

**INVESTIGATING EMPLOYEES' TENDING TO KNOWLEDGE SHARING BEHAVIOR USING
ROUGH SET THEORY (RST)**

(Case study: Asset office of yazd)

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ABSTRACT

These days in different countries such as Iran, managers tend to create knowledge management systems in organizations with the goal of taking advantage of its beneficial results. Abonnement of introduced processes in different knowledge management structures is sharing knowledge and people's motivation for sharing their knowledge in organizations is also one of the most important priorities of those involved in knowledge management in today world. One of the main goals of managers in using knowledge management in organizations is improving knowledge sharing among people in organizations and also between people and organization in order to creating competitive advantage. Effective knowledge sharing among organization's members lead to reducing knowledge production costs and the guarantee of better recognizing of working methods with the result of facilitating problem solving and organization's difficulties. Employees' tending to knowledge sharing behavior is investigated in this study and an overall look is proposed related to effective factors on people tendency to knowledge sharing for setting a goal and making knowledge sharing special strategy in organization. Statistical population is the employees of Yazd asset office (180 people) and sample volume is 123. The methodology is descriptive and sampling method is simple random. Data are collected through questionnaire. The goal of performing this research is analyzing strategies to increase the willingness of employees' knowledge sharing behavior. Research findings which are provided with analyzing collected data by questionnaire and are analyzed through ROSE 2 software show that attitude, subjective norm and perceived behavioral control affect employees' tendency to knowledge sharing behavior.

KEYWORDS: Rough Set Theory (RST), knowledge sharing, information system, decision feature

INTRODUCTION

Knowledge management is the process of value creation for intangible capital of an organization. Intangible capital that is called spiritual capital as well includes structural human capital and customers' capital or relationships. Human capital is an organization's mental-knowledge power of people. Structural capital is also called spiritual asset. Organizations investigate knowledge management for some reasons, first is for increasing innovation in organization. The main reason of this is people's isolation and their retirement that brings going out of organization. With recognizing employees' knowledge before their retirement, required theme will be increased for creation of organizational memory or knowledge base through knowledge management activities. Work crowds where people share their beliefs and values are a part of knowledge management programs.

Therefor people's attachment must be increased because employees' conscious will be increased during these crowds' membership and cooperation. According to Francis Biken knowledge is power and knowledge management concentration is on this point that knowledge is a power. Now through internet technology and web knowledge remote and isolated parts can be attached to each other. Thoughts' cooperation for creating new idea isn't a new concept but facilitating knowledge sharing in an electronic web environment is almost new. Foundation of knowledge management is based on people, culture and technology. Experts believe that 80% of knowledge management depends on people and the rest 20% depends on knowledge management technologies. Knowledge management's cultural aspects of the people are rooted in organizational behavior of human resources management and management principles. Technology

is based on artificial intelligence, knowledge engineering, IT, library science and information systems. A real changing of approach which make knowledge management difficult is changing the concept direction of Individualistic and competitive "knowledge is power" to cooperative and collaborative approach, "sharing knowledge is power." In order to promoting knowledge sharing, cultural developments are needed to happen (Libovitz, translated by Hassanzadeh , 2005).

In the following, first we discuss research literature and history then research's model and method will be presented. Conclusion and suggestions are the next parts of this article.

Research literature

Knowledge management definitions

Knowledge management: it is a social activity that needs voluntary involvement, high committed people and voluntary participation. People will promote easily in sharing attitudes and goals with feeling of efficiency and attachment (Kwok & Gao, 2004). Knowledge management is a systematic and external management related to activities, performance, programs and policies. Process of production and conflation of knowledge in each organization causes that knowledge effective delivering to appropriate people at the required time will be possible with performing knowledge management (Karolin, 2008). Knowledge management is a process where during that, an organization gains health through their intellectual assets or knowledge assets. Knowledge is a mixture of structured knowledge, standards, values and information, empirical attitude and a framework for evaluation and uniting experience and new information (Karolin, 2008). Sharing knowledge is explained by Mak Dermat in this way that when we say somebody shares his knowledge it means, that person guide another person using his knowledge, vision and thoughts to help him for better looking at his position (Keshavarz, 2008).

The common problem of knowledge receiving or transferring depends on the kind of knowledge. More or less evident knowledge can be included in working processes and showed in the form of instructions, written methodologies and information bases and exchange them with significant accuracy but intangible transfer of knowledge needs many human relationships. Although knowledge sharing can be realized through participation in knowledge, teaching and making student-teacher relationship, but none of these methods will be effective without creating intimacy in working relationships. This kind of knowledge transferring relationships usually provides the field of tangible knowledge and intangible simultaneously. Offices that are committed to transfer intangible knowledge usually create a formal educational program that knowledge transfer to younger employees will be an obvious part of job description of specialist and senior staff (Davenport and Prosak, translated by Rahaman Seresht, 2004).

Knowledge management methodology

Different scholars have proposed different methods for implementation of knowledge management which some of them will be mentioned as following.

Leibowitz and Bachman:

- Identification: key essentials, main strategies and knowledge field are clarified.
- Available knowledge is formulated.
- Relationship selection and knowledge validity are evaluated and the knowledge is being lost is clarified.
- Common memory of organizational knowledge is being opened in the form of knowledge different plans.
- Sharing knowledge: knowledge is distributed automatically based on users' activity and interest and it is tried to cooperate in the field of knowledge work in the form of virtual groups.
- Implementing knowledge is used for making decisions, problem solving or supporting the performances and helping duties and training.
- Knowledge creation: a new knowledge is discovered through empirical experience and creative thought.
- New productions and knowledge-based services are provided or sold.

Markwart:

- Collection
- Creation
- Converting and using

- Saving

Wig

- Creation and establishing
- Combine and convert
- Distribution
- Using and valorizing

Van DraspikEspikrot:

- Knowledge development
- Maintaining new and available knowledge
- Knowledge distribution
- Combining available knowledge

RuikruRaglez is somehow more complicated.

- Creation (Creating, collecting, sorting, uniform, adjusting)
- Coding (Conquer opening)
- Transferring

Odel has used a seven direct level method.

- Identification
- Collecting
- Adjusting
- Organizing
- Implementation
- Sharing
- Knowledge creation

HolespalVeushi:

- Collecting (gathering, the extract, interpret, transfer)
- Selection (locate, retrieve, transfer)
- Internalization of knowledge (assessment, goal setting, deposit)
- Using knowledge
- Knowledge creation (Showing assessment production of transfer)
- Outside projection (targeting, production, transfer)

Daitaver has discussed seven levels for knowledge management:

- Identifying business problems
- Readiness for change
- Knowledge management teams
- Manipulation and analysis of knowledge
- The definition of the basis processes for problem-solving procedures
- Creating basic building blocks of knowledge management
- Linking of knowledge to people

Vandarspike and Dohog:

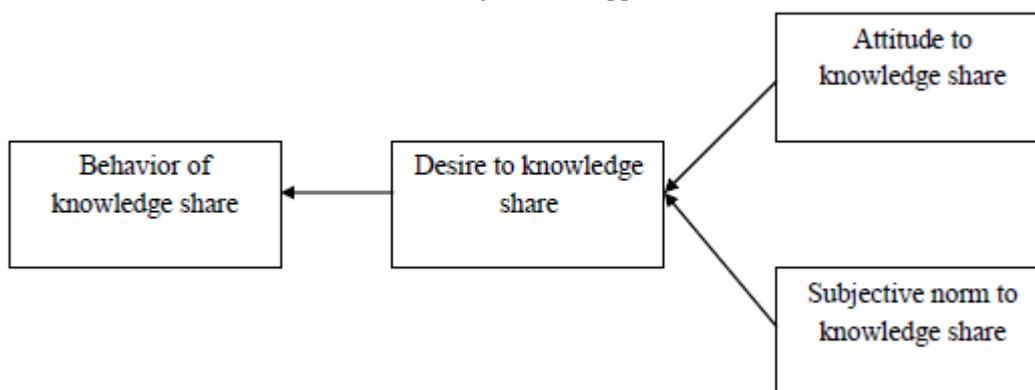
- The conceptualization (existing knowledge discovery, analysis of strengths and weaknesses)
- Reflection (decision for required modification , preparation of plans for improving the process)
- Action (providing of knowledge, the combination of knowledge, distribution of knowledge, dissemination of knowledge)

- Review (new and ancient items comparison, evaluation obtained results) (Leibowitz, translated by Hassanzadeh, 2005).

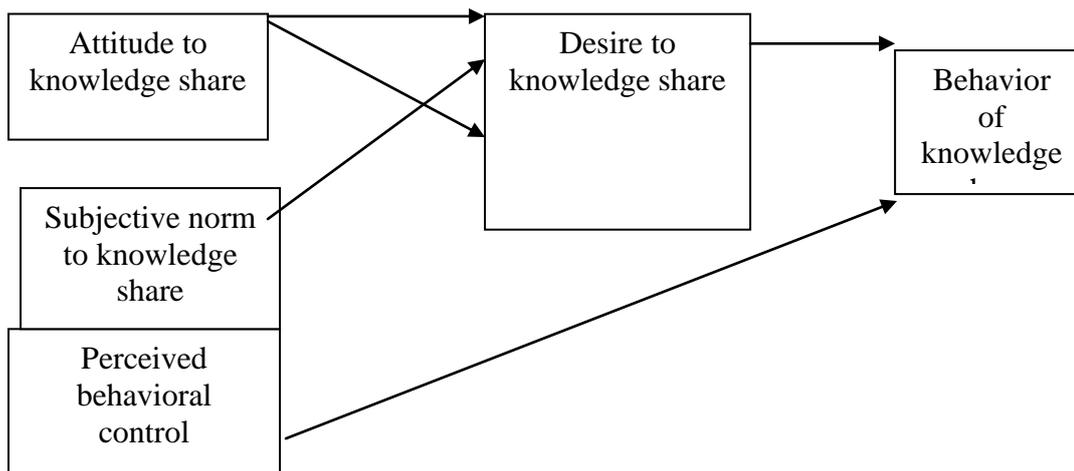
Dickson believes that choosing an appropriate sharing knowledge process in an organization depends on factors such as the kind of knowledge (implicit or explicit), usual method and the frequency of sharing knowledge process and knowledge receiver (individual, group or whole organization) (Keshavarz, 2008, p 8).

Designed behavior theory is discussed by Ajzen in 1985 in an article named “from tendencies to behavior”. It is an expanded model from TRE (Theory Related Action) that had been discussed by Martin Fishben and Isaak Ajzen in 1975. Mentioned model is as follows: (Ajzen, 1991, pp 179-211).

Model TRA (Ajzen, 1991, pp 179-211)



Model TPB (Veramicky and Chetezgo, 249: 2009)



TRA theory investigates tendencies on under condition behavior, high voluntary control on behavior while Ajzen investigate tendencies on under condition behavior, low voluntary control on behavior. The difference between TRA and TPB (theory of perceived behavioral control) is in PBC. PBC investigates factors which are out of people’s control that affect their behavior (Ajzen, 1991). Designed behavior theory is a comprehensive framework for explaining a process that leads to forming a special behavior and also checks relationships and multiple results between behavior and special tendencies (Ajzen and Fishbin, 1980). The approach of planned behavior theory is discussed and used to show the rate of tendency capabilities on behavior. Designed behavior theory is useful in conditions that there is a significant voluntary control on behavior (in another word the success of designed behavior theory depends on the rate

of voluntary control on behavior) while as the rate of voluntary control decreases on a behavior (that is, in spite of behavior purpose, person isn't capable of doing that) the function of this model will face some problems, there is a third factor beside these two factors (subjective norm and attitude to sharing knowledge) which is called perceived behavioral control. When norms and attitudes of mind are stable, easiness or hardness of doing a behavior affect the purpose of that behavior strongly. In conditions that behavioral purpose is enough for doing something or voluntary control on that behavior is high, the power of third factor will be decreased. In this pattern it is said that doing a behavior is in relation with two bundled together factors: motivation (behavioral purpose) and ability (behavioral control). Ajzen expressed his idea as this: a person who has high perception of control on his behavior and there is purpose of doing that behavior in his mind more likely will do that job. Perceived control depends on the existence or lack of facilitators or obstacles of doing a behavior or perceived ability. With the existence of high rate of control beliefs about the existence of facilitators for a behavior, perceived ability of person will increase on behavior (Ajzen et al, 1992).

Subjective norm

Subjective norm refers to perceived social pressure by person for doing or not doing goal behavior. People often behave based on their perception from what others think they should do and their intention for behavior acceptance potentially is affected by people who they have close relationship with (Mathieson, 1991, p 181).

In another word, subjective norm is person's perception toward of those people who are important for him think that he should or shouldn't do a behavior (Fishbin and Ajzen, 1975, 302).

Attitude

Attitude includes positive or negative feeling about goal behavior doing. Individual attitude toward behavior is the product of attitude beliefs and those outcomes' evaluation (Fishbin and Ajzen, 1975, p 216).

Perceived behavioral control

Perceived behavioral control is perceived ease or difficulty for a behavior (Ajzen, 1991 p 188).

Research history

Rough Set:

Considering, this research has been performed with new approach of RST concept; current research history is proposed in a part related to RST (Rough Set Theory).

In recent years, increasing attention to analysis using RST has become common. In 1998 a model for predicting purchase and discovering knowledge about customers' behavior patterns has been proposed using Rough classification. In a research named analyzing halo error of customer behavior using Net promoters index (NPS) Rough Set Theory (RST), this subject was also investigated by Effat Mohammadi and Reza Sheikh. A research named "identification and ranking successful managers' features based on John Aplin" was identified and then ranked using RST and hierarchical analysis. A research was performed named "analysis of strategies for increasing students" using RST in vocational Faculty of Sama Kerman by Sheikh poor et al. There are many researches about different aspects of sharing knowledge. For example investigating environment and organizational culture of six Russian offices showed that, those offices' culture is the opposite of sharing knowledge culture. Another research has also shown that optimizing knowledge streams in organization through staffs' relationship with customers' and stockholders help development of strategic methods by organization. The other research showed that sharing organization's knowledge has an important role in improving overall performance of organization (Keshavarz, 2008).

The study of Noriko Hara about sharing knowledge in professional groups such as nurses that has been performed with the goal of investigating the way of sharing knowledge and different kinds of sharable knowledge shows that professional organizations and societies should examine the potential ability of network communications widely to empower their members in sharing knowledge and create professional environments. Since much knowledge of people is implicit and invisible, professional societies such as nurses are one of effective tools for sharing knowledge. Face to face communications with a formal structure are time consuming and expensive. The members of professional societies through net communications such as internet can easily exchange experiences. One of very important methods for sharing knowledge among society members such as nurses is conversation. In a network system, some conversations related to sharing knowledge happen and a person who is searching for knowledge send an open question or helping request via network and a knowledge responder explain his answer in the form of a story or similar experience.

Professional societies are a group of people who pay attention to a special subject or a set of subjects. They spend their knowledge and skill in interaction with each other and dynamic environment (Noriko Hara, 2007, pp 235-261). Rivera and Fournier investigated effective cultural obstacles on sharing knowledge. Their goal was investigating cultural obstacles and the methods of overcoming those obstacles for creating an environment for producing and sharing knowledge (Rivera et al, 2009). Kwok and GAO investigated sharing knowledge with decentralized networks P2P (face to face) and showed that can we provide necessary motivation for people and group with decentralized networks P2P to produce and share knowledge. In P2P environment, certain knowledge is shared and gap between knowledge producer and receiver will be removed and the possibility of verbal and visual communication will appear for required knowledge sharing (Kwok and GAO, 2004).

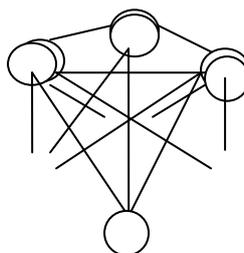


Figure 4-2, network structure of P2P
Kwok and GAO, 2004

Asefzadeh and Piri studies about five main elements of knowledge publishing with goal of functionalizing produced knowledge show that for functionalizing produced knowledge, an appropriate planning must be provided for publishing knowledge considering the features of effective publishing with users' participation (Asefzadeh and Piri, 2004).

Bahrololoom investigated the relationship of leadership and organizational culture and analyzed facilitating resources of four key activities of knowledge management from new perspective with the goal of clarifying the relationship between culture, compatible leadership style with that and effective performance of knowledge management in each one of four areas of production, saving, transferring and knowledge function (Bahrololoom, 2007). Ruy studies show that tending to knowledge sharing has a relationship with the behavior of sharing knowledge. There are some studies about effective components on sharing knowledge behavior by Ajzen as well (Veramiki and Chatzogolo, 2009). The studies of Sheeran and Orbell expressed that many people with tendency to positive sharing knowledge haven't been able to succeed in creating new behavior of sharing knowledge (Veramiki and Chatzogolo, 2009). Millar and Shervlin investigated theoretical planed behavior model (TPB) with considering the variable of previous behavior and concluded that people's behavior will be affected ideally by their past behavior (Veramiki and Chatzogolo, 2009).

Effective factors on model's variables and components are studied as following by different scientists.

- Zmud, Kim and Bock Behavior of sharing knowledge was studied by Lee,
- Different levels of IT were studied by Bock, Kim, Pen
- Tending to sharing knowledge was studied by Ajzen, Bock, Kim, Pen, Lin, Ruy and Lee
- Attitude to knowledge sharing behavior was studied by Ajzen, Bock, Kim, Pen, Lin, Ruy
- Subjective norm to sharing knowledge was studied by Ajzen, Bock, Kim, Pen, Lin
- Perceived behavioral control was studied by Ajzen, Lin, Ruy and Lee (Veramiki and Chatzogolo, 2009, p 250).

Effective factors on people's attitude toward of sharing knowledge are divided to subjects of software and hardware. Hardware is related to tools and technology and software is related to motivators and encouraging stimulus of sharing knowledge (Flores et al, 2009 p 258).

METHODOLOGY

Current research is a functional one in terms of goal and in terms of collecting data is an analytical-descriptive research and a kind of survey one.

The way of collecting data are library and documentary, research is based on internet and using field study, for collecting data and research history, specialized books and articles have been used.

Research tool is questionnaire, one question "do you share your knowledge with others or not?" is added to questions.

In table 1, there are 13 objects with three features; a_1 attitude and a_2 subjective norm and a_3 perceived behavior control, these features are known as conditional features.

Decision feature that based on it, staffs' ideas are evaluated is this question that "do you share your knowledge with others or not?"

Questions 1 to 4 are related to attitude = a_1

Questions 5 to 8 are related to subjective norm = a_2

Questions 9 to 13 are related to perceived behavior control = a_3

For answering questionnaire five degree Likert scale (1 absolutely disagree to 5 absolutely agree) is used.

Validity and reliability:

Validity is one of measuring tools' technical features. The meaning of validity is if measuring tools can evaluate characteristic or feature that tool is designed for that.

For determining validity, questionnaire and research subject were given to five people of professors and experts of management to give their ideas about suitability of questionnaire's items and their proportion with subject. Using content validity method, the rate of validity was obtained as 0.92.

Reliability means if a measuring tool, that is made for evaluating variable and adjective, is used in similar conditions or another place, similar results will be obtained from that; in another word reliable tool or variable is a tool that has property of repeatability and same results measurement.

In another word the meaning of reliability is that the results which are obtained from that test's function in evaluating with research must be the monotone.

Statistical population and sampling method:

Statistical population of this research is all staffs of Tax Affairs office of Yazd 180 people that 123 of them were selected as sample randomly.

Data analyzing method

Information systems and rough set theory (RST)

In computer science, RST was first founded by a Polish scientist, professor Zed Silaw Paulk, in early 1980. Finding an equivalent for RST is almost difficult. In dictionary there are some equivalents for rough such as rough, coarse, coarse, approximate, rude, turbulent and lumpy. Among these words, approximate is closer to what the founder of this theory means. This theory works with analyzing data table that data tables can be obtained by measuring with experts and aware people. The main goal of RST analysis is obtaining approximate concepts from acquired data. This theory is a powerful tool of mathematic for reasoning in cases of ambiguity and lack of certainty and discovering hidden patterns in data that provides some methods for removing and reducing irrelevant or more than required information and knowledge from data base. In this process removing extra data is performed based on training and without losing main data of data bases that as a result data reduction, a set of tabloid and significant rules are obtained that simplifies the decision maker's job. In fact it can be said that with reducing data space and choosing important expressions, RST does a mapping of the raw data spaces and the term of conductor to concepts' space. So considering the explosive growth of data volume, RST can have an effective role in decision support systems because it can be used for patterns' extraction and decision making rules, data reduction and ...through recognition and partial and total dependence and delete duplicate data. RST has a lot of common points with fuzzy set theory, theory of intuition, Boolean argument methods and discriminant analysis. The main advantage of this theory is that RST does not need data extra information such as probability and Statistics degree of membership in the fuzzy theory but RST is considered as an independent theory.

RST is known as one of the most functional methods in discovering knowledge in informational systems. This theory is generalized form of Classical set theory and its base is on approximate. RST can lead to extra data reduction in tables and data bases though discovering dependencies in different data and using equivalence rules. One of the most important functions of RST is in relevant affairs of classifying and grouping. The main goal of RST is obtain approximate concepts from acquired data. This theory is a powerful tool of mathematic for reasoning in cases of ambiguity and lack of certainty that gives methods for removing information surplus to requirements. Considering the increasing volume of Information and data on various issues and areas and also need to make quick decisions in the shortest possible time, RST can play an important role in making decisions based on tables and databases through reducing row data to main data. The special competence of RST is in interconnected analysis and a group of non-explicit data without the need for any additional and preliminary information. RST process collected data scientifically without personal opinion intervention and without any mental ideas (Roghanaian et al, 2014).

RST can be used in solving main problems in the field of data analysis such as:

- Clarifying a set of objects based on values and features
- Finding dependencies among features
- Removing (reduction) features of surplus data
- Finding the most important features
- Producing decision making rules

Approximation space and high, low approximate from a set are important concepts in RST. In fact in RST any uncertain and ambiguous concept which is often called class in classifications can be shown by its high approximate or low one. Contents of a collection include elements that certainly can be classified based on available data with a class. Extent area of a class is a collection of elements which can be classified in that class, whether exactly at that class, or it expressed as supplement (Roghaniaian et al, 2013).

In performing RST, collected data are entered in a special form of informational table that is usually shown in the form of flat table and is called “information system” or “decision making table”. Input information may be from different areas such as medicine, financial and military science.

Information system (IS) is an ordered pair (U, A), U is a non-empty set of objects and A is a non-empty set of features.

$$\forall a \in A \rightarrow a: U \rightarrow V_a$$

That V_a of the set of each feature’s values is called a in A.

Decision making system (DS) is an ordered pair (U and $A \cup \{d\}$), that $d \notin A$ is a decision feature but the elements of A are conditional features. Columns represent features and rows represent input and objects. Cells contain values of features in each object.

If scores are as follows, in order to meet hidden continuum system in Likert scale of five degree that range of valorization of features means $V_{a_i} = \{1, 2, 3, 4, 5\}$ for $i = 1, 2, 3, 4, 5$ values of conditional features, its cells are classified as below continuum categories.

Class 1= [0.5-1.5]=1= very low

Class 2= [1.5-2.5]=2= low

Class 3= [2.5-3.5]=3= average

Class 4= [3.5-4.5]=4= high

Class 5= [4.5-5.5]=5= very high

The values of decision feature are also as following:

$$\{\text{Yes, no}\} = \{y, n\} = \{0, 1\}$$

$$V_d = \{y, n\} = \{0, 1\}$$

$$C1 = \{x \in U \mid d(x) = y\}$$

$$C2 = \{x \in U \mid d(x) = n\}$$

Therefore considering analysis model and the number of indices table 1 is drawn for measuring and evaluating each feature. For example feature a_1 is measured by four questions or indices. The scores of this feature for each object is based on Likert scale maximum 4 and minimum 1. For example for question number 1 from attitude aspect, its scores are:

$$a_1(x_1) = \frac{q_1 a_1(x_1) + q_2 a_1(x_1) + q_3 a_1(x_1) + q_4 a_1(x_1)}{4}$$

$$a_1(x_1) = \frac{\text{question 1 score} + \text{question 2 score} + \text{question 3 score} + \text{question 4 score}}{4}$$

So considering that 3.25 is in the middle of 2.5 and 3.5, it will place in class 3 and therefore $a_1(x_1)$ is shown with code 3.

$a_1(x_1) = a$

Table 1 is organized based on this range valorization, information system that 21 rules were extracted from 123 collected questionnaires. In column N the number of frequency of elements is mentioned with similar features. In general mood for each feature $a \in A$, $V_a = \{a(x) | x \in U\}$ is a set of feature values a . now we consider an arrow space, a continuum set as an axis that includes V_a . We show this space with a^* . Each cut (a^*, m) , the checking of $m \in V_a$ of this space divides this space to two left area L_m and right R_m . The function of δ_m^* on U is defined as follows:

$$\delta_{m(x_1 y)}^* = \begin{cases} 0 & \text{If } a_x a_y \text{ be } L_m \text{ or } R_m \text{ in both of them} \\ 1 & \end{cases}$$

It can be easily seen that for each $m \in v_a$, each δ_m^* , $a \in A$ is a distance function so called discrete distance function on U .

Because

$$a - \delta_m^*(x_1 x) = 0$$

$$b - \delta_m^*(x_1 y) = \delta_m^*(y_1 x)$$

$$c - \delta_m^*(x_1 y) \leq \delta_m^*(x_1 z) + \delta_m^*(z_1 y)$$

Considering below partitioned cuts:

$$* = \rho = \{(a_{1,1.5}), (a_{1,2.5}), (a_{1,3.5}), (a_{1,4.5}), (a_{1,5.5}), (a_{2,1.5}), (a_{2,2.5}), (a_{2,3.5}), (a_{2,4.5}), (a_{2,5.5}), (a_{3,1.5})$$

$$(a_{3,2.5}), (a_{3,3.5}), (a_{3,4.5}), (a_{3,5.5})\}$$

The whole space of values' set:

$$V = \{a_2(x), a_3 \in a_1(x), (x) | x \in U\} = v a_1 * v a_2 * v a_3$$

Are ranked to below micro spaces, more simplified figure can be as follows:

Classification table

Category No.	upper bound $U = \leq a_{i(x)} \leq L =$ Lower bound	Category code
1	$0.5 \leq a_{i(x)} < 1.5$	1
2	$1.5 < a_{i(x)} < 2.5$	2
3	$2.5 < a_{i(x)} < 3.5$	3
4	$3.5 < a_{i(x)} < 4.5$	4
5	$4.5 < a_{i(x)} < 5.5$	5

Table: information system

	a 1	a 2	a 3	d	N
X1	3	4	3	1	5
X2	3	3	3	0	18
X3	2	2	2	0	6
X4	3	3	2	0	3
X5	4	4	3	0	7
X6	4	4	5	1	3
X7	5	5	5	0	14
X8	4	4	3	0	11
X9	4	4	4	0	28
X10	4	3	4	0	5
X11	2	2	3	0	2
X12	4	3	2	1	1
X13	2	3	3	0	3
X14	5	5	4	1	5
X15	3	4	4	0	2
X16	5	4	4	0	4
X17	4	5	5	0	1
X18	5	4	3	0	2
X19	1	1	1	0	1
X20	1	1	2	1	1
X21	3	2	3	0	1
					123

Each cut (a,m) converts the conditional feature a to a new pair conditional feature a^* with values $V_{a^*}^m = \{0,1\}$ that is true in below conditions: for each $x \in U$:

$$a(x) < m \Rightarrow a^*(x) = 0 \quad \text{if } a(x) \in l_m$$

$$a(x) > m \Rightarrow a^*(x) = 1 \quad \text{if } a(x) \in R_m$$

It means that if they place in both two sides of cut $a=m$, objects U are considered toward of new feature a^* , but if they place in one side of $a=m$, then two objects of x,y will be inseparable toward of feature a .

Based on these preparations, we make a new decision making system where elements of World's words U

$$A^* = \{a_2^*, a_3^*, a_1^*\}$$

But they are the set of new features.

Moreover

$$X_1 = \{x \mid d(x) = p \text{ f}(x) = 1\} = \{x_1, x_6, x_{12}, x_{14}, x_{20}\}$$

$$X_0 = \{x \mid d(x) = p \text{ f}(x) = 0\} = \{x_2, x_3, x_4, x_5, x_7, x_8, x_9, x_{10}, x_{11}, x_{13}, x_{15}, x_{16}, x_{17}, x_{18}, x_{19}, x_{20}\}$$

$$U/D = \{X_1, X_0\} = \{\{x_1, x_6, x_{12}, x_{14}, x_{20}\}, \{x_2, x_3, x_4, x_5, x_7, x_8, x_9, x_{10}, x_{11}, x_{13}, x_{15}, x_{16}, x_{17}, x_{18}, x_{19}, x_{20}\}\}$$

In fact conceptual set of x_1 includes staffs who share their knowledge.

And conceptual set of X_0 includes staffs who don't share their knowledge.

If $A = \{a_1, a_2, a_3\}$ is a set of features $\emptyset \neq B \subseteq A$

The arbitrary and non-empty set of A , then below relationship is called the relationship of inseparability of the objects U toward of B :

$$IB = \{(x, y) \in U^2 \mid \forall a \in B, (a(x) = a(y))\}$$

To put it simply that:

If x and y are two objects and for each feature which is in set B , the values of those two objects in value a are the same, then (x, y) will be in relationship IB and $-B$ will be inseparable.

In above decision making table or system, power set features regardless of the empty set will be as follows:

$$\{\{a_1\}, \{a_2\}, \{a_3\}, \{a_1, a_2\}, \{a_1, a_3\}, \{a_2, a_1\}, \{a_2, a_3\}, \{a_1, a_2, a_3\}\}$$

The number of non-empty subset of the conditional feature set

$$N = \text{card } |\text{Sub}(A)| - 1 = 2^3 - 1 = 8 - 1$$

Assume that there is an information system $IS = (U, A)$ in that U set of objects and A set of features. For each

$$B \subseteq A \subseteq \emptyset, X \emptyset \subseteq U \neq$$

Two sets are defined as follows

$$\underline{BX} = \{x \mid [x]_B \subseteq X\}$$

$$\overline{BX} = \{x \mid [x]_B \cap X \neq \emptyset\}$$

That is named respectively, approximates of ^{37}B low and ^{38}B high of X .

The set of $BNB(X) = \overline{BX} - \underline{BX}$ is known as border area of X and contain objects which can be said surely that they are in X . if $BNB(X) \neq \emptyset$ then X is an RST toward of features in B .

In this research:

$$X_1 = \{X \in U \mid d(x) = 1\} = \{x_1, x_6, x_{12}, x_{14}, x_{20}\}$$

It means that staffs with numbers 20, 14, 12, 6 and 1 tend to share their knowledge.

$$X_0 = \{X \in U \mid d(x) = 0\} = \{x_2, x_3, x_4, x_5, x_7, x_8, x_9, x_{10}, x_{11}, x_{13}, x_{15}, x_{16}, x_{17}, x_{18}, x_{19}, x_{21}\}$$

Features dependency

In investigating data finding the relationship of ϕ is important among conditional features and decision making feature.

Using this dependence among features, those who aren't important can be removed, if T_d is a set of decision making features and T_c a set of conditional features, the dependency among the is expressed as $T_c \Rightarrow T_d$ and it means that all decision making values are obtained from conditional values. Of course partial dependency mood either can be existed.

The formal definition for this feature is:

Decision making rules

Rule 1. $(a_1 = 2) \& (a_3 = 3) \Rightarrow (dec = 0) [\{65, 64, 46, 35, 19\}, \{\}]$

Rule 2. $(a_1 = 3) \& (a_3 = 4) \Rightarrow (dec = 0); [\{62, 57\}, \{\}]$

Rule 3. $(a_3 = 1) \Rightarrow (dec = 0) :[\{93\}, \{\}]$

Rule 4. $(a_1 = 3) \& (a_2 = 2) \Rightarrow (dec = 0); [\{109\}, \{\}]$

Rule 5. $(a_1 = 4) \& (a_2 = 5) \Rightarrow (dec = 0); [\{82\}, \{\}]$

Rule 6. $(a_2 = 5) \& (a_3 = 4) \Rightarrow (dec = 1); [\{92, 87, 86, 74, 47\}, \{\}]$

Rule 7. $(a_2 = 4) \& (a_3 = 5) \Rightarrow (dec = 1); [\{37, 26, 9\}, \{\}]$

Rule 8. $(a_1 = 1) \& (a_3 = 2) \Rightarrow (dec = 1); [\{102\}, \{\}]$

Rule 8. $(a_1 = 1) \& (a_3 = 2) \Rightarrow (dec = 1); [\{102\}, \{\}]$

c)[36], {\}]

The extracted rules of above approximation include possible concepts (feasible or possible) and known as possible rules.

Possible Rules:

Rule 10. $(a_1 = 4) \& (a_3 = 4) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{122, 115, 106, 101, 99, 95, 72, 63, 61, 53, 51, 44, 33, 22, 18, 17, 16\}, \{121, 112, 97, 81, 78, 75, 70, 60, 56, 54, 42, 31, 25, 23, 21, 14\}]$

Rule 11. $(a_1 = 3) \& (a_2 = 3) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{117, 111, 105, 104, 85, 49, 34, 15, 5, 2\}, \{119, 113, 94, 76, 52, 41, 30, 20, 11, 8, 6\}]$

Rule 12. $(a_1 = 4) \& (a_3 = 3) \Rightarrow (dec = 0) \text{ OR } (dec = 1)$

$[\{110, 98, 96, 79, 59, 58, 55, 13\}, \{118, 107, 88, 83, 67, 1, 66, 45, 24, 12, 7\}]$

Rule 13. $(a_1 = 5) \& (a_3 = 5) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{84, 48, 43, 40, 27, 10\}, \{91, 69, 50, 39, 38, 32, 29, 28\}]$

Rule 14. $(a_2 = 4) \& (a_3 = 3) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{114, 108, 89, 68, 59, 1\}, \{103, 100, 88, 83, 67, 45, 12, 7\}]$

Rule 15. $(a_1 = 2) \& (a_3 = 2) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{77, 4, 3\}, \{123, 120, 116\}]$

Rule 16. $(a_1 = 5) \& (a_2 = 4) \Rightarrow (dec = 0) \text{ OR } (dec = 1);$

$[\{90, 89, \text{and } 73\}, \{100, 80, 71\}]$

Checking the above rules shows that

If the attitude be little and perceived behavioral control be middle, staffs don't tend to share their knowledge.

If the attitude be middle and perceived behavioral control be high, staffs don't tend to share their knowledge.

If the attitude be very little, staffs don't tend to share their knowledge.

If the attitude is middle and subjective norm be little, staffs don't tend to share their knowledge.

If the attitude be high and subjective norm be very high, staffs don't tend to share their knowledge.

If the attitude be very high and perceived behavioral control be high, staffs tend to share their knowledge.

If the attitude be high and perceived behavioral control be very high, staffs tend to share their knowledge.

If the attitude be very little and perceived behavioral control be little, staffs tend to share their knowledge.

If the attitude be high and perceived behavioral control be little, staffs tend to share their knowledge.

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