organization follow economic problems of different industries in and out of the country and represent them in the form of a report?
- 4. Do manager encourage the employees for recognizing environmental and economic problems?

## Learning culture:

- 1. Has your organization learned from environmental and economic crisis of past years and used them for coping with upcoming crisis?
- 2. Do you receive necessary trainings for coping with environmental and economic crisis?
- 3. Are the plans of resistive economy presented in the form of manuals to the staff?
- 4. Can employees use a manual with past successful experiences of organization for future programing?

## Awareness:

- 1. Do you have a thorough understanding of your organization's relationships with other organizations/corporation?
- 2. Are you aware of the actions of government for the industry activity and the impact of these actions on your organization's performance?
- 3. Is your organization always informed about the terms of raw material suppliers?
- 4. Is your organization always informed about the terms of the markets in which products are supplied?
- 5. Do managers analysis their industry related issues continuously to have foresight of future crisis?

#### Preparedness:

- 1. Does your organization have necessary plans for coping with the condition that one of the central suppliers is unavailable?
- 2. Does your organization have the necessary plans for coping with conditions in which one of the main customers is unavailable?
- 3. is there sufficient planning for all that can support your organization in conditions of sanction or environmental and economic crisis?
- 4. Is there sufficient focus and preparation for responding to the disruptions made in sections of communication, transportation network, electricity, water, gas, etc.?

# Flexibility:

- 1. In the time of sanction or environmental and economic crisis, is there any necessary information about different paths and places?
- 2. Are the customers of your corporation's products limited to a number of companies and countries?
- 3. Are the customers of your corporation products limited to just few organizations and countries?
- 4. Does organization have enough source for unexpected cost or investment opportunities?
- 5. Can organization settle its debt timely?
- 6. Does organization change its strategic plan, production program and labor structure Coordinated by environment changes?

## Self-organization:

1. If the managers are unavailable in conditions that the organization is faced with a crisis, are there any other qualified individuals that are able to make decisions?

2. In critical conditions in which time has a fundamental role in decision making, can qualified units make decisions without going through chain of commands (hierarchy)?

#### Teamwork:

- 1. Does your organization cooperate with other related organizations for managing economic shocks and challenges?
- 2. Does your organization continuously consult and cooperate with its suppliers for managing disruptions and economic shocks?
- 3. Does your organization continuously consult and cooperate with its customers for managing disruptions and environmental or economic shocks?

## Fault-tolerance:

- 1. If the required raw materials are supplied in a level less than normal, is your organization able to continue its production in an acceptable level?
- 2. If some sections of the organization such as marketing and sales are not able to find a proper market for some products, is the whole organization able to continue its work with an acceptable condition? Redundancy:
- 1. If one of the main markets for distributing products encounters a problem, is there any alternative market for it?
- 2. If one of the secondary distribution markets faced with a problem, is there any alternative market for it?
- 3. Does your organization/cooperation, in times of environmental or economic crisis, have some agreements with other corporations for using their resources?
- 4. Does your organization have alternative option when it loses main employees or facing resource shortage?

# Creativity and innovation

- 1. Is investment in research and development program or being innovated in your organization, important?
- 2. How much does your Organizational culture persuade employees to innovative methods?
- 3. Is learning and using the newest finding in IT in your organization, important even crisis period?
- 4. Does your organization consider being innovate and creative in crisis period?

## Knowledge management

- 1. Is there Knowledge sharing culture in your organization?
- 2. Is there a mechanism in your organization for changing individual knowledge and skill to collective knowledge and skills?
- 3. Does your manager think about creating a database for sharing organizational knowledge with other organizations?

## Competiveness

- 1. Does your organization consider competiveness analyzing in strategies formulation?
- 2. Does your organization consider competiveness analyzing (bargaining power of suppliers, bargaining power of customers, threat of substitutes, threat new entrants) in crisis period in particular?