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Research Article

EVALUATION OF THE TECHNOLOGY COMPONENTS OF ORGANIZATION (A CASE STUDY)

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ABSTRACT
The main purpose of this research is to rank the technological level of East Azerbaijan Social Security Insurance (EASSIO). The main question is that whether the average of technological level ranking is higher than average of country or not. The research method used in this study is a descriptive survey. Observation and Atlantic Technology are used to determine the rate of technological levels and questionnaires have been used to collect data. Multi-stage Cluster sampling method is used and according to Morgan table 200 personnel were selected as sample. We applied Atlantic Technology Model and one sample T-test to analyze research data. The results of Atlantic Technology model shows that the rate of technological level of EASSIO is high in compare with other insurance companies. The results of the hypotheses test demonstrate that Techno, human, information, and organization ware rates of EASSIO are higher than average rate.

Keywords: *Technology Components, Technology Ware, Human Ware, Information Ware, Organization Ware*

INTRODUCTION
Atlas technology method is used to evaluate the technology and light manufacturing systems. The economic value of this method is the value of the goods at the enterprise or industry which is calculated by using the standard processes such as product flow method or revenue stream. In this method, technology is divided into 4 components:
Techno ware: It is embodied technology in various objects to produce goods and services such as tools, equipments, machines, installation, physical facilities and hardware of this kind is called technology. See Hajfatali (2009).
Human Ware: It is embodied technology in human beings as workers, staff, technicians, engineers, scientists, managers and etc used to develop, complete and develop technology itself that is experiences, skills, knowledge, wisdom, creativity and mental aspects of this kind is called human ware. See Jafarnejad (2010). Info Ware: It contains technology used in information and documents required for the application of that technology in the production of various goods and services including: process description, procedures, opinions, observations and instructions. A set of such software is called information application. See Yousefpor (2011). Orga Ware: It is embodied technology in the institutions from workshops to laboratories, complexes and… used in development, completion, application and development of technology. All methods, organizing and management operations, organization frameworks, other systems and methods for managing the institutions are involved in technological activities can be placed within its scope. See Sharif (2009).
Hereafter some recent researches on THIO are given.
Technology status of Saipa car factory has been evaluated by Mirzaie (2003). In this study, four hypotheses are considered: (a) techno ware, (b) human ware c) info ware and (d) orga ware status is at an acceptable level. All four research hypotheses were rejected with 99% confidence level.
Technology status of Industries and Mines Organization of Iran has been compared to that of Malaysian industry by Jalilzadeh (2006). The results indicate that techno, info, orga and human ware levels are much weaker than those of Malaysian.

Evaluation criteria were presented for technology levels of private companies in Iran by Farhanghi (2004). They concluded that the technology status of private companies were evaluated using the THIO model and it was specified that all Iranian companies aren't well conditioned.
Mirian and Noghondorian (2008) argued technology transfer from developed countries to Iranian automotive companies, organizing training courses for staff, optimal data collected from successful companies, purchasing of equipment and machinery from European companies and co-organizing the company with experienced and professional managers can upgrade THIO car companies in Iran.
In this paper, we estimated the rank on each of four constituent parts of the organization technology in EASSIO using Atlantic Technology model. We also answered this question that if the average technological level ranking is higher than average. The overall objective of the study is to assess the level of technology in EASSIO in 2012. The following specific objectives are intended:
1) Determining the level of technology.
2) Evaluation of balance in 4 THIO constituent parts of the technology.
3) Providing required information needed to make decisions about upgrading existing technologies.
4) Recognizing the best possible conditions of technology in all 4 THIO components.
In order to achieve specific objectives, we consider the following hypotheses:
I. Techno ware rating mean is higher than average in.
II. Human ware rating mean is higher than average.
III. Info ware rating mean is higher than average.
IV. Orga ware rating mean is higher than average.
The results of this study made the authorities and managers to improve the technology. In such a case there are some deficiencies and weaknesses in order to improve the technology level.

MATERIALS AND METHODS

This is a kind of applied research and it used the descriptive research method. In this study visualization tools and a questionnaire is used to collect data. The questionnaire is made by the researcher himself. So that the researcher has to be ensure about the reliability of the questionnaire before distributing it. Cronbach's alpha coefficient was 0.91 which is an appropriate and high value of reliability.
Indicators considered in the questionnaire have been depicted in table (1). The questionnaire structure consists of two parts, in the first section some questions have been raised about gender, age, educational level, occupation and in the second part some closed questions including 20 questions have been raised. The first 5 questions related to techno ware evaluation, the next 5 questions were about human ware evaluation, 5 questions related to information ware evaluation and the last 5 questions associated with the evaluation of organization ware. At the end of the questionnaire, an open question for appraisal of the respondents has been presented. It means that the respondent is required to answer just mentioned cases.
The statistical population consisted of 812 people from EASSIO. Multi-stage Cluster sampling method is used and according to Morgan table 200 personnel were selected as sample. The details of clusters and sample are presented in table (2).
In Atlantic Technology method, after that the status of all 4 THIO components of was characterized, unit value representing the contribution of total four components should be estimated to obtain an overall index. It is done by using Technology coefficient (TCC) that we define a coefficient for each of the components in terms of their importance in particular industry. In table (3) mathematical description of the concepts is presented.
There is the least degree of complexity for each of the required technical components so called low range complexity and on the other side there is maximum possible extent that is called high range complexity. In order to achieve high-and low complexity for transformation functions for each of the components, it is necessary to determine the position of each of the components into global positioning. See Feghi Farahmand (2005).
From table 4 upper and lower complexity in each dimension of the EASSIO into global positioning can be achieved which is shown in table (5).

Table 1: Indicators used in the questionnaire

Techno ware	Human ware	Info ware	Orga ware
Applying telecommunication systems to reduce operating costs of the organization	Employment of professional experts in software, hardware and network	Utilizing the latest and the most modern technologies to design web sites for each branch to provide information to those insured people	Supervising administrative and management costs through business automation processes
Provide services to insured at all hours of day and night through the network	Implementing incentives policies such as providing bonuses to employees	Use of modern information technologies and the latest scientific achievements to inform pensioners and disabled people	Ability to establish 24-hour communication with insurance organization (By e -mail, chatrooms, IVR, …)
	Holding various training courses such as skill training courses of modern technologies for staff	Preparation and distribution of educational brochures and booklets among branches	Employment of innovative and professional personnel to solve slowness difficulty (error deletion) of hardware and software systems
	Publicity of innovative and expert people through the mass media and innovative and expert people outside the organization	Applying SMS tools to inform insured about inurance records	
		Provide accurate and up to date and reliable information for the insured about insurance records	
		Clarify its own and organization mission to those employees and cause the development and progression of the organization	
		Holding training courses for staff to acquire skills to apply advanced technologies	
		Systematic and efficient organizing of personnel to perform tasks as a group or team	
		The planned management of staff in order to increase their knowledge and become knowledge-based workers	
		Establish Optimal relations between organizational units and staff and implementing participatory management culture in the organization	

Table 2: Details and samples of clusters

Cluster	Sample size	Cluster size
Supervision district and Tabriz branches	439	108
Ahar and Varzaghan	47	12
Marand and Jolfa branch	55	14
Mianeh and Hashtrud Branch	58	14
Maragheh and Bonab Branch	78	19
Sarab and Bostan Abad Branch	45	11
Shabestar and Soofian Branch	48	12
Kaleibar and Khodafarin Branch	42	10

Table 3: The concepts of Technology Components

$T_i = \frac{1}{9}\left[LL + \frac{ST_i(UL-LL)}{10}\right]$	$T = \sum T_i W_i$	Low Complexity	LL
$H_i = \frac{1}{9}\left[LL + \frac{SH_i(UL-LL)}{10}\right]$	$T = \sum H_i W_i$	High degree of complexity	UL
$I_i = \frac{1}{9}\left[LL + \frac{SI_i(UL-LL)}{10}\right]$	$T = \sum I_i W_i$	Weight	W_i
$O_i = \frac{1}{9}\left[LL + \frac{SO_i(UL-LL)}{10}\right]$	$T = \sum O_i W_i$	Rating Average	S
$TCC = T^{\beta t} H^{\beta h} I^{\beta i} O^{\beta o}$		The role of each of technology components on TCC	β

Table 4: Complexity degree of technology components

Degree of complexity				**Privilege**
Orga ware	**Info ware**	**Human ware**	**Techno ware**	
effort phase	familiarizing information	work by car	handy features	1/2/3
Syndication step	describing information	installation	mechanical features	2/3/4
impetuosity phase	descriptive information	repair	technical general	3/4/5
Support phase	User information	cloning	technical specialized	4/5/6
Consolidation phase	Understanding Information	adaptation	technical automatic	5/6/7
efflorescence stage	Repair provider information	improvement	technical computer	6/7/8
Leadership stage	Assessing information	innovation	Technical - all computer	7/8/9

Table 5: Points of complexity of technology components

UL	*LL*	**complexity type**		**Technology components name**	**THIO**
8	3	Computer Engineering	Technical general	Technology ware	Techno ware
9	4	Innovation	Cloning	Human ware	Human ware
9	1	Assessing information	Familiarizing information	Information ware	Info ware
9	2	Led stage	Syndication step	Organization ware	Orga ware

In this study, inferential statistics also were used in this way that we studied the normality of research variables by using Kolmogrov-Smirnov test and because of normality of all variables, we applied single sample T-test which tests the following model:
- Null assumptions: variable average under consideration is less or it equals three.
- Opposite assumption: variable average under consideration is more than three.

RESULTS AND DISCUSSION

Results

To calculate the contribution of THIO we should determine the weight of each component related to this dimension. Then, we calculate the contribution of each component. Finally, we gain the total sum of multiplied weights and contributions. ST_i Values is between 0 and 10 which were obtained from interviews and observations and $W_i = \frac{ST_i}{64} . T_i$ Values are calculated using Table (3). The results are given in Table (6, 7).

To calculate the score for each of the members of the sample in each of the variables, we took the average of the relevant questions. Descriptive statistics of the technology Components are presented in Table (8). It is observed that average range of Techno ware variable is more than that of other variables.

We used one sample Kolomogrov Smirn of test to specify the normality or abnormality of the variables that results have been presented in Table (8). As significance level for all variables is more than 0.05, variables follow a normal distribution with 95% confidence, so to confirm or reject the hypothesis a single sample t-test was used.

One sample t- test results are presented in table (9). It is observed that the level of significance for all hypotheses is less than 0.05, thus there are sufficient reasons to reject the null hypothesis and average Techno ware, human ware, information ware, info ware, and Orga ware is higher than average.

Discussion

Now, according to the results of the calculation of the contribution of each of components of technology and determining the help intensity and technology impact in tables (6, 7) of each of these components, technology coefficient can be acquired. The results are presented in table (10).

According to the results reported in this study and compared with the Scalp report about the status of technology in insurance industry. Remarkable differences can be observed in each of technology components, but obtained TCC is near the Scalp report. This can be due to differences of β intensity

impact on each of technology components in various industries. For example, in a small metal producing workshop, techno ware may have high impact, but it doesn't have much impact in Social Security Insurance Organization. This is what creates a lot of differences in comparison of different groups of industries. See Feghi (2005).

Table 6: Calculation of Techno and human ware contribution

$T_iW_i\%$	$T_i\%$	$W_i\%$	ST_i	**Indicator**	$H_iW_i\%$	$H_i\%$	$W_i\%$	SH_i	**Indicator name**
7.942	72.2	11	7	new computers	8.88	88.8	10	8	Education
9.324	77.7	12	8	new software	3.33	66.6	5	4	skill
9.324	77.7	12	8	telephone	1.11	55.5	2	2	Specialty
4.88	61.1	8	5	fax	1.11	55.5	2	2	Agility
3.33	55.5	6	4	internet	3.33	66.6	5	4	innovation
2.5	50	5	3	management information system	3.33	66.6	5	4	Initiative
0.004332	28.8	1.5	1	Other information systems	5.439	77.7	7	6	Genius
2.5	50	5	3	communication systems	5.439	77.7	7	6	motivation
0.732	24.4	3	2	audiovisual systems	7.497	83.3	9	7	Accuracy
2.5	50	5	3	facilities	4.332	72.2	6	5	transmission speed
4.88	61.1	8	5	devices	5.439	77.7	7	6	Ability
1.332	44.4	3	2	tools	8.88	88.8	10	8	Talent
2.5	50	5	3	workplace	3.494	77.7	7	6	Confidence
0.00582	38.8	1.5	1	vehicle	8.88	88.8	10	8	patience
4.478	61.1	8	5	educational tool	3.33	66.6	5	4	competition
3.33	55.5	6	4	Printers and copy machines	1.11	55.5	2	2	Entrepreneurship
59.562	-	100	-	total	74.93	-	100	-	total

$$T = \frac{1}{9}\left[LL + \frac{ST_i(UL - LL)}{10}\right],\quad T = \sum_{i=1}^{n} T_i W_i = 59.562\%$$

$$H_i = \frac{1}{9}\left[LL + \frac{SH_i(UL - LL)}{10}\right],\quad H = \sum_{i=1}^{n} H_i W_i = 74.93\%$$

With attention to the results presented in table (9) by confirming all four research hypotheses it can be concluded that average rate of technological level components of EASSIO is higher than average. The results of this research aren't aligned to the research findings of Mirzaei (2003) and Jalilzadeh (2006). The findings also aren't aligned to the results of Farhanghi (2004). It was determined that status of technological ranking in Iranian private companies is too low. In table (11) and figure (1), the status of THIO components between ESSIO and entire insurance organization are compared. We can conclude that THIO rank and technology index (TCC) in EASSIO is higher than those of other insurance companies.

Table 7: Calculation of Info and Orga ware contribution

I_iW_i%	I_i%	W_i%	SI_i	Indicator name	O_iW_i%	O_i%	W_i%	SO_i	Indicator
3.885	55.5	7	5	information	1.131	37.7	3	2	Organizing
5.152	64.4	8	6	figures	1.131	37.7	3	2	Grillwork
1.508	37	4	3	Work practices	1.82	45.5	4.6	3	management
1.508	37.7	4	3	methods	4.277	61.1	7	5	marketing
5.152	64.4	8	6	Newspapers and magazines	0.0042	30	1.4	1	systematize
2.796	66	6	4	conversations	4.277	61.1	7	5	Explicit mission
3.885	55.5	7	5	Correspondence	6.192	68.8	9	6	Complexity degree
5.152	64.4	8	6	signs	3.198	53.3	6	4	focus degree
7.33	73.3	10	7	Latest scientific achievements	6.192	68.8	9	6	Type of Relationship
7.33	73.3	10	7	New scientific books	6.192	68.8	9	6	Control rate
5.924	64.4	8	6	rich scientific books	3.198	53.3	6	4	Responsiveness to customers
0.864	28.8	5	2	rules	3.035	68.8	9	6	Team and group
0.864	28.8	5	2	Guidelines and Procedures	3.192	68.8	9	6	Communication range
0.0028	20	1.6	1	Description of duties	4.277	61.1	7	5	degree of formality
0.0028	20	1.4	1	standards	1.131	37.7	3	2	Personnel training
3.885	55.5	7	5	Statistics	4.277	61.1	7	5	Importance of customers
55.241	-	100	-	total	53.518	-	100	-	total

$$I_i = \frac{1}{9}\left[LL + \frac{SI_i(UL-LL)}{10}\right], \quad I = \sum_{i=1}^{n} I_i W_i = 55.241\%$$

$$O_i = \frac{1}{9}\left[LL + \frac{SO_i(UL-LL)}{10}\right], \quad O = \sum_{i=1}^{n} O_i W_i = 53.518\%$$

It is recommended that the authorities improve the technological level of the components of organization by appropriate management, providing necessary substrates to provide better and more ideal variety of hardware, software and communication equipments, holding training courses and inviting experts in this field. Therefore, it causes satisfaction of insured people and promotion of Social Security Insurance Organization in different fields.

Table 8: Descriptive statistics and Kolomogrov-Smirnof test

Variable	Number	Range	Standard Variation	Kolmogorov-Smirnov statistic	Significance
Techno ware	200	3.624	0.9107	0.953	0.433
Human Ware	200	3.2175	0.75313	0.966	0.064
Info Ware	200	3.3375	0.68691	0.931	0.075
Orga Ware	200	3.2479	0.63173	0.962	0.249

Table 9: One sample T-test

Hypothesis	T-statistics	Degrees of freedom	Significance level	Mean difference
I	9.6898	199	0.000	0.624
II	4.084	199	0.000	0.2175
III	6.948	199	0.000	0.3375
IV	5.549	199	0.000	0.2479

Table 10: Contribution and impact of each of technology components

THIO	Impact intensity%	Contribution rate
Technology ware	T = 59.56	T= β6%
Human ware	H = 74.93	H= β50%
Information ware	I = 55.24	I= β30%
Organization ware	O = 53.51	O= β14%

$$TCC = (59.56)^{6}(74.93)^{5}(55.24)^{3}(53.51)^{14} = 54.8$$

Table 11: Comparing technology status of EASSIO with entire insurance industry

Entire insurance industry	ESSIO	THIO
58	59.56	Technology ware
36	74.93	Human ware
31.3	55.24	Information ware
31.2	53.51	Organization ware
41.36	54.8	Overall status

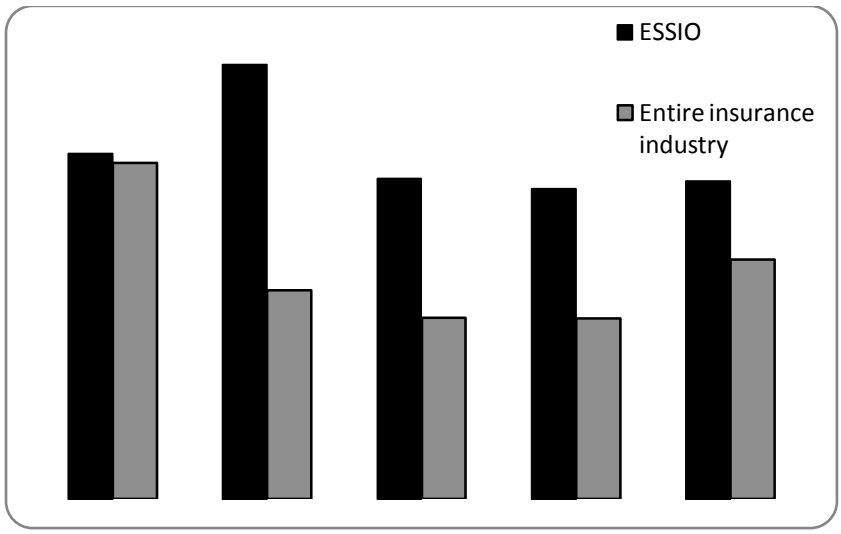

Figure 1: Comparing technology status of ESSIO with entire insurance industry of the country

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