



MEASURING ORGANIZATIONAL RESILIENCE: A SCALE DEVELOPMENT

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ABSTRACT

Today's business context is characterized by hyper competition, uncertainty, and ambiguity. Added to this is the unfortunate increase in the occurrence and the intensity of the natural disasters and crises situations including economic, political and social events. Accordingly, all the changes in the external environment amplified the significance of 'resilience' for all organizations. Resilient individuals and organizations positively adapt to changing conditions without showing any stress (Mallak, 1998), and thus today organizations desire to be resilient to easily adapt to changing circumstances and move forward. Organizational resilience term is highly adopted in organizational theory field and specifically in crisis management and disaster management literatures, and recently in strategic management literature. Yet, there is not an agreed upon and commonly accepted scale of organizational resilience. Accordingly, the organizational resilience literature is yet to develop regarding quantitative studies. This study attempts to fill this gap by developing a reliable and valid scale of organizational resilience construct through adopting both qualitative and quantitative methods.

JEL Classification

M00,M10

1.INTRODUCTION

In today's business context, organizations are faced with increased level of pressure from external environment due to rapidly changing business circumstances. The competition intensifies each day and there is increased occurrence of crisis and disaster situations. In such a context, resilience has become a high concern for both practitioners and academicians. The concept of resilience is rooted in psychology and ecology literature. In the management literature, the concept is mostly adopted in crisis and disaster management studies. With the increased level of uncertainty in the external environment, resilience also started to become a central concern in strategic management literature as an important concept for organizations to ensure continuity, sustainability and future success. Accordingly, organizational theory, strategic management, organizational behavior and human resources management literatures progressively focused on resilience at the organizational level. The studies mostly concentrated on conceptualizing the resilience term at the organizational level and analyzing its relationships with both internal and external factors. While practitioner, theoretical and qualitative studies abound in the literature, the quantitative studies are at the early stages of their

development. This is mostly due to the non-existence of a reliable and valid scale measuring organizational resilience. This paper attempts to fill this gap by developing an organizational resilience scale. It aims to contribute to organizational resilience literature by developing a reliable and valid measure for future development of quantitative studies.

2.LITERATURE REVIEW

The term 'resilience' is adopted in organizational studies, human resources management and engineering literatures but it is mainly rooted in the psychology and ecology field. In the studies by Werner and Smith (1977) conducted among children whose parents were suffering from severe psychological illnesses, psychological resilience was found to be the basic reason behind children's survival. The resilience capacity of these children enabled them to enhance their adaptive capacity in order to survive (Werner and Smith, 2001). With this capacity they resist to unfavorable circumstances, and develop positive reactions in order to carry on (Werner and Smith, 2001). In the psychology literature, resilience is mainly defined as the positive adaptation capacity to struggle with unfavorable circumstances. According to the literature review conducted by Luthar et al. (2000) the studies on how to dimensionalize and measure psychological resilience are still developing. In the ecology literature, at the early stages the field concentrated on sustainability and resistance of the ecosystems against stressful conditions (Holling, 1973). In recent years, the ecological studies focused more on the adaptive capacity and the flexibility of the systems (Redman and Kinzig, 2003). When the term is analyzed in these two literatures, it can be concluded that in the field of psychology the term is mostly perceived as the positive adaptive capacity of individuals experiencing adverse conditions, while in the field of ecology the term is mostly perceived as the resistance and flexibility capacity of the systems to ensure sustainability.

In organizational theory literature, resilience term is studied in crisis management, disaster management, high-reliability organizations and positive organizational scholarship literatures (Weick, 1993; Weick, Sutcliffe and Obstfeld, 1999; Tierney, 2003; Paton and Johnson, 2001). Kenda and Wachtendorf (2003), in their studies when they analyzed the World Trade Organization disaster, defined resilience as to withstand against shocks without showing any disintegration. In studying 1993 Mann Gulch fire disaster, Weick (1993) states that resilience is not only about accepting the change and ambiguity and trying to continue but also it is about turning this unfavorable condition into an advantage and finding ways to deal with it. Accordingly, Weick (1993) suggests that resilience is more than adaptation but it is also about being solution oriented, creative and proactive. Additional to crisis and disaster management literatures, with increased uncertainty and ambiguity in the external competitive, political and social conditions, 'organizational resilience' term started to be mentioned by several authors in organizational studies field

(Doe, 1994; Horne, 1997; Horne and Orr, 1998; Mallak, 1998; Mallak 1999). The studies mainly defined organizational resilience term, as the resistance capacity of the organizations to withstand against unfavorable and stressful conditions, as the capacity of the organizations to preserve their position and as the capacity to benefit from unfavorable conditions and to benefit from them.

More recent literature, focused on understanding organizational resilience in terms of its relationship with organizational variables to enhance success (Lengnick-Hall, Beck, and Lengnick-Hall, 2011; Teixeira and Werther, 2013; Richter and Löfsten, 2014). In their theoretical study, Lengnick-Hall (2011) studies human resources management system as a factor influencing organizational capacity for resilience. The authors define organizational resilience with three dimensions of cognitive, behavioral and contextual. Teixeira and Werther (2013) in their qualitative study analyzes resilience as a factor enhancing competitive advantage and concludes that resilient organizations not only have reactive and proactive innovations but also anticipatory innovations where buyer preferences are anticipated and innovations are developed accordingly. Limnios, Mazzarol, Ghadouani and Schilizzi (2014), suggests that the literature perceives resilience as a positive state that every organizational aims to achieve. The authors develop a framework with quadrants of rigidity, transience, adaptability and vulnerability and concludes that the desirability of resilience varies depending on the characteristics of the quadrant. The concept of resilience also started to be a major focus of discussion in small and medium sized companies literature, considering the importance of the term especially after economic crisis situations (Aleksic, Stefanovic, Arsovski and Tadic, 2013; Pal, Torstensson and Mattila, 2014).

Despite the growing interest on the term, there is not an agreed upon and widely accepted measure of organizational resilience construct. Campbell-Sills and Stein (2007) states that, in the psychology literature there is a consensus on the reliability and validity of the Conner-Davidson measure. In organizational theory literature, there are attempts to analyze the construct with different dimensions. Hind and Rowley (1996) studies the term with dimensions of change capacity, organizational commitment, social relationships, team integrity and reality perception. Mallak (1998) with the aim to dimensionalize the construct and to measure it, studies organizational resilience under six dimensions of goal-directed solution seeking, avoidance, critical understanding, role dependence, source reliance, resource access and develops a scale. Somers (2009) adopts the scale developed by Mallak (1998) and proves that the scale is reliable and valid. Tierney (2003) also dimensionalizes the construct with four dimensions of robustness, redundancy, resourcefulness and rapidity. Adopting this dimensions Wicker, Filo and Cuskelly (2013) generates 21 items to measure organizational resilience of sport clubs. Richter and Löfsten (2014) studies the capacity for organizational resilience with four dimensions of structural, cognitive, relational and emotional capacity and adopts 14 items to measure this capacity. Yilmaz-Börekçi, Say and Rofcanin (2014) attempts to develop a scale to measure supplier resilience with three dimensions of structural reliance, organizational capability and processual continuity. The literature review suggests that while there are attempts to measure organizational resilience there is not any consensus on how to measure organizational resilience.

Overall, organizational resilience term is highly adopted in organizational studies and strategic management literature. While the qualitative and theoretical studies are developing, the development in the quantitative studies are relatively slow. This is mainly attributed to the non-existence of reliable and valid scale in the literature (Vogus and

Sutcliffe, 2007). Accordingly, this study attempts to fill this gap by developing a scale to measure organization resilience. As suggested by the review of Kantur ve İseri-Say (2012), most of the conceptualizations and corresponding scales of organizational resilience includes items that *enhance* resilience capacity of the organizations.

This study accepts that there are external and internal factors that will contribute to the resilience of organizations and the existence of those factors may stimulate resiliency in the organizations. This study aims to develop an organizational resilience scale measuring the degree of resilience in the organization not the degree of the existence of the factors that contribute to it. With this aim, this study aims to contribute to organizational resilience literature by enabling development in quantitative studies focusing on antecedents and consequences of organizational resilience in organizational settings.

3.METHODOLOGY

This study aims to develop a scale to measure resilience at the organizational level. With this aim, the study adopts both qualitative and quantitative methodology as suggested by Churchill (1979). After reviewing the current scales in the literature, first in-depth interviews and a focus group study are conducted as part of qualitative research for item generation. Second, questionnaire is developed and scale is assessed for reliability and validity with two different samples. Overall, the study aims to contribute to the literature by developing a reliable and valid scale for measuring resilience at the organizational level.

4. RESULTS

4.1. Item Generation

The literature review suggests that there is not an agreed upon and commonly accepted conceptualization of resilience at the organizational level. Accordingly, in order to dimensionalize the construct and develop the conceptual model of the study in-depth interviews and focus group studies are conducted. According to Bryman (1988) and Denzin and Lincoln (2000), in-depth interviews and focus groups studies as a qualitative approaches enable the researcher to attain a deeper information about the field. Accordingly, as part of qualitative research ten in-depth interviews and one focus group study is conducted.

The in-depth interviews were semi-structured in order to ensure that the participants feel comfortable to share their views and to achieve flexibility. Accordingly, an interview protocol is developed but served as a checklist during the interviews. The questions are asked by the interviewer to start the discussions and then the participants are allowed to elaborate on the topic. All the interviews started with 'What does resilience mean to you generally?' question and then followed with questions concentrating on the meaning of resilience in organizational settings. The researcher acted as an interviewer in each in-depth interview.

All the semi-structured in-depth interviews are conducted between 3 December 2012-11 February 2013. The interview time ranged between 25-75 minutes and the average

interview time is 45 minutes. In order to ensure to diversity of findings, the participants are selected from a heterogeneous group with different industry backgrounds and different managerial positions. All the discussions were tape recorded and then transcribed. Appendix 1 provides information on the age, gender, industry, company, position and tenure details of the participants. The appendix also includes the highly frequently mentioned items by the participants.

Additional to semi-structured in-depth interviews one focus group study is conducted. The focus group participants are graduate school students of a private university. According to Morgan (1997), the number focus group participants should range between 8-12. In the current focus group study, eight students participated. The tenure of the participants ranged between one to five year and the positions included assistant, specialist, and assistant manager. The researcher acted as the moderator and started the discussions by asking the participants their opinion about the general meaning of resilience. The discussions then concentrated on resilience at the organizational level. The participants were classmates so the environment was relaxed which ensured the depth of the discussions. In cases where one or two participants dominated the discussions the moderator intervened and ensured that other participants also shared their ideas. As in in-depth interviews all the discussions were tape-recorded and then transcribed.

Data collection is ended when the saturation is achieved. Zimmer and Golden (1988)'s procedure is adopted in analyzing the data. In order to content analyze the transcriptions data reduction method is adopted (Griggs, 1987) where the transcriptions are quantified in numbers and frequencies are calculated. The content analysis is first conducted separately for each in-depth interview and focus groups study. Then all the results are consolidated. Table 1 included the results of content analysis. In conclusion, it is observed that top three frequently mentioned items are financial power, developing a B plan and to be powerful.

Table 1. Content analysis results

Items Generated	Frequency	Items Generated	Frequency
Financial strength	57	To stand straight / to be sapient	9
Developing a B plan	43	Secure/ to resist/ resistant	9
To be powerful	32	To be prepared against risks	8
Human strength	21	Not being effected	8
To show resistance	19	To be prepared	8
To control the risks	17	To take action rapidly	8
To act as a whole	16	Not to give up	7

Employee loyalty	11	To be able to revitalize	6
Integrity	11	To keep going	6
To be experiences	11	To turn into an opportunity	5
To be prepared/to be cautious	11	To be creative	5
Employees being knit	10	Resistance strength	3
To keep the control at hand	10	Powerful management structure	2

Following content analysis, the previous scales developed in the literature are analyzed again to develop initial version of the scale. Specifically the scale developed by Mallak (1998) and Tierney (2003) is focused on. Mallak (1998) develops the scale under six dimensions of goal-directed solution seeking, avoidance, critical understanding, role dependence, source reliance, resource access. On the other hand, Tierney (2003) defines it under dimensions of robustness, redundancy, resourcefulness and rapidity. By analyzing dimensions generated by these authors and comparing them with content analysis results the organizational resilience scale is developed. Overall, organizational resilience construct is initially dimensionalized under six dimensions of robustness, integrity, agility, resistance, proactivity and precaution with 23 items.

4.2. Scale Purification

The developed scale then analyzed by two assistant professors participated in in-depth interviews. Based on their feedback item 15 and item 5 are eliminated due to clarity of the meaning and close overlap with different other items (respectively item 18 and item 7) in the scale. Accordingly, in order to test for reliability and validity a questionnaire is developed with 21 items. The questionnaire adopts Likert scale (1=strongly disagree to 5=strongly agree) questions. The respondents are asked to indicate their level of agreement with statements about their organization. The questionnaires are distributed to graduate school students in two different private universities during March 2013. At the end of the data collection period 73 questionnaires are collected. In order to assess the dimensionality of the construct first exploratory factor analysis is conducted using Principal components analysis with Varimax rotation. The initial results revealed that the use exploratory factor analysis is proper with a significant The Bartlett's test of Sphericity and the Kaiser-Meyer-Olkin estimate of .895. Contrary to expected the analysis revealed three dimensions with eigenvalues greater than one. In total these three dimensions of *robustness, agility and integrity* explained 66% of the total variance in the data. For item purification item loadings are analyzed. The items with below .70 loadings and items that cross-load on multiple dimensions are eliminated from the scale. Overall, 12-item loading on three dimensional organizational resilience scale has an acceptable Cronbach's alpha value (.92). Items generated and their corresponding loadings are available in Appendix 2.

4.3. Scale Validation

In order to assess the validity of the developed scale, one week later a new questionnaire is distributed to same respondents using a ratio scale. This time the respondents are asked to indicate the existence of the items mentioned in the scale by giving values between 0 to 100. At the end of the data collection procedure 59 questionnaires are collected. At the end of the second data collection period Multi-Trait Multi-Method (MTMM) (Campbell and Fiske, 1959) is developed and the scale is tested for reliability and validity (see Table 2). To assess reliability first the longest diagonal of the MTMM is analyzed which involved Cronbach alpha values. The matrix shows that all the values are at acceptable levels which indicated that the scale is a reliable scale. To assess construct validity, both convergent validity and discriminant validity is evaluated. To assess convergent validity, validity diagonal values which shows the measurement results of the same dimensions with different methods are evaluated. The results are at acceptable levels. There are three requirements of discriminant validity as suggested by Campbell and Fiske, 1959. First, the validity values in the validity diagonal should be greater than the values sharing same rows and columns with them in the same hetero-method blocks. Second, the validity values should be greater than the values in hetero-trait mono-method triangles. Third, the distribution in both hetero-trait hetero-method triangles and hetero-trait mono-method triangles should follow the same pattern. When the matrix values are analyzed, it is observed that first and second requirement is achieved while the third requirement for discriminant validity is partly achieved. Overall, the developed scale is found to have acceptable reliability and validity values. When the Cronbach alpha values are analyzed

separately for both methods, the 12-item organizational resilience scale has an estimate of 0,92 for interval scale, and an estimate of 0,96 for ratio scale.

Table 2. Multi-Trait Multi-Method Matrix (MTMM)^c

MTMM		Method 1 (Interval scale)			Method 2 (Ratio scale)		
		Robustness	Agility	Integrity	Robustness	Agility	Integrity
Method 1	Robustness	0,912 ^a					
	Agility	0,558	0,925 ^a				
	Integrity	0,343	0,401	0,767 ^a			
Method 2	Robustness	0,713 ^b	0,544	0,530	0,954 ^a		
	Agility	0,617	0,787 ^b	0,417	0,797	0,922 ^a	
	Integrity	0,566	0,514	0,641 ^b	0,734	0,673	0,875 ^a

a = reliability values; b = validity values; c = Correlations are significant at 0.01 level.

4.4. Scale Revalidation

In order to reassess the reliability and validity of the developed scale new data is collected. The sample is selected from firms operating in İstanbul Manifaturaçılar Çarşısı (İMÇ). İMÇ is one of the oldest marketplace of Turkey since 1970. There are cluster of small and medium sized companies operating in diversified industries. This sample is selected mainly because of three reasons. Firstly, these companies are perceived to be resilient family business operating for long years. Secondly, considering the toughness of collecting firm-level data in the national context, it is considered more likely to reach a larger number of firms. Thirdly, considering that Turkish economy is dominated by small and medium size enterprises, it is more meaningful to validate a scale with a sample representative of the whole population. The questionnaires are developed with Likert scale and respondents were asked their agreement with resilience statement (1=strongly disagree to 5= strongly agree). The data is collected by face to face between September 2013- November 2014. The questionnaires are distributed to the firms and the respondents are given ample time for them answer the questions. At the end of the data collection 188 questionnaires are collected. 32 of the firms operate in home textile industry, 28% of the firms operate in machine and replacement parts industry , 18% of the firms operate in textile industry, 15% firms operate in music industry , 4% of the firms operate in carpet industry and %3 of the firms operate in decoration industry. 43% of the participants are firm owners, 22% of the participants are store managers, %33 of them are sales representatives and %2 are accountants. Approximately 57% of the firms are family businesses. 31% of the firms are operated by the first-generation, 58% of the firms are

operated by the second-generation and lastly 11% of the firms are operated by the third-generation.

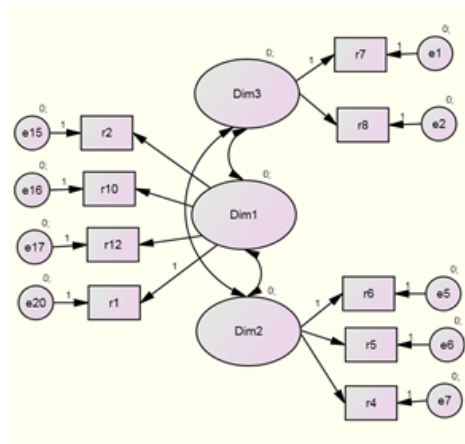
First exploratory factor analysis is conducted with the new data using Principal components analysis with Varimax rotation. The Bartlett's test of Sphericity is significant with Kaiser-Meyer-Olkin estimate of .86. The analysis produced three dimensions explaining the 66% of the variation. Three items have loadings below .70 and therefore excluded from the analysis. When the results are compared with exploratory factors analysis results of the first data it is observed that items deleted in the current stage were loading on the same dimension and they were all related to strength/power of the business. Overall, 9-item organizational resilience scale has Cronbach's alpha value of .85. The results of exploratory factor analysis are available in Table 3.

Table 3. Exploratory Factor Analysis Results

Item no	My organization...	Dimension 1	Dimension 2	Dimension 3
1	stands straight and preserves its position.	.773		
2	is successful in generating diverse solutions.	.768		
3	has the strength to use required resources.	.517 (deleted)		
4	rapidly takes action.		.628	
5	develops alternatives in order to benefit from negative circumstances.		.802	
6	is agile in taking required action when needed.		.724	
7	is a place where all the employees engaged to do what is required from them.			.774
8	is successful in acting as a whole with all of its employees.			.891
9	is a powerful organization and not easily affected by outside factors.		.524 (deleted)	
10	shows resistance to the end in order not to lose.	.727		
11	is powerful to overcome everything.			.524 (deleted)
12	does not give up and continues its path.	.703		

Next to revalidate the scale Confirmatory Factor Analysis (CFA) is conducted (see Fig. 1). The measurement model had a significant chi-square statistic [$\chi^2_{(24)} = 59$] as expected due to the sample size. When the indices are analyzed it is observed that they are acceptable levels. Comparative fit index (CFI) is .95, Normed fit index (NFI) is .92, and the root mean square error of approximation (RMSEA) is .8. When standardized item loadings are analyzed (see Table 4) it is observed that all items significantly load on their dimensions. To scale is accepted to have convergent validity since all the items significantly load to their respective dimensions. To assess discriminant validity, average variance extracted (AVE) is computed for each dimension and compared with squared correlations and the results show that they are significantly higher for each dimension. Table 5 shows AVE values and descriptive statistics.

Fig. 1. Measurement Model



Overall, the analysis confirmed the three-dimensional structure of organizational resilience construct. The robustness dimensions included items aiming to measure the resistance capacity of the firms. Agility dimension includes items assessing how easily and rapidly firms adapt to changing circumstances and lastly integrity dimensions measures the extent to which employees are knit together in the firm.

Table 4. Standardized Item Loadings

Item no	Item	Dimension	Standardized Loadings
1	stands straight and preserves its position.	robustness	.633***
2	is successful in generating diverse solutions.	robustness	.610***
4	rapidly takes action.	agility	.688***
5	develops alternatives in order to benefit from negative circumstances.	agility	.544***
6	is agile in taking required action when needed.	agility	.802***
7	is a place where all the employees engaged to do what is required from them.	integrity	.900***
8	is successful in acting as a whole with all of its employees.	integrity	.819***
10	shows resistance to the end in order not to lose.	robustness	.814***
12	does not give up and continues its path.	robustness	.853***

***p<.01 (one-tailed tests)

Table 5: Descriptive Statistics

	AVE	Mean	S.D.	1	2	3
Robustness	.83	4.3	.59	.82 ^a		
Agility	.86	4.0	.63	.64**	.73	
Integrity	.94	4.3	.75	.51**	.65**	.85

^a Values on the diagonal are Cronbach's alpha values.

** p<.01 (one-tailed tests).

5. CONCLUSION

This study adopts both qualitative and quantitative research methods with the aim to measure organizational resilience. As part of qualitative methodology in-depth interviews and focus group studies are conducted. Based on the content analysis results of the qualitative phase, items are generated and questionnaire is developed to test for reliability and validity. As part of quantitative study, data is collected from the same respondents with two different methods and the scale is tested for reliability and validity. The results showed that organizational resilience construct is dimensionalized with three dimensions of robustness, agility and integrity, and the develop scale has acceptable reliability. To assess construct validity Multitrait-Multimethod Matrix (MTMM) developed and scale produced acceptable convergent and discriminant validity. In order to revalidate the scale new data is collected and confirmatory factor analysis is conducted. Overall, the results showed that 9-item organizational resilience scale developed in the current study is a reliable and valid scale.

Organizational resilience scale developed in the current study has a three dimensional structure. The first dimension is robustness includes four items and measure the organizations capacity to withstand against and recover form unfavorable conditions. Second dimension agility includes three items and measure organizations capacity to take actions rapidly. Lastly, integrity dimension includes three items and measures the cohesion among employees in the organization faced with unfavorable circumstances. In conclusion, the scale developed in the current study aims to contribute to the development of quantitative studies in the organizational resilience research through developing a reliable and valid scale. Future research is needed to revalidate the scale with diverse set of samples such large-sized organizations, non-for-profit organizations and public institutions.

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Appendix 1: Participants of in-depth interview

No	Age	Gender	Industry	Company	Position	Tenure	Items*
1	60	female	chemistry	Holding Company Large-sized	Chief	28	To resist, to hold out against, to be powerful, financial strength
2	60	male	plastics	Holding Company	Assistant to manager	27	Human strength, financial strength, to countervail
3	50	female	automotive	Multinational Company Large-sized	Manager	15	To be prepared, financial strength, to be cautious
4	34	female	academician	Private University, Management Department	Assistant Professor	10	To be prepared with a B plan, to stand straight, to be impervious
5	27	female	law	Law Consultancy, Medium-sized	Lawyer	2	Strength, integrity, revitalization capacity
6	32	female	academician	Public University, Marketing Department	Assistant Professor	10	To be powerful, loyal employees, engagement
7	40	male	textile	International Trade Company, Small-sized	Owner	12	Human strength, financial strength, to take action rapidly
8	51	male	textile	Holding Company Large-sized	Assistant General Manager	18	Minimizing risk, generating alternatives, to be prepared
9	58	male	food	Restaurant owner, Small-sized	Owner	38	To act as a whole, not to give up, to stand straight
10	52	female	banking	Private Bank, Small-sized	Assistant to manager	25	To be powerful, to show resistance, to continue

*Items include top three frequently mentioned items by each participant

Appendix 2: Items generated

Item no	My organization...	Dimension 1	Dimension 2	Dimension 3
1	easily adopts to changing circumstances.		.644 (deleted)	
2	is a place where employees clearly know which resources to use and how to use them.			.483 (deleted)
3	stands straight and preserves its position.	.752		
4	is successful in generating diverse solutions.		.743	
5	is a place where team/department members share their responsibilities if needed.	(excluded from the analysis)		
6	has the strength to use required resources.	.744		
7	rapidly takes action.		.873	
8	develops alternatives in order to benefit from negative circumstances.		.753	
9	does not easily give up.	.660 (deleted)		
10	is agile in taking required action when needed.		.831	
11	has always-ready alternatives against possible scenarios.		.620	.408 (deleted)
12	is a place where all the employees engaged to do what is required from them.			.876
13	is a place where how to take action is always clear.			.520 (deleted)
14	never gives up and resist to different conditions.		.461	.468 (deleted)
15	takes action quickly.	(excluded from the analysis)		
16	turns circumstances to its benefit by acting creative and innovative.		.565	.430 (deleted)
17	is always prepared for every situation.	.567	.447	.440 (deleted)
18	is successful in acting as a whole with all of its employees.			.833
19	is a powerful organization and not easily affected by outside factors.	.775		
20	shows resistance to the end in order not to lose.	.723		
21	is powerful to overcome everything.	.841		
22	does not give up and continues its path.	.790		
23	easily overcomes everything.		.461	.468 (deleted)