A Study on Determining the Level of Individual, Procedural and Organizational Maturity Based on Integrated Pattern of People – Capability Maturity Model: (P-CMM) and 3- Dimensional Pattern of Organizational Maturity in Production and Industrial Organizations

(Case Study: Mobarakeh Steel Company"M.S.C")

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Abstract

Excellence of the organization depends on directing improvements in all the fields and organizational dimensions. Excellence of the organization requires organizational maturity in three individual, procedural and organizational levels. The present research has been performed with the purpose of measuring the rate of organizational maturity in Mobarakeh Steel Company during 1389 in which from statistical population of managers and experts 105 out of 140 individuals have been selected based on Morgan Table. A questionnaire for determining the level of organizational maturity was designed for measuring the rate of organizational maturity and data were analyzed using SPSS and Minitab software and T, ANOVA Tests, post-test TUKEY and Pearson correlation coefficient. Studying reliability and internal stability of the test indicated that reliability for the questionnaire is 0.910 for measuring the rate of individual maturity, it is 0.952 for measuring the rate of procedural maturity, it is 0.934 for measuring the rate of organizational maturity, and in general, it is 0.962 for measuring total organizational maturity. The results show that the rate of individual maturity in Mobarakeh Steel Company is 81.18 %; it is 62.48% for procedural maturity, and 67.32% for organizational maturity.

Keywords: Individual maturity, Procedural maturity, Organizational maturity, P-CMM Model, Human Resources development

1. Introduction

Excellence, first of all requires organizational maturity. Excellence model is legalized based on actualizing organizational maturity. Organizational maturity needs an environment in which maturity is achieved. The purpose of organizational maturity is that change process be implemented and established in individuals, structure, culture and product well, and internal and external adaptability be created in a desirable level.

To place and retain organization in the excellence path, it is needed to work on individual, procedural and organization levels. Hither to, conducted researches only have addressed one aspects of maturity. To measure organizational maturity level in three mentioned levels helps organizations as Follows:

1- Helps managers in identifying organizational maturity level.
2- Helps in compiling operational plan for improving individual, procedural and organizational maturity level.
3- Helps in aligning between individual, procedural and organizational maturity level.
4- Helps strategic planners to regulate strategies relevant to organizational maturity level.

2. Literature

2.1 life cycle and organizational maturity

Thinkers of organizational development field have been able to present different systems and tools through surveying and analyzing organizations condition in order to identify and resolve organizational problems and concerns through using them. One of these tools is "life cycle model", in this model scientists have attempted to consider a life cycle for organization as an organism (Adizes, 2009). Organizations pass through these stages in sequences and each stage has unique characteristics .life of an organization starts with "initial stage" and then over time passes through several stages such as: maturity, growth, evolution and death. (Quinn and Cameron, 1983:51).

Adizes organizational life cycle model is a famous ones consisted of ten stages as follows:

1- Establishment, 2- Infancy, 3- Rapid Growth, 4- Maturity,5- Evolution, 6- Stability,7- Aristocracy, 8- Initial Bureaucracy , 9- Bureaucracy,10- Death

2.2 organizational change

Lewin considers change as a three stages process:

These stages involve getting out of freezing, moving toward new condition and eventually re-freezing (Hayed, 2002: 26).

With regard to Hayek view toward organization and considering adaptation as the most important concern of economic organizations he expresses three stages of Lewin as follows: (Hayek, 1976: 63).

1- Manifestation of dysfunction in current adaptation.
2- Attempt to gain new adaptation
3- New adaptation, hither to different methods has been developed for doing organizational change such as: organizational development, re-freezing, learning Organization, knowledge management.

2.3 Re – engineering of business processes

First, the word of " process re- engineering" was coined by " Hammer and Champy". They define this concept in their book entitled " companies re-engineering, organizational revolution charter" in 1991 as " fundamental rethinking and new and root designing in processes for achieving improvement and wonderful advance in performance based on criteria such as cost, quality, service and speed (Hammer and champy, 2001: 37) .

Davenport defines process re-engineering in 1993 as follows:

Analysis and designing work flow and internal and inter organizational processes (Davenport, 1993: 53).

Manganelli and klein (1994) in their book entitled "hand book of re- engineering of processes define it as follows:

Re- engineering involves rapid and root redesigning of business strategic and value – added processes and also systems, policies and organizational structures that they support in order to optimize work flow and productivity in an organization (Manganelli and klein,1997 : 82) .

2.4 learning organization

Pioneer founders of learning organization are D.schon and C.Argris and raised this issue in 1950 (Argris and Schon, 1996:16) .

According to Dodgson, learning organization is an organization that helps organizational promotion through creating structures and strategies (Dodgson, 1993: 380).

Garvin considers learning organization, an organization that has the ability to create, gain and transfer knowledge and modify its behavior so that reflect new views and knowledge (Garvin, 1993:82).

Organizations in which individuals continuously increase their abilities in order to gain desirable results, Where new patterns of thinking nurture and people continuously learn from each other. (Farago and Skyrme, 1995:27). Michael, j. Marquardt (1995) in his book entitled "to make learning organization" views learning organization ones that learns strongly and collectively and constantly changes itself so that can gather and manage information better toward goals of organizational setting.

Five principals of learning organization from Peter Senge point of view:

1- Individual mastery

2- Common perspective
3- Mental model
4- Team learning
5- Systemic thinking

According to Senge, perspective is common once individuals have a common image of desirable future and have commitment toward reaching it, and then plan for a defined purpose; this causes people wills and aspirations become a source of energy and actualization.

In fact mental models involve basic and engraved assumptions in human mind. Argris believes that our behavior practically shape based on our mental models. Senge says about team learning: that, in such a state minimum of energy wastes and in fact current and aligned energy of individuals become synergic. Finally, he describes systemic thinking as follows: beauty in human, flower or poem appears and recognized when we see each of them as a whole and related elements comprehensively. Utilization of systemic thinking causes not to look at signs of problems, but consider their causes and address their wholeness and completeness, not particular cases or some of its parts (Argris and Schon,1996). Senge writes: I haven't invented these five principals. These are resulted from experiences, writings and innovations of hundreds of human, what I have done are that surveyed these principals for years, refined them and deployed them in different institutes (Senge, 1990).

2.5 three dimensional model of organizational maturity

Organizational maturity only in one dimension doesn't lead to success, but it is needed to form in different dimensions because maturity and development require integrated and comprehensive plan. Balanced movement not only assures sustainable development, but also causes coordinated and multi-dimensional maturity. Multidimensional maturity smooths the path of excelling. With regard to importance of organizational maturity, components of three dimensions of organizational maturity are shown in pattern No.1 (Soltani, 2009: 135).

2.6 People – Capability Maturity Model (P-CMM).

P-CMM is a map and guide to diagnose, design and implement of processes related to human resource that continuously lead to promoting of human resource capability. As An organization cannot implement all the best practices in a very short time, P-CMM provide them at five level of maturity and 22 areas of processes. Each level of P-CMM produces unique change in organizational culture through equipping it with many powerful activities in order to attract, develop, organize, motivate and retain work force (Turetken and Demirors, 2004: 185).

The main purpose of P-CMM involves improvement of human resource capability that can be defined as a specified level of knowledge, skills, and procedural abilities for doing business activities in an organization.

3. Research goals

1- Measurement of organizational maturity level based on incorporating model of P-CMM and three dimensional model of organizational maturity
2- Measurement of individual maturity level in M.S.C
3- Measurement of procedural maturity level in M.S.C
4- Measurement of organizational maturity level in M.S.C

4. Research questions:

1- How much is the organizational maturity in M .S.C?
2- What are indicators of individual maturity in M .S.C?
3- What are indicators of procedural maturity in M .S.C?
4- What are indicators of organizational maturity in M .S.C?

5. Research methodology

This research is a survey – type in which 105 out of 140 managers and experts were selected as sample based on Morgan table from statistical population. In this research a questionnaire was used for data gathering. The questionnaire is consisted of questions for determining individual, procedural and organizational maturity level in M.S.C and include 55 questions, 1 to 19 devotes to individual maturity, 20 to 37 to procedural maturity and 38 to 55 to organizational maturity. Responses options are as follows:

5- Completely true
4- true

3-somewhat true

2- A little true
1-Not at all true

To validate this questionnaire, content validity was used for compiling and gathering main indicators of each maturity types, one hundred indicators using studying books, valid scientific papers and theses were gathered, then through consulting managers and professional experts of industry, main indicators among gathered indicators were elicited. For analyzing data, SPSS, Minitab software, T- test, ANOVA, Tukey test and Pearson correlation coefficient were used. Reliability and internal reliability was calculated through Cronbakh α Using SPSS software and following results were found:

The reliability of the questionnaire was 0.91, 0.952 and 0.934 for individual, procedural and organizational maturity respectively.

Indicators for different types of maturity were as follows:

✓ Individual maturity : social, mental, affective and professional maturity

✓ Procedural maturity: process definition, process design, process evaluation, continuous improvement of process, process integration, process agility, process supportive systems, process bench marking and process owners.

✓ Organizational maturity: organizations leadership, organizational culture, employee's skills, organizational systems, organizational change, organizational learning and organizational structure.

6. Analysis of research finding

6.1 results of measuring rate of individual, procedural and organizational maturity

• Among individual maturity indicators, the greatest rate is related to social maturity (84.30%) and the least rate is related to mental maturity (77.58%) in M. S.C.

• Among procedural maturity indicators, the greatest rate is related to process continuous improvement (65.84) and the least rate is related to process agility (58.76) in M.S.C.

• Among organizational maturity, the greatest rate is related to organizational systems (75.22) and the least rate is related to organizational culture (60.56) in M.S.C.

• Generally, the greatest maturity rate in M.S.C is 81.81 and the least rate is 62.48 and is related to individual and procedural maturity respectively.

• In this research Kolmogorov – smirnov was used as normality test. Based on table 1, the result of normality test in all indicators is greater than 0.05 and indicates normality of data.

6.2 to examine difference of maturity indicators mean from number 3

To examine difference of maturity indicators mean from number 3, independent one- sample T-test was used that its results has been shown in table 2 :

❖ Independent one-sample T-test shows p = sig = 0.000, as sig = 0.000< 0.05, so there is significant difference between mean of individual, social, mental, professional and affective maturity and number 3 and because at 0.95 confidence interval both high and low ranges are positive, so this mean is greater than 3 and indicates that individual, mental, professional and affective maturity in M.S.C is very good, and in this regard has strength points.

❖ Independent one – sample T- test shows p= sig =0.077 for procedural maturity, as sig = 0.077 > 0.05, so there is no significant difference between procedural maturity mean and number3, and because at 0.95 confidence interval, low range is negative and high range is positive, so mean of procedural maturity in terms of statistics is almost equal to 3 and indicates that procedural maturity level in M.S.C is moderate.

❖ Independent one – sample t-test for process definition shows p= sig =0.050, as sig=0.050, so, there is no significant difference between mean of process definition and number 3, because at 0.95 confidence interval, low range is negative and high range is positive, so the mean of process definition in terms of statistics is equal to 3 and indicates that procedural maturity level in terms of process definition in M.S.C is moderate.

❖ Independent one – sample t-test for process design shows p=sig = 0.178, because sig = 0.178>0.05, so there is no significant difference between mean of process design and number 3, because at 0.95 confidence interval, low range is negative and high range is positive, so mean of process evaluation in terms of statistics is almost equal to number 3, and indicates that procedural maturity level in terms of process evaluation in M.S.C is moderate .

❖ Independent one – sample t-test for continuous improvement of process shows p= sig = 0.000. because sig = 0.000< 0.05 so, there is significant difference between mean of continuous improvement of process and number 3, because at 0.95 confidence level, low range and high range both are positive, so the mean of process continuous improvement is greater than 3 and indicates procedural maturity level in terms of continuous improvement of process in M.S.C is very good and has strength points.

❖ Independent one –sample t-test for process integration shows p=sig=0.682, as sig = 0.682>0.05, there is no significant difference between mean process integration and number 3 and because at 0.95 confidence interval low

range is negative and high range is positive, so mean of process integration in terms of statistics is almost equal to 3 and indicates that procedural maturity level in terms of process integration in M.S.C is moderate.

❖ Independent one–sample t-test for process agility shows p=sig=0.480,as sig 0.480>0.05, so, there is no significant difference between mean of process agility and number3, because at 0.95 confidence interval, low range is negative and high rang is positive, so mean of process agility in terms of statistics is almost equal to 3 and indicates that procedural maturity level in terms of process agility in M.S.C is moderate

❖ Independent one–sample t-test for supportive systems shows p=sig=0.651, as sig = 0.651>0.05, so there is no significant difference between mean of supportive systems and number 3, because at 0.95 confidence interval, low range is negative and high range is positive, so mean of supportive systems in terms of statistics is almost equal to 3, and indicates that procedural maturity level in terms of supportive systems in M.S.C is moderate.

❖ Independent one–sample t-test for process benchmarking shows p=sig=0.018, as sig=0.018< 0.05, so there is significant difference between mean of process bench marking and number 3, because at. 0.95 Confidence interval, both high and low ranges are positive, so mean of process benchmarking is greater them 3, and indicates that procedural maturity level in terms of process benchmarking in M.S.C is very good and in this regard has strength points.

❖ Independent one–sample t-test for process owners shows p=sig=0.002, as sig =0.002 <0.05, so there is significant difference between process owners and number3 because at 0.095 confidence interval high and low ranges both are positive, So mean of process owners is greater than 3 and indicates that procedural maturity level in terms of process owners in M .S.C is very good and in this regard has strength points.

❖ Independent one–sample t-test for organizational leadership shows p=sig=0.021, as sig = 0.021< 0.05, so, there is significant difference between mean of organizational leadership and number 3, because at 0.95 confidence interval both high and low ranges are positive, so the mean of organizational leadership is greater than 3 and indicates that organizational maturity level in terms of organizational leadership in M.S.C is very good and has strength points.

❖ Independent one–sample t-test for organizational culture shows p=sig= 0.737. as sig = 0.737>0.05, so there is no significant difference between mean of organizational culture and number 3, because at 0.95 confidence interval, low range is negative and high range is positive, so the mean of organizational culture is statistically almost equal to 3 and indicates that organizational maturity level in terms of culture in M.S.C is moderate .

❖ Independent one–sample t-test shows p=sig = 0.024, as sig = 0.024<0.05, so there is significant difference between mean of organizational learning and number3. because at 0.95 confidence level, both high and low ranges are positive, so the mean of organizational learning is greater them 3and indicates that organizational maturity level in M.S.C is very good and has strength points.

❖ Independent one–sample t-test for organizational maturity of employees skill, organizational systems, organizational change, organizational structure shows p=sig = 0.000, as sig = 0.000< 0.05, so there is significant difference between mean for organizational maturity, employees skills, organizational systems. Organizational change, organizational structure and number 3. because at 0.95 confidence interval both high and low ranges are positive,so the mean for organizational maturity, employees skills, organizational systems, organizational change and organizational structure is greater than 3, and indicates that organizational maturity level in terms of employees skills, organizational systems, organizational change, organizational structure in M.S.C is very good and in this regard has strength points.

6.3 Calculation of Pearson Correlation Coefficient among individual maturity indicators of M.S.C

In this section, using Pearson correlation test, correlation coefficients among individual maturity indicators were examined. The results are shown in table 3.

Gray boxes indicate that correlation between these two individual maturity indicators in this axis comparison to other indicators in this same axis is maximum.

6.4. Calculation of Pearson Correlation Coefficient among procedural maturity indicators in M.S.C

Coefficients among procedural maturity indicators were examined. The results are shown in table 4.

The gray boxes indicate that correlation between these two procedural maturity indicators in this axis in comparison to other Indicators of this same axis is maximum.

6.5 Calculation of Pearson Correlation Coefficient among organizational maturity indicators in M.S.C

In this section using Pearson correlation test, correlation coefficient among organizational maturity indicators was examined. The results are shown in table 5.

The gray boxes indicate that correlation between these two organizational maturity indicators in this axis comparison to other indicators in this same axis is maximum.

Conclusion: This research was designed to measure organizational maturity rate in M.S.C in 2010. To assess organizational maturity, the rate of individual, procedural and organizational were measured. to measure individual maturity rate four indicators with the topics of social, mental, professional and affective maturity, to measure procedural maturity nine indicators with the topics of process definition, process design, process evaluation, process continuous improvement process integration, process agility, supportive systems, process benchmarking and process owners, to measure organizational maturity rate seven indicators with the topics of organizational leadership, organizational culture, employees skills, organizational systems, organizational change, organizational learning, organizational structure were considered. and the rate of maturity in all these indicators were determined in M.S.C based on defined indicators and gained results it is possible to present the level and dimensions of organizational maturity in pattern NO2. Application of research for practicing managers, industrial organizations and organizational development are as follows:

1- Planning for developing individual maturity in professional and mental aspects
2- Benchmarking for providing organizational processes in practice.
3- Integration and combination of procedures and processes
4- Elimination of none value added activities in organization
5- To create relevance between processes and their owners
6- To design knowledge management system in companies based on employees maturity level
7- To review strategic plans relevant to maturity level of organizational process.

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Table 1. Mean of maturity indicators

row	Maturity indicators	Number	Mean	Percent point	P-value	SD
A	**Individual maturity**	105	4.059	81.81	0.583	0.502
1	Social maturity	105	4.215	84.3	0.421	0.512
2	Mental maturity	105	3.879	77.58	0.362	0.718
3	Professional maturity	105	4.156	83.12	0.983	0.595
4	Affective maturity	105	3.984	79.68	0.271	0.539
B	**Procedural maturity**	105	3.124	62.48	0.807	0.71
5	Process definition	105	3.157	63.14	0.212	0.812
6	Process design	105	3.114	62.28	0.415	0.864
7	Process evaluation	105	3.062	61.24	0.221	0.839
8	Process continuous improvement	105	3.262	65.84	0.961	0.820
9	Process Integration	105	3.038	60.76	0.234	0.949
10	Process Agility	105	2.938	58.76	0.157	0.895
11	Process supportive systems	105	3.038	60.76	0.189	0.859
12	Process benchmark	105	3.238	64.76	0.325	1.014
13	Process owners	105	3.238	64.76	0.615	0.757
C	**Organizational maturity**	105	3.366	67.32	0.521	0.640
14	Organizational leadership	105	3.177	63.54	0.531	0.779
15	Organizational culture	105	3.028	60.56	0.167	0.868
16	Employees skills	105	3.352	67.04	0.151	0.818
17	Organizational systems	105	3.761	75.22	0.215	0.766
18	Organizational change	105	3.695	73.9	0.261	0.722
19	Organizational learning	105	3.196	63.92	0.195	0.881
20	Organizational structure	105	3.347	66.94	0.281	0.800

Table 2. T-test for maturity indicators

	Test value = 3					
	t	df	Sig (two-tailed)	Difference from 3	0.95canfidence interval	
					Low range	High range
A) Individual maturity	21.587	104	000.0	1.059	0.961	1.156
1- Social maturity	24.325	104	000.0	1.215	1.116	1.314
2- mental maturity	12.554	104	000.0	0.879	0.740	1.018
3- professional maturity	19.895	104	000.0	1.156	1.041	1.271
4- affective maturity	18.681	104	000.0	0.984	0.879	1.089
B) procedural maturity	1.788	104	0.077	0.124	-.013	0.261
5- Process definition	1.982	104	0.050	0.157	-.001	0.314
6- Process design	1.355	104	0.178	0.114	-.053	0.281
7- Process evaluation	0.755	104	0.452	0.062	-0.101	0.224
8- Process continuous improvement	3.650	104	0.000	0.222	0.133	0.451
9- Process integration	0.411	104	0.682	0.038	-0.146	0.222
10- Process agility	-.709	104	0.480	-0.062	-.235	0.111
11- Process supportive systems	0.454	104	0.651	0.038	-0.128	0.204
12- Process benchmark	2.405	104	0.018	0.238	0.042	0.434
13- Process owners	3.22	104	0.002	0.238	0.091	0.384
C) Organizational maturity	5.849	104	0.000	0.365	0.242	0.489
14- Organizational leader ship	2.338	104	0.021	0.178	0.027	0.329
15- Organizational culture	0.337	104	0.737	0.028	-0.139	0.197
16- Employees skills	4.409	104	0.000	0.352	0.193	0.511
17- Organizational systems	9.797	104	0.000	0.762	0.608	0.916
18- Organizational change	9.864	104	0.000	0.695	0.555	0.835
19- Organizational learning	2.288	104	0.024	0.197	0.026	0.367
20- Organizational structure	4.454	104	0.000	0.348	0.193	0.502

Table 3. Calculation of Pearson Correlation Coefficient among individual maturity indicators of M.S.C

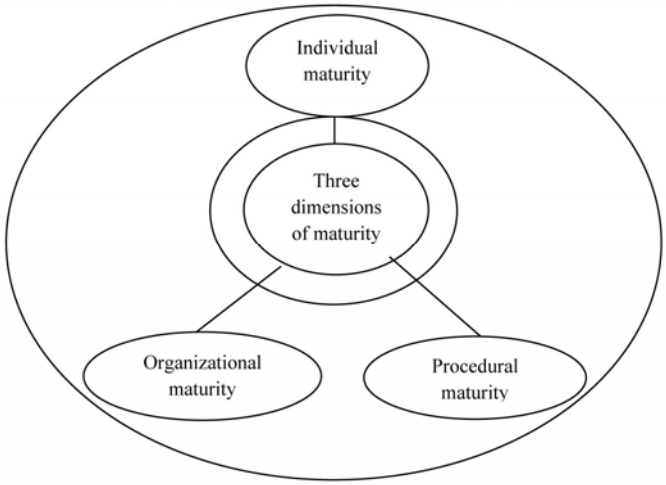
	Social maturity	Mental maturity	Professional maturity	Affective maturity
Social maturity	1	0.706	0.657	0.494
Mental maturity	0.706	1	0.736	0.516
Professional maturity	0.675	0.736	1	0.599
Affective maturity	0.494	0.516	0.599	1

Table 4. Correlation among procedural maturity indicators in M.S.C

	Process definition	Process design	Process evaluation	Continuous improvement of process	Process integration	Process Agility	Supportive Systems	Process Bench marking	Process owners
Process definition	1	0.704	0.627	0.690	0.598	0.628	0.628	0.456	0.522
Process design	0.704	1	0.726	0.674	0.698	0.684	0.635	0.517	0.509
Process evaluation	0.627	0.726	1	0.681	0.660	0.577	0.706	0.598	0.495
Continues improvement of process	0.568	0.674	0.681	1	0.767	0.671	0.693	0.628	0.599
Process integration	0.690	0.698	0.660	0.767	1	0.721	0.699	0.619	0.499
Process Agility	0.598	0.684	0.577	0.671	0.721	1	0.750	0.615	0.551
Supportive Systems	0.628	0.635	0.706	0.693	0.699	0.750	1	0.695	0.601
Process Bench marking	0.456	0.517	0.598	0.628	0.619	0.615	0.695	1	0.488
Process owners	0.522	0.509	0.495	0.599	0.499	0.551	0.601	0.488	1

Table 5. Correlation Coefficient among organizational maturity indicators in M.S.C

	Organizational leadership	Organizational Culture	Employees Skills	Supportive Systems	Organizational Change	Organizational learning	Organizational Structure
Organizational Leadership	1	0.587	0.564	0.443	0.498	0.474	0.484
Organizational Culture	0.587	1	0.630	0.548	0.571	0.554	0.567
Employees Skills	0.564	0.630	1	0.591	0.604	0.517	0.430
Supportive Systems	0.443	0.548	0.591	1	0.758	0.478	0.519
Organizational Change	0.498	0.571	0.604	0.758	1	0.625	0.690
Organizational learning	0.474	0.554	0.517	0.478	0.625	1	0.729
Organizational Structure	0.484	0.567	0.430	0.519	0.690	0.729	1



Pattern 1. Three dimensions of maturity (soltani, 2009).

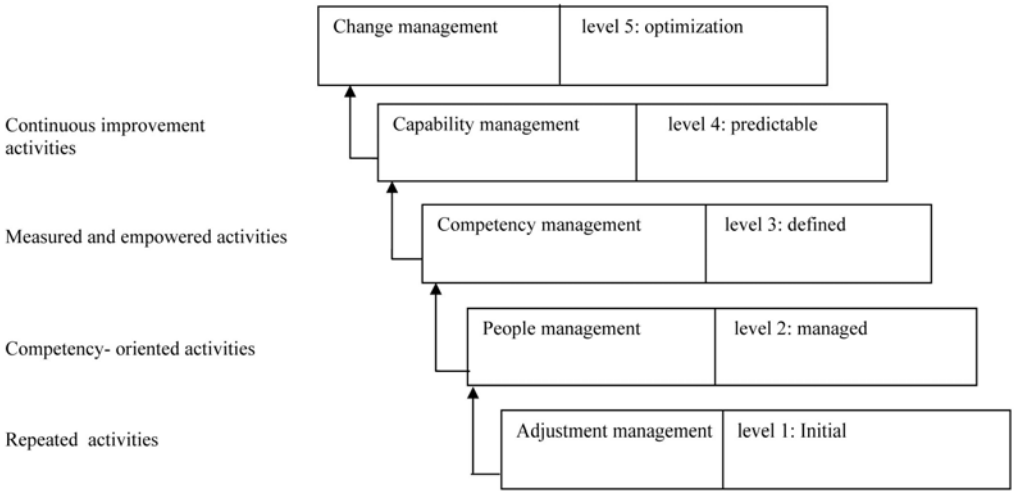
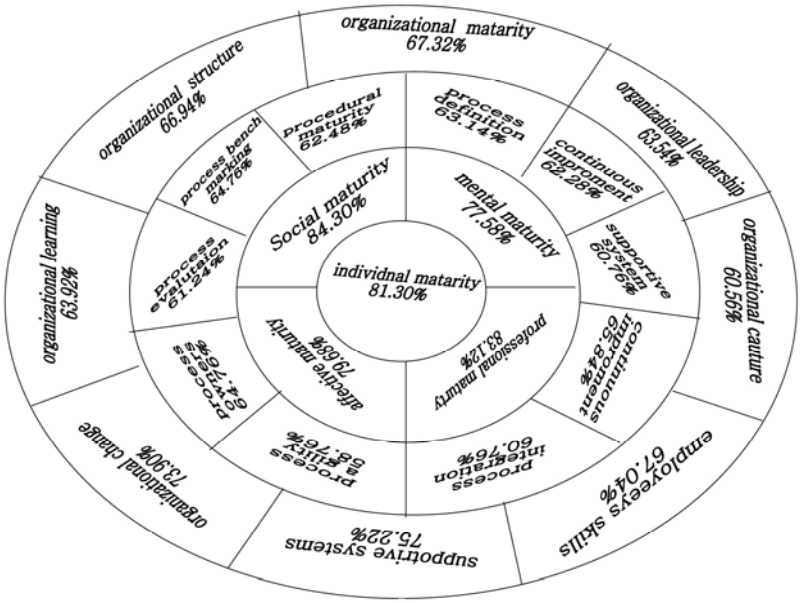


Figure 1. maturity level of people capability maturity (Curtis et al, 2001)



Pattern2: Dimensions and levels of organizational maturity in M.S.C