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Prioritizing the Core Competencies by TOPSIS Method in Foolad Techniqe Co.

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ABSTRACT

Recognizing strength and weakness of organization and thereby, doing strategic planning based on them against opportunities and threats, can provide safety to organization in competitive environment. Due to sharing of major resources and assets that belong to competitor companies, each organization should understands its core competencies and base them as cores of gaining competitive advantage in order to catch profitability and go ahead. So, in this research we try to rank core competencies of Foolad Co. based on 7 indices by using TOPSIS method from Multi criteria decision methods. First, managers and supervisors measure 90 listed competencies according to relative power and strategic importance indices based on Saati spectrum, where 42 core competencies by higher than score 5 in all two indices, are extracted and then 45 members of experts, scored them according to 5 indices in another phase based on Saati spectrum. Then, total table includes 42 components and 7 indices along mean scores of each component in each index, considered as ranking base. From multi criteria decision methods, TOPSIS technique was selected according to experts' choice, and inter-weight of indices was computed using Shanon entropy method. TOPSIS method showed that based on 7 given indices, competencies of Foolad Technique Co. are prioritized as follows: 1-Creativity and thinking;2- R&D activity;3- Flexibility;4- Continuous quality ;5- Control;6- High level of organizational emotion- number of experts;7- Customer-relation management;8- Rapid response to environmental conditions and recognizing competitors;9- High-technology;10- Competency-based training;11- Attract/keeping customer;12- Forecasting- quality standards;13- Genius management- venturing;14- Invention patent;15- Organizational intelligence;16- Productivity- integration of dense organizational data ;17- Jo cycling-production diversity;18- Safe working;19- Fixing system;20- Business process alignment-trained personnel- sense organizational dependency;21- value chain management;22- recommendation system;23- information system flexibility;24- timely production;25- data production;26- coaching- Six sigma method running;27- desired market share;28- financial power;29- personnel loyalty;30- providers' technical knowledge.

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1. Introduction

As today' organizations are faced to some challenges "such as lack of knowledge about core competencies, lack of proper tools to recognize capabilities, low productivity due to lack of proportion between decisions and organizational competencies, emphasize on non-competition cores in organization, cost and time expending in non-competitive areas, lack of tools to detect capabilities which provide core competencies, lack of alignment between strategies and capabilities and competitive advantage factors and not to focus on capabilities and competencies that result to reaching competitive advantage" in order to attain competitive advantages, so organization can easily contrast this challenge ,through recognizing and ranking core competencies.

Background

Ramazani(2008), in a research titled" human resources training based on competency and approach of formulating competencies" state that recognize and fostering competencies and human power capabilities have a determinant role in sustain and surviving an organization in a competitive environment and any neglecting regard to these capabilities and competencies of human power considered as strategic resources and knowledge capitals can result in competitive score deposition. So, organizations that have systematic plan for deploying intangible assets and capitals certainly can provide more values for costumers, where this plan is one of the approaches for deploying capacities and capabilities of human resources toward value creation "competency-based training".[14]

Ja-Shen Chen, et al. (2012) in a research titled "Functional effects of information technology abilities, innovation of services processes, and role of customer-service intermediaries" in study on 174 Taiwan companies deviated from industry of information technology, show that management innovations should serve to developing abilities and innovation of service processes to facilitate costumers-service toward achieve better and higher function.[10]

Aron O'Cass, et al. (2012) in a research titled "establish superior customer value for company through abilities of supplier companies" say that market-orientation is not sufficient for create value and raising market advantage by itself but is effective in establishing competitive

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advantage, market orientation, innovation and marketing abilities and express that capability of marketing innovation for intermediation is creating relation between market orientation and value creation.[5]

Awie Vlok (2012) in a research titled "Representing specifications of leadership for innovative leaders in organization of research based on science and innovation in South Africa" provide competence profile by creating a list of leader features that cause to innovation and invention.[7]

Elena García-Barriocanal, et al (2012) in a research titled "organizational model of capacity beside competence computation", by presenting a cognitive and extendable model of job status and analysis method for competence gap, also personnel knowledge, states that flexibility belongs to organizational assets that effect on competence and capacities of organization.[11]

Ana Lisboa, et al. (2010) in a research titled "Innovation abilities: stimulus and their effects on current and future performance" by study on records and results of innovative capability, introduce it as a factor of increasing performance, current and future export.[4]

Ram Mudambi, et al (2011) in a research titled "knowledge leverage through total area: new boundary in international business" state that reaching innovation systems are effective for sharing knowledge and merging them to create new competencies. Managers in functional levels should consider merging knowledge from different Geographical places, technology and private networks.[15]

Rossitza Rousseva (2010) in a research titled "need to scrutinize software development activities and technical abilities" believe that software development activities are company windows toward opportunities and analyzing needs computable technical abilities. Then, they describe details in order to understand complexities in software industry.[16]

Andreas Größler (2010) in a research titled " mobility model of heuristic model from strategic abilities in manufacturing", investigate processes full of strategic abilities such as costs, quality, fast delivery and flexibility, with design, identification method and heuristic approach of a dynamic model based on hierarchical way of accumulated abilities to test resource assigning strategy to strategic abilities.[6]

Jose et al(2010) ، in a research titled " Regulator role of technology abilities: competitive strategies and company performance", regarding to 253 Spain Information technology companies, regulate relation between competitive strategies and technology abilities and performance, and believe that technologic abilities are effective on high performance quality and achieving competitive advantage.[9]

Akgun et al(2009)، in a research titled " experimental analysis: organizational sentiment, abilities, product and innovation process and company performance", through study on 163 Turkey company show that encouraging company and enhancing sentiment abilities can result to product innovation ability and thereby, increasing financial power.[21]

2. Theoretical resources of research

2.1. Competency and Core Competency

Core competencies are resources and capabilities that provide organization with competitive advantage. Relative stable circumstances of market that are due to innovation, competitors variety, and revolutionary changes of technology, cause to core capabilities and competencies considered as a base for strategic plans of organization. In other words, if combination of resources and valuable capabilities in organization was costly to mimic and they are without substitute, then we can determine them as core competency.

By increasing core competency of an organization, it would be possible to exploits from more opportunities for that environment. The success factor of an organization is the balance between capabilities and competencies.

2.2. Competitive Advantage

Competitive advantage is a number of core competencies that distinct organization from other competitors.(Ahmadi et al.2001) .[3] Approaches to gaining competitive advantage. There are three approaches regarding to gain competitive advantage: asset-process-function approach, capability-base approach, market-base approach. In the first one, competitiveness includes a mix of assets and processes. Second approach regards to effect of organization local factors on competitive power include financial, technologic and human inputs. Third approach recommends that business should be costumer-oriented, market-oriented, innovative and entrepreneur and tend to learning (sayyed Javadayn et al.2009).

It should be noted that competitive advantageous also can be stable for a long time. Resources which have potential of creating stable competitive advantage, should be rare, non-copy, irreplaceable and sustainable (Barney et al.,1995).[8] In the questionnaire of this research, these five indicators are considered as scoring criteria for components(based on Hamel & Perahalad model 1990).[13]

2.3. Capabilities

Capability: business skills toward resources coordination and productive use of them and organization ability to change and accept financial, technologic and strategic changes.

Capability is the needed skill to achieve perfect advantage from available resources. According to Ulrich(1987) ،,capability is skill of resource coordination and productive use and ability for change and accept financial ,technologic and strategic changes. There is any consistency from viewpoint of this definition about capabilities and competencies and differentiate them is not a simple task (Teece et al ، 1997).[18]

If put together business's assets and capabilities then we can achieve business competencies (Wheelen & Hunger2000 ،). [19]

International Journal of Economy, Management and Social Sciences, 2(6) June 2013

Core competencies: A class of competencies that solely belongs to organization and could not be imitated (ahmadi et al,2001).[3]

Firm can meet basic business competencies and when it done better than competitors, called differentiate (core) competencies that we can divide it into two groups. Implicit competencies that include mental learning during task, explicit competencies that encompass organizational laws, behavioral codes and written knowledge resources

2.4. Multy criteria decision method

Multi-criteria decision making: a set of techniques that wants to evaluate possible solutions based on more than one criterion to choose the best one، (Azar,2010).[1]

Simple weighted average method: a method of offset multi-criteria decision techniques that given weight of each criterion and constructing decision matrix and quantifying qualification indicators, rating(ranking) alternatives in descending order (Azar،، 2010).[1]

Multi criteria decision models (MCDMs), in contrast to classical models for optimization, use a number of evaluation criteria instead of on optimization evaluation criteria.

2.4.1. Shanon Implementing entropy technique

In information theory, entropy is uncertainty criterion that explains by using probability distribution. In this method, 'k' is constant. The idea behind this method is that increasing value dispersion of an index can raise its importance.
Weighting formula:

$k=1 / \ln m$

$Ej= -k \Sigma n_{ij} \ln n_{ij}$ $\quad d j = 1- E j$ $\quad wj = dj / \Sigma dj$

2.5. TOPSIS method

Topsis method: one of the offset multi-criteria decision methods that rates alternatives as descending by specifying distance from best option (ideal) and worst option (anti-ideal)(Asgharpour,2008).[2]

Adaptive method: in this multi-criteria decision method by choosing "ideal" and "anti-ideal" and "P" according formula, we measure the distance of each option to ideal option, then assign the highest rate to shortest distance, i.e. rate descending based on distance from "ideal"(Asghar pour, 2008).[2]

Hwang & Yoon present this method in 1981. In this method 'm' options are evaluated by 'n' indices. This method is based on this concept that selected option should have least distance from positive ideal solution (worst possible case, A_i^-).[20] This method has a 6 steps algorithm:

1. Decision matrix de-scales by using soft method
2. De-scaled matrix multiplies in diagonal matrix of weights
3. Positive and negative ideal alternative are identified
4. Distance is computed according to Euclidean norm for negative ideal solution and positive option and same distance for positive ideal solution and negative option.
5. Relative closeness of A_i to ideal solution is computed
6. Options that are resulted from previous stage are ranked in descending order

3. Research identification method

In this research, organizational basic assets are identified and collected based on scripts and valid papers, and then, by using opinions of industrial experts and establishing meetings, key factors are specified.

This research is applicable from deployment method viewpoint, also considering the time of gathering data is of survey type and cross-section kind.

3.1. Step 1

A questionnaire is provided include 90 components of organizational capabilities where each component is evaluated by n, indices: strategic importance and relative power based on Saati spectrum and give to 108 members of Foolad Technique' managers and supervisors who are selected among 150 members according to Morgan Table. Components that have more than score5 in all two indices are extracted and feed to second questionnaire.

3.2. Step2

For scoring, 45 experts are provided with a questionnaire that evaluates 42 components of former stage as "core competencies of organization", based on Saati spectrum with 5 indices "scarceness, durability, controllability, non-copy and irreplaceable.

3.3. Step 3

Also the importance weight of 7-fold indices of two above questionnaires is determined using Shannon entropy method [2]. Then, given weight of indices, 42 components of core competency are ranked based on their scores in each index using TOPSIS method.

4. Finding

Table 4.1. Core competencies Average scores in 7 index

number	Core competencies	Non- copy	sustainable	controlable	Non- replacable	rareness	Strategic importance	powerment
1	Genius management	4.2272	.6.8636	3.8181	3.9090	4.2727	5.5	6.4
2	Managerial skills	3.9090	3.8636	3.7727	3.8636	4.8181	6.4	5.6
3	Providence	4.5454	3.6363	3.5	3.4090	5.1363.	6.03	7.2
4	flexibility	6.0909	6.1363	6.3181	6.3181	6.7727	6.4	7.1
5	fast reaction to environment and identifying competitors	6.1818	6.1363	6.0909	6.3636	6.8181	6.1	6.9
6	risky	5.9090.	4.04545	3.8181	5.5909.	4.3636	5.6	6.5
7	safety	3.9545	3.8181	5.0909.	4.1363	4.3636	5.03	6.4
8	mentoring	3.8636	3.1818	3.6363	3.3636	4.3636	5.4	6.2
9	Strategic thought	6.1818	6.0909	6.3181	6.04545	6.5909	6.1	7.2
10	Crisis management	4	3.7272	3.2727	3.9090	4.3636	5.8	7.2
11	Business process alignment	3.8181	5	3.2727	3.3636	4.2272	6.2	7.05
12	Customer relation management	6.4090	6.5909	6.3181	6.3181	6.4545	5.9	6.7
13	Six-sigma method	4.3181	3.6818	3.6818	4.04545	3.7727	5.8	5.8
14	Total quality control	5.9090	6.4545	6.2272	6.2272	6.6363	6.4	7.1
15	Job circulation	3.9545	3.8636	5.5909.	3.6818	4.5	5.5	5.4
16	productivity	3.6818	3.7727	6.5909.	3.5454	3.8636	5.6	6.4
17	Production diversity	3.5454	5.8636.	4	4.04545	4.1363	5.7	6.8
18	On-time manufacturing	4.0909	3.9090	3.8181	3.9545	4.2272	5.1	5.9
19	Offers system	5.5.	3.9090	4	3.6363	3.4545	5.5	6.5
20	Standard existence	3.5909	3.6363	5.7272.	3.8181	3.9545	5.2	6.2
21	Information system flexibility	3.9090	3.7272	4.04545	6.1363.	4.3181	5.2	6.7
22	Information integrity	3.9545	4.9090	3.9090	4.3181	4.3181	5.8	7.1
23	Superior and new technology	6.6363	6.9545	6.1363	5.7727	6.8636	5.7	7.07
24	Research and development activity	6.8636	6.5	5.9545	6.2272	6.7727	7.1	7.3
25	Information production	3.6818	3.8636	3.8636	3.7272	3.7727	5.2	6.4
26	Fixing system	3.8181	5.5	4	3.7727	4.1363	5.8	6.2
27	Invention monopoly	3.7727	3.8181	3.9545	4.0909	6.2727	5.05	5.5
28	Trained personnel	5.9545.	3.8181	3.7727	3.6818	4.0909	5.7	6.4
29	Competency-based training	6.5	6.4545	6.1363	6.3181	6.1363	5.6	6.3
30	organization high sensation power	6.2272	6.5454	6.6818	6.0909	6.7727	6.1	6.5
31	Experts number	6.4545	6.5909	6.4090	6.6363	6.1363	7	6.6
32	Thinking and creativity	5.8181	6.8181	6.2727	6.0909	7.4090	5.7	7.01
33	Sense of Organizational dependency	3.7272	3.4090	3.7727	5.7272.	5.2272.	5.6	6.02
34	Personnel loyalty	3.5	3.6818	3.8181	3.6363	4.2272	5.07	5.1
35	personnel Technical knowledge	3.5	3.7727	3.9090	3.7727	4.1363	5.1	6.09
36	Organizational intelligence	5.7272.	4	3.7727	6.1818.	4.1818	5.7	6.9
37	Absorb and sustain customers	6.1818	6.2272	6.2272	6.2272	6.5454	5.9	7.5
38	Favorable market share	3.4545	3.6363	3.9090	3.6818	3.8181	5.6	6.9
39	Value chain management	3.8636	3.7272	3.9545	3.9090	4.0454	6.1	7.5
40	Financial power	3.6818	3.5	3.6818	3.5454	4.1818	5.3	6.03
41	Strategy development	4.2272	4.1818	4	4.1363	3.1818	5.4	6.5
42	investments	4.04545	3.8181	3.7272	3.7727	4.0909	5.4	6.7

Table 4.2. Index weight by Antropy techniqe

Indexes →	Non-copy	sustainable	controlable	Non- replacable	rareness	powerment	Strategic importance
wj	0.16	0.147	0.153	0.155	0.121	0.133	0.131

Table 4.3. Prioritize and score of competencies

Prioritize	TOPSIS score	competecies	Number
12	0.833	Genius management	1
20	0.604	Managerial skills	2
11	0.836	Providence	3
3	0.935	flexibility	4
6	0.909	fast reaction to environment and identifying competitors	5
12	0.833	risky	6
17	0.712	safety	7
26	0.392	mentoring	8
7	0.89	Strategic thought	9
20	0.604	Crisis management	10
19	0.661	Business process alignment	11
5	0.916	Customer relation management	12
26	0.392	Six-sigma method	13
3	0.935	Total quality control	14
16	0.738	Job circulation	15
15	0.778	productivity	16
16	0.738	Production diversity	17
24	0.456	On-time manufacturing	18
22	0.56	Offers system	19
11	0.836	Standard existence	20
23	0.471	Information system flexibility	21
15	0.778	Information integrity	22
8	0.868	Superior and new technology	23
2	0.936	Research and development activity	24
25	0.429	Information production	25
18	0.703	Fixing system	26
13	0.806	Invention monopoly	27
19	0.661	Trained personnel	28
9	0.859	Competency-based training	29
4	0.929	organization high sensation power	30
4	0.929	Experts number	31
1	0.938	Thinking and creativity	32
19	0.661	Sense of Organizational dependency	33
29	0.217	Personnel loyalty	34
30	0.201	personnel Technical knowledge	35
14	0.784	Organizational intelligence	36
10	0.855	Absorb and sustain customers	37
27	0.338	Favorable market share	38
21	0.583	Value chain management	39
28	0.225	Financial power	40
23	0.471	Strategy development	41
23	0.471	investments	42

5. Conclusion

In current study, first, a list of 90 organizational competency and capability is collected according to valid textbooks and articles and provided for 108 member of managers and supervisors of Foolad Technique Co. in order to score according to Saati spectrum (1: very least important; 2: least important;5: fair;7: important;9: very important). According to Morgan table, 108 members are selected among 150 people. After taking total mean of opinions, 42 components with means more than average both in terms of relative power in organization and strategic importance are extracted and then scored in a questionnaire, based on 5 indices “scarceness, durability, irreplaceable, non-copy and controllability” by 45 members of experts according to Saati spectrum. Then, by considering scores mean of each component in

each index, a total table is provided with 42 rows i.e. organizational competencies and 7 columns that include two indices: power and importance from first questionnaire, and 5 other indices form second questionnaire, and MCDM considered as ranking base. From ranking MCDM methods according to experts, TOPSIS considered as proper and inter-weight is computed through entropy method. TOPSIS method showed that based on 7 given indices, Foolad Co. competencies are prioritized as follow: : 1-Creativity and thinking;2- R&D activity;3- Flexibility;4- Continuous quality ;5- Control;6- High level of organizational emotion- number of experts;7- Customer-relation management;8- Rapid response to environmental conditions and recognizing competitors;9- High-technology;10- Competency-based training;11- Attract/keeping customer;12- Forecasting- quality standards;13- Genius management- venturing;14- Invention patent;15- Organizational intelligence;16- Productivity- integration of dense organizational data ;17- Jo cycling-production diversity;18- Safe working;19- Fixing system;20- Business process alignment- trained personnel- sense organizational dependency;21- value chain management;22- recommendation system;23- information system flexibility;24- timely production;25- data production;26- coaching- Six sigma method running;27- desired market share;28- financial power;29- personnel loyalty;30- providers' technical knowledge

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