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Exploring Intellectual Capital

Evaluation Model for Experts Social Networks (Based on Case Study)

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Abstract

Every Social network is considered as a structured Society constitute of individual or organizational group which are associated together within different type of dependency. The most important elements influence the success of such social network is the level of interest for sharing the information. This article addresses the important factors on assessment of Intellectual National Internet Network(ININ). For assessment we propose Enhanced technology acceptance model which we deployed by extending Davis TAM(technology acceptance model).ININ is a web base sites for think thanking of researchers which is acting within a four month at RICT(Research institute of ICT) and the number of 214 ICT researchers distribute and delivered their experience. The result shows that in intellectual society, Intelligence has higher values to be disseminated and higher inspiration is needed for its successful sharing in new generation of Information technology.

Key Words: Social network, Community, Technological evaluation model, knowledge sharing.

1. Introduction

Nowadays, each employee should share his experiments. This is the basic requirement for competitiveness of his corporations. However, it's hard to make sure about occurrence of sharing because the generated knowledge will be confined among the employee. The first initiative in knowledge management concentrate on providing centralized database, network systems and related software application, but these technical requirements are not fulfilling our goal. The new trend focuses on recognition of a special society which improves the behavior to share the knowledge by using the incentives awards, trust, connection and etc.

Knowledge sharing involves some behavior which help its exchange. A next generation IT institute can exclusively create a social group to distribute and transfer knowledge. The main goal of this group is to convert the individual knowledge to the organizational knowledge[1] [2].But what reason cause the organization member to share knowledge .Some studies is based on theory of reasoned action claims that success is gained through Volition and leadership.

Indirect reward expedition of bilateral relation self stem and organization environment encourage sharing of knowledge. Wong et al.[3] suggested that building long lasting positive relationship with employee helped generate organizational knowledge. Ramasamy et al. showed statically that making a close ties among organizations extends organizational knowledge [4].Other researchers theorized the role of social capital in sharing knowledge. Wing et al [5] have evaluated the social capital and provide theoretical frameworks that confirm effect of social capital factors in knowledge sharing.

According to Comscore[6]some of main social network site like Hi-5,myspace,facebook have dramatic growth in 2007 . Today the number of employees who think social network subscription is important for promoting their carrier is suddenly increasing. Despite the social network services' perceived impact, research on identifying the psychological process of using social network service is still in its early age. Most of information systems are knowledge-oriented. It means that the main goal is providing useful information for users to take the better decision.

In this article first we review technology acceptance model and current model for evaluation of social network. Then by using that model and the experts idea dimensions and component of our model for evaluation of social network is extracted. In the next step we experience a social network for Knowledge sharing and brain storming

among Iranian Intellectuals. In the end we analyze our proposed model base on statistics.

2. Inspection of models for technology user acceptance

There is a common belief of technology acceptance which tells the usage of a system is indicator and metric of acceptance for the user. In this direction two metrics of the number of usage and life time of usage is added as the measuring metric [7].Current studies with three approaches explain why and how a new technology is accepted or rejected by users. These approach are as follows:

1)user satisfaction :In this model the main effort is measuring subjective satisfaction related to technology DeLone, W. H. & McLean, E. R. (1992)[8] present a model which declare as much user satisfaction is higher his inspiration for using the technology will increase.

2) Adaption with innovation: This category of studies is based on theory of innovation diffusion and has emphasis on certain aspect of systems. In theory of adaption with innovation there is a process on which users can acquire some information on new system which helps them in using them. After understanding this information decision about acceptance or rejection of new technology is based on the insight of 5 important factors: relative competency, adaptability, complexity, and trial ability, observe ability [9]

3) Behavioral theory: this kind of studies is based on theory of behavior and specifies the relation among three factors of attitude, decision and real behavior .Davis has investigated the work of other researchers on this area and reveal the deficiency of their research. The problem in other research is in this points that they did not consider users' psychological factors and the organizational factors or users were forced to use the technology. Then Davis presents the technology acceptance model which heals mentioned deficiency [10].In technology acceptance model it is assumed user belief and thoughts about new technology affects forming and development of users' view on system and their behaviors. In this model the effect of external factors in internal belief of individual was under study and in users' adaptability with Information technology systems discussion two new factors is added to users' belief. These two new factors are usefulness and ease of the use which determine individual behavior. These two factors is equivalent to relative competency and complexity in Innovation Diffusion Theory [7, 10]. Davis's technology acceptance model points to six factors: External variable, Usefulness, Ease of use, Individual views, behavioral intension, real usage of system.

The more research shows there is some deficiency Davis model because there are not clearly considering users characteristics by which the new and better model is

presented [11]. D.Goodhue, R.Thompson [12] suggest their model in order to remove the deficiency in Davis model in which they provide 5 elements which are: technology characteristics, obligation requirement, equivalence between technology and obligation ,individual performance and real usage of system. In spite of difference in models, all of them are converged at considering the significance of understanding user's behavior. User tendency to employ the system will fulfill the organization strategic goal[13].] Chow, W.S. and Chan studied these models and presented a model specialized for social network. In this model 6 main factor as social network, social trust, shared goals, knowledge sharing attitude, knowledge sharing subject, decision to share information.

3. Introducing social network of ININ

In the field of communication and information technology RICT (the former Iran Telecom Research Center) , is the biggest educational and research institute of ICT in middle east. It has a wide range of solution from telecom switches to next generation network   and from Mobile system to IMS and has 500 experts with the least degree of bachelor on ICT related courses. In developing an national project on recruiting internet which needed a wide range of expert, chairman (the deputy of ICT ministry) decided to ask for contribution of latent capability of employee. This was the creation point for social network of ININ (intellectual national internet network).Using the innovation power of employee to develop the novel products was first applied by Kartzer et. al. [14].He created a social network to manage developing program of new product.

Therefore this was relatively new model for research activity in RICT. Joining ININ was not the main duty of staff and was added to the main activity of every one job in voluntary way.

Therefore a group of RICT managers took responsibility to organized working group for convention and brain storming among expert related to their occupations. The aim of working group was clarifying the ambiguities of national internet network(NIN).

Here we should distinguish between working group and specialized group .Before carrying NIN mega project in RICT, it had three research department and every department consisted of a number of specialized groups .But to handle NIN mega project, a number of independent professional working group with an exclusive interest to RICT's specialized group formed. The topics of working group was assigned on the requirement of NIN mega project. Intellectual member of it was gathered from specialized group in research department of RICT.

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3-1) Management and organizing work groups

Number of 22 workgroup established for brain storming among RICT technical staff .during the first session it became clear that four group have a common activities (group2&3, group12&13) so they merged and 20 group pursued their activities. Everyone employee could register at maximum two working group. In table.1 the working group is introduced. For activities of these group a new regime was assigned e.g. Senior managers of RICT (10 people) registered in all working group. The limitation of registering in 2 working group caused this problem that some working group suffered from the lack of key members. Therefore ININ managers invited the experienced staff to subscribe on more than two workgroup.

At first each working group held sessions so member had an appropriate chance to confer about goal of NIN

and their role in fulfilling the targets. In these meeting workgroup director delivered a report about the targets and the area of interest related to NIN. Then the members of workgroup presented their ideas and challenged other colleague suggestions and in this way a brain storming was reached to some proposals and solutions. Management of different workgroup and their presentation was depended on directors who had different experience to instruct workgroup. At the end of physical session the NIN forum which was a web based application for knowledge sharing was lunched .By using this platform Intellectual National Internet Network was formed in which RICT intellectual began to exchange their ideas.

In order to analyze the work group activities we gathered statistics of appropriate metrics. According to Table 1.

TABLE I. STATISTICS OF SOCIAL NETWORK FORUM

NIN work group	Area of Work Group activity	Members No.(Mn)	Topics No. (Tn)	Post No. (Pn)	Views No. (Vn)	Activity Time (day) (At)	Manager Files No.(MFn)
WG1	Strategic Management	38	4	8	132	38	0
WG3	Governance & juristic & regulatory	35	2	8	54	1	1
WG4	Customization & national security information	42	23	29	436	8	0
WG5	Integrated security management	40	3	3	43	2	0
WG6	Access network	57	0	0	0	0	0
WG7	Network management	25	21	32	415	30	2
WG8	Costumer care & billing	19	6	7	92	20	0
WG9	Customizing basic & open source software(for Persian users)	18	1	0	12	1	0
WG10	National network & basic services infrastructures	30	4	8	102	12	0
WG11	Value added services	58	19	72	861	30	4
WG12	Private network & security value added services	20	3	4	25	1	0
WG14	Social network	39	31	54	924	63	2
WG15	Architecture & security solution (application, service & infrastructure)	23	27	71	626	27	1
WG16	Integrated Core and edge network	50	10	74	701	36	1
WG17	Service network for IMS & NGN	27	1	1	13	1	2
WG18	Multimedia	20	3	15	116	26	0
WG19	Quality of services and service level agreement	20	0	0	0	0	0
WG20	E-government basic services	33	8	16	239	15	6
WG21	Transmission	41	0	0	0	0	0
WG22	Economics and market analysis	30	0	0	0	0	0

These metrics are Number of posts, Number of topics, Number of views, activity life time and managers files. Our definition of activity life time is the time between first and last file uploading or posting script .After five month of lunching this forum there are views of visitors surfing but without sending post or uploading files. Viewing the forum does not increase any knowledge in forum therefore it is not considered as activity life time. The activity life time is defined the time between the workgroup creation and the last post within the forum .The definition of other metrics is as follow:

Number of manager files: This number indicates files uploaded by workgroup director to specify working area and interest of work group.

Number of views: This parameter shows the number of visiting the NIN forum.

Number of Topics: This is the number of subject which is collected in the brain storming session to be discussed on the NIN forum.

Number of Post: This parameter shows the number of contribution of members on which they write about their extended experience and knowledge on some topic or reply to their colleague posts.

Number of member: The total number of people subscribed at NIN social network work group (every employee could subscribes in more than one work group).

For developing NIN forum drupal ,which is an open source platform and considered as a content management system, is configured and mounted on a servers of RICT Data centers.

All the employee could have access to it by accessing intranet of RICT after registration. One of specification of content management is distinction between web site design ,content, business, logic and its options. These capabilities allow changing some part of this platform without affecting other parts. The structure of drupal is capable to create content ,adding your comments, writing blog and etc. Users can have different access privilege such as sight manager , normal user who only had access to their register work group and RICT high rank managers who accessed to all work groups. A simplified topology of relation between work group registered members is drawn in figure 1.

4. Developing a model to analyze ININ social network forum

Within models introduced in introduction and with consulting with elite researchers at RICT we introduced a three layer model consist of eight element. These element are management factors, organization and execution factor, social network, social trust, shared goals,(in first layer) subjective norm about Knowledge sharing, having behavior about knowledge sharing (in second layer), sharing knowledge intension(in third layer) as shown in Figure 2. Each dimension of proposed model have some components that are explained in Table2. Theses dimension was used to analyze ININ social network forum. Because of time restriction and validity inspection of model in this article we limited ourselves to presenting the model and analyzing the statistics of ININ social network forum based on its workgroup activities in Table. 1.
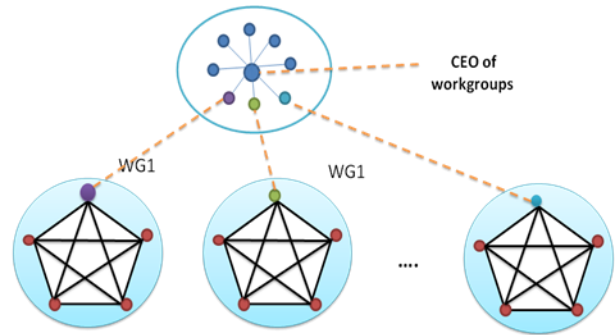
Ten of Top managers are contributed in all Workgroups.

Figure 1: Connection topology among members of workgroup at NIN forum.
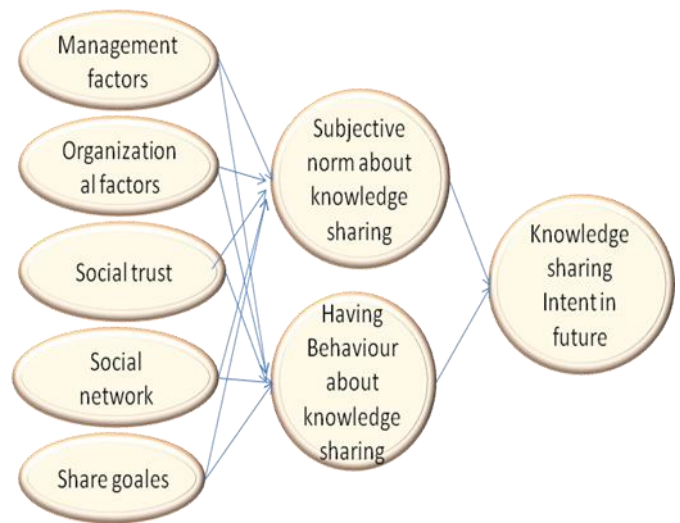

Figure 2: Proposed Model for evaluation of expert's social network

5. Empirical analysis of NIN forum statistics based on proposed model

For social network assessment based on figure 2 there exists two methodology: One of them is qualities' assessment based on questionnaire filled by intellectuals subscribed to ININ social network forum..

The second method bases on analysis the statistics of ININ social network forum. The quality assessment will be covered after validation verification ININ assessment model (figure (2)). These statistics are drawn in Table (1) and their relation to model factor is described as follow:

A-Number of management file (MFn) is interpreted as an indicator of Management factors in our model. Because as much more management interest to recruit more members sharing their knowledge, his contribution would be in

higher rate and he will distribute more knowledge by uploading files in NIN Forum to activate more member

B-Number of views(Vn) is considered as an Indicator of organization factor in our model because by increasing affiliation the members has more frequent visit ININ social network forum.

C-Post number (Pn) is the number of contribution of members to post their experience and it is logical to take it as index of social trust.

D-number of members Mn is equivalent to social network factor. By increasing the number of members, user community as a most important index will find the better indicator of social network

E- The topic number is Tn the main subject extracted in brain storming session between members and work group director. Therefore it can be considered as metric of shared-goal because these topics are used as a dominant field of knowledge sharing in work groups.

After introducing the first layer factor by using statistics of table1 we should calculate the second layer factors (Subjective norm about knowledge sharing and having behavior about knowledge sharing) from the first layer factor in figure (2). If there exist the subjective norm about knowledge sharing it means that members have potential inspiration to share in ININ social network forum. This parameter depends on normalized product of visit and members   and normalized product of activity time and member of ININ social network forum which is:

Subjective norm about knowledge sharing =

$$(\alpha_{v,m} + \alpha_{AT,m})/2 \qquad (1)$$

In equation (1) $\alpha_{v,m}$ is the normalized product of The number of visits paid by members and number of work group member which is calculated as follow:

$$\alpha_{v,m} = \frac{\sum_{i=1}^{20} M_i.V_i}{\sqrt[2]{\sum M_i} * \sqrt[2]{\sum v_i}} = 0.88 \quad (2)$$

On the other hand $\alpha_{AT,m}$ is normalized product of activity time and number of work groups member, which is defined as follows:

$$\alpha_{AT,m} = \frac{\sum_{i=1}^{20} M_i.AT_i}{\sqrt[2]{\sum M_i} * \sqrt[2]{\sum AT_i}} = .75 \quad (3)$$

By applying equation (2) and (3) in equation (1) the subjective norm about knowledge sharing is equal to 0.783

In the same way for calculating the other second layer factor i.e. having behavior about knowledge sharing we make the average of three normalized products of (topics & members), (posts & members), (posts & activity time) as follow

Having behavior about knowledge shaing =

$$(\alpha_{t,m} + \alpha_{p,m} + \alpha_{AT,p})/3 \quad (4)$$

And its relation between work group activity time and number of visit

$$\alpha_{t,m} = \frac{\sum_{i=1}^{20} M_i.Tp_i}{\sqrt[2]{\sum M_i} * \sqrt[2]{\sum T_i}} = 0.670 \qquad (5)$$

$$\alpha_{p,m} = \frac{\sum_{i=1}^{20} M_i.P_i}{\sqrt[2]{\sum M_i} * \sqrt[2]{\sum P_i}} = 0.646 \qquad (6)$$

$$\alpha_{AT,p} = \frac{\sum_{i=1}^{20} p_i.AT_i}{\sqrt[2]{\sum p_i} * \sqrt[2]{\sum AT_i}} = 0.828 \qquad (7)$$

By using equation 4 to 7 the factor having behavior about knowledge sharing would be 0.714.

The higher normalized product shows the better situation .If we compare the two values of subjective norm about Knowledge sharing (0.783) and having behavior about knowledge sharing (0.828)we reach to this fact that inspiration of individual for being active in ININ social network forum was higher than their behavior to share knowledge .therefore the manager of ININ could not use the employee inspiration in the best way in knowledge sharing and brain storming.

In figure (3) the amount of parameter $\frac{V_n}{M_n}$ is compared with $\frac{P_n}{M_n}$ .we can observe that the number of visiting is five time of the number of posting a script in all work groups and many of members do not like to share knowledge in spite of visiting the sites.
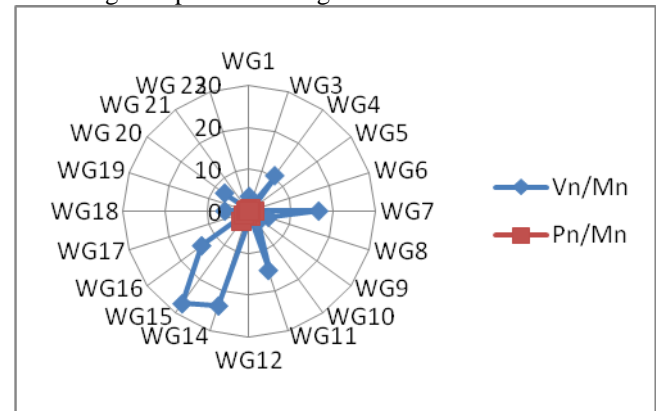

Figure 3. The amount of parameter $\frac{V_n}{M_n}$ is compared with $\frac{P_n}{M_n}$

Figure 4 shows that the the workgroup 14,15,16 have the highest post divided to members .while figure (5) indicates that the work group 12,17,3 the rate of posts divided to number of view is highest among all workgroups.Which reflects the high amount of knowledge sharing INNI forum.we should mention this fact that

member of some work group were in a close neighborhood(same geographic location) so without using the ININ social network forum they could negotiate and held meeting to share their knowledge so lack of activity for every work group dose means their lack of presence in ININ social network forum.
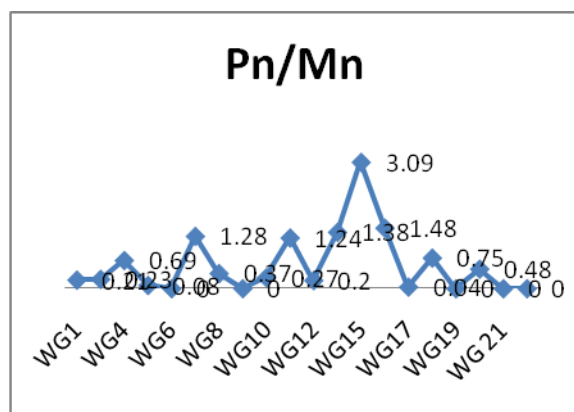

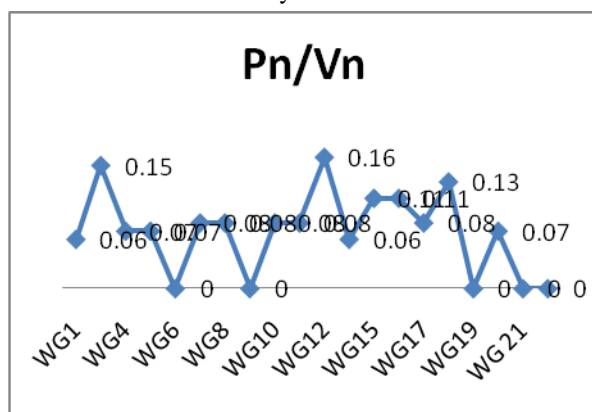Figure 4. The Comparing between different workgroups by Pn/Mn

Figure 5. The Comparing between different workgroup by Pn/Vn

6. Conclusion

User community, individual inspiration and shared knowledge are the factors causing a social network to be successful. In this article we reviewed different models of evaluating social network and the main dimension of models are extracted and with consulting of specialist a model for evaluating social network is proposed. This model shows that in first layer the factors as: management factors, organizational factor, social trust, social network and share goal .These factor combines and resulted in

subjective norm about knowledge sharing and having behavior about knowledge sharing. If the second layer factors have synergy the result would be the knowledge sharing intent in future which is the third layer factor in our model. Evaluation of RICT shows that the employee inspiration is more than shared knowledge. Therefore for future use of this network management should increase trust among the employee and directing their inspiration to share knowledge in the network. Researcher wants to analyze the proposed model with the Structured Equation Model.

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Dimension	Component
Management Factors	Transparancy of management initial goal to construct social network Having attraction and stimulating property of goal discrirbed by management for employee Existance of comprehensive and forsights in goals and strategies which is provided by management of network for creation of social network
Organizational factors	Appropriate management and scheduling of social network Dissamination and advertisement about social network execution and network creation Appropriate technical property of network Coordination of network managers about social networks Simplicity and ease of work in network
Social network	Good relation between network member Belife in effect of network member for success of group members Interest in presenting and sharing knowledge in network Feelling that NIN would be successful by countribution of social network members
Shared goals	Dedicating a spare time to have discussion among members of social network Paying attention to the importance of NIN project and scientific aspect of network Being intrested in colabrative mission and network goales
Subjective norm about knowladge sharing	Amount of experience and knowladge of social network director Eligibility of social network members Social networks manager interest to encourage knowladge dissamination and his assistance with members Social network manager encouragement the group working and caolaboration among network members
Social trust	Creating a knowledge transparent environment and prevent hidding information between members Network manager well treatment with members Members believes that subscribtion in social network is logical and wise action Considering subscription on social network as a valuable experience Thinking of countribution in social network as a enjoyable experience
Having befaviour about knowladge sharing	Dedicating time to view ININ social network forumsite Delivering your thought transparently Wheater Knowlage presented in ININ social network site is useful and scientific
Knowledge sharing intention in future	Managers attention to use the potential power of members as a social capital Managers concern to create stimulus in members by creating ININ social network forum Management role in persuing coapration with members to create social network Managers attention to forum halls in network as a repeatable and effectiveness expertise in future