



## Multiple human schemas and the communication-information sources use: An application of Q-methodology

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### ABSTRACT

This study was conducted with the aim of developing a communication and information model for greenhouse farmers in Yazd city using schema theory. Performing the Q methodology together with the factor analysis, as such, the different variables were loaded over the five schematic factors which included the human philosophical nature, ideological, economic, social, and environmental-conservation beliefs. Running AMOS, of course, it was also unveiled that the philosophical, ideological, social, economic and environmental schemas influence directly on the personal communication-information sources use. Furthermore, the environmental-conservation schema affects directly and indirectly the personal communication-information sources use. More importantly, this study indicated the important role of the indigenous sources which play in constructing, evaluating and retrieving the environmental knowledge in respondents. The research predisposes a suitable context for policymakers who seek to draw up much more effective and appropriate communication and information strategies to address the specific target groups' needs.

### INTRODUCTION

Globalization has affected the diverse social and economic facets of the world. The international unrestricted regulations and approved trade rules make an appropriate opportunity to facilitate exchanging the different kinds of the agricultural products, especially greenhouse ones. In recent years, the rising greenhouse products remarkably signal the development of the greenhouse areas in Iran (Mehrabi-Boshrabadi and Zeinalzade 2008). In fact, the greenhouse cultivation is an effectual way to cope with the agricultural challenges such as the limited fertile lands and the lack of the water resources (Cheshmehmanesh et al. 2004). From 2002 to 2007, the greenhouse areas of Iran have increased from 3380 to 6630, including the vegetables 59.30%, flowers 39.81%, fruits .54% and mushroom 0.35% (Mohammadi and Omid 2009). According to FAO, Iran has been aligned as the second producer of cucumber throughout the world in 2000 (Cheshmehmanesh et al. 2004). In 2007, cucumber was cultivated in the area of 78000 ha with the production of 1.72 million tons

(Mohammadi and Omid 2009). Internationally, the cucumber is being annually produced in the amount of 13.14 million tons. The low level of the precipitation for open-field cultivation, the increased agricultural graduations and the open Persian-Gulf countries' markets to Iran predispose to invest in developing the greenhouse areas. Yazd city has been recognized as one of the desired places to produce the greenhouse cucumber. In this respect, the disseminated agricultural information and knowledge should be consistent with the greenhouse farmers' needs as possible. Consequently, the present study aimed at developing a model investigating the connections between the farmers' schemas and use of communication and information sources using schema theory. This theory was developed to understand the natural phenomena (Sless 1981). The reason we selected this theory deals with the fact that the recognition of the schemas in a specific target group provides the planners for designing and offering the knowledge and information as consistent as possible with the knowledge and information need they feel to be fulfilled. As such, the communication planning and the implementation strategies should be developed for the participants so as to whose knowledge improve (Arai et al. 2001). The objectives of this study were to identify the greenhouse farmers' schemas, and to determine the relationships among the different greenhouse farmers' schemas and

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amount of the communicative and informative sources use.

### **Theory of schema**

The background of the schema theory referred to the Gestalt psychology during 1920s and 1930s (Salway 1997). Schema theory concentrates on the belief that “every comprehension act involves one’s knowledge of the world” (Al-Issa 2006). It introduces the construction of the mental models for the problem-solving and interpretation (Offredy and Meerabeau 2009). When a person faces the same familiar situation, therefore, the prior built cognitive structures are retrieved which helps the person to organize the external information, interpret the exterior stimuli, and consequently choose the suitable reactions (Chang 2009). According to schema theory, an individual’s knowledge about the world can be described as a complex collection of schemas to interpret the perception and initiate the action (Ritchie 1991). Schema theory is useful for reasoning, categorizing, evaluating and so on. It intrigues the interest of specialists including linguists, anthropologists, psychologists and experts on artificial intelligence (Bing et al. 2007). Additionally, schema theory is basically related to the knowledge to describe how knowledge is represented and how that representation facilitates the use of the knowledge in particular manners (Lou and Qi 2005).

### **The concept of schema**

To respond the question that how the knowledge is acquired, processed and retrieved, and subsequently how the stored information influence on the perceptual process, the psychologists focus on the concept so-called *schema* (Conover and Feldman, 1984; Al-Issa 2006; Bing et al. 2007). This term referred to the Greek language meaning ‘form’, ‘shape’ or ‘figure’ (Offredy and Meerabeau 2009). The schema, as a unit of the action, is a mental structure that stores people’s common knowledge learned from their life experiences (Chang 2009), widely used in interpreting people’s understanding of the world (Bing et al. 2007; Offredy and Meerabeau 2009; Kuklinski et al. 1991). In addition, it organizes the individuals’ similar and dissimilar experiences, assesses a generic framework that contains the essential elements of all these similar experiences; draws the inferences, and makes estimates (Zhang 2003). The schema is seen as the cognitive constructs by which people organize the information in their long-term memory, reflecting the experiences, conceptual understanding, attitudes, values, skills, and strategies (Al-Issa 2006). Schematic knowledge, used to predict the events, makes the regular information and filling the gap in status quo information (Shamsayi 2001). Nishida (1990) declared that the every interactant’s

social world is usually constituted within a framework of the familiar and pre-acquainted knowledge about various situations, called schema. According to Zhang (2003) some functions of the schema are the following 1) it provides a structure against which the experience is mapped; 2) it directs the information encoded and retrieved from memory; 3) it affects the efficiency and speed of the information processing; 4) it guides the filling of the gaps in the information available; 5) it provides templates for solving a problem-; 6) it facilitates the evaluation of the experience; and finally 7) it leads to the anticipating of the future, goal setting, planning, and goal execution.

### **Knowledge relevant to schema theory**

Knowledge about any stimulus can be schematized; therefore, the individuals can have at their disposal many schemas (Zhang 2003). As such, the identifying of the types of knowledge pertains to the schema theory help psychologists better understand about the schema function and the procedure of store, process, and retrieve the knowledge. In this respect, the four types of the knowledge included in the schema theory are the following (Offredy and Meerabeau 2009):

- *Identification knowledge* allows the recognition of an issue; therefore, its key task is pattern recognition happening as a result of the many cognitive processes taking place together. Nor does single stimulus act as a trigger to the recognition and each schema has its own distinct identification knowledge, although schemas may share some commonalities.

- *Elaboration knowledge* includes the details related to the key elements of the event causing a schema to be developed. This kind of knowledge permits the individuals to imagine the current situation. When a general event is recognized by the identification knowledge, as such, the information about the current experience will be acquired from a ‘template’ about the event.

- *Planning knowledge* refers to the ability to apply the schema to be creative, make plans and establish goals and sub-goals when confronted with the events. This ability derived from the experience; meanwhile, makes possibility for the individuals to have the identification and elaboration knowledge but have no planning knowledge, so-called working schema.

- *Execution knowledge*: The possession of the execution knowledge permits the individuals to implement the plans. In this respect, it can be said that the schema contains the data patterns for representing the generic concepts stored in the memory, additionally encompassing grids of the interrelations that are believed to hold the attributes of the concept that is being debated. The attributes are different with regard to concepts discussed. They make the schema flexible to recognize the

patterns, because the schemas may exist at different levels of the abstraction and complexity.

### **Schema and communications**

Schema contents the basic building blocks of the knowledge and intellectual development (Chalmers 2003). They are characterized by the abstract property, because of whose location in the human's mental structures. Different people possess the different prior knowledge and experiences, reflecting the different contents and organizations of the schema from one person to another as well as being changeable over the time. The schema changes may be affected by the extensive generalizations in terms of a larger collection of the experiences which happens either in a non-dramatic way by means of gradual purifying and changes in the connection strengths or more rapidly and fully by employing the new ties and links (Aretoulaki et al. 1998). Shahvali et al. (2009) are convinced that every event which is affected by the mental and cognitive dimensions, of course, can content the communicative potential. When an event is perceived as a communicative one; as such, the interpreter initiates a search for the relevancy which begins with currently activated schema and continues with other schema that may be suggested by some aspect of the event (Ritchie 1991). Consistent with schema theory, the users assimilate the text information into the existing knowledge structures and the sets of expectations to extract the meaning and how a user are interpreting a written (or other) communication depending on the information presented and on the users schema (Dunn and Grabski 2001). The relevance of a communicative event includes whose effect not only on the schemas which pertains to the individuals, but also on the social schemas in which the individuals are engaged. When new information become available; therefore, a person tries to fit the new information into the pattern in which he or she has used in the past to interpret the information about the same situation (Axelrod 1973). Individual schemas combine through the communicative interaction into social schemas which include the individual schemas as the subroutines, the reversely individual schema which contents the representations of the social schemas by which social interaction can be predicted and interpreted (Ritchie 1991). According to Nishida (1999) once people interact with the members of the same culture in certain situations for a number of times, as such, the schema is constructed and stored in their brain. Furthermore, when people encounter more of the same situations; therefore, the schema gets more organized, abstract, and compact and consequently people develop the schema by their direct experience. Additionally, Nishida declared that as the schema get more abstract, organized, and compact, people's communication get much easier through the refined schema; therefore, these

schemas come to characterize the behavior of the members of the culture. Electronic transmission speeds up the links and they allow the simultaneous processing of the identical data by a very large number of the individuals, for example broadcasting greatly expands the geographic and social achievement of the schemas but much of the information received through broadcasting is poor in the relevancy (Ritchie 1991). When the cultural contexts of the speaker and listener are different, as a consequence, it may lead to the use of the inadequate schemas by the listener, resulting in the transmission of no passage (Shemshadi 2002). Multiplicity and complexity of the communication and information systems illuminate this fact that peoples' schemas should be given attention in developing and localizing the communication-information strategies, because schemas are the units of the stored knowledge in the brain (Bing et al. 2007).

### **The Measurement of the schema**

A general and precise operational definition of the schema is not easy (Conover and Feldman 1984) because it depends on the kind of the schema and its conceptual definition. An instance to the measurement of the schema has been presented by Tiffany Lynn Thomson (2007); thus, it reflected the three ways of the argumentative depth, construct differentiation, and issue elaboration as procedures to measure schematic knowledge. The first deals with where a special statement is given to participants and asked them a series of the open ended questions which are coded on the basis of reasoning level by assuring in terms of whether or not the relevant reasons were adduced, the number of relevant reasons, the number of claims with the rational reasoning, whether a relevant counter was provided, and whether a relevancy refusing to the counter was made. The second schematic measurement was assessed by the respondents composing a letter to a friend related to a specific issue and these letters were initially coded for a number of constructs applied with regard to the determined issue. The third deals with asking the respondents to write the most significant things understood from the news material. By coding the gained statements, as such, it is possible to see to what extent the relationships have emerged between people or claims in terms of given issues. Blending these three ways, therefore, these measures may well result in the schema conceptualization. But some difficulties pertain to these procedures emerge. For example, the argumentative depth appears to capture one's ability to reason through an issue. For their measure of the construct differentiation; thus, the authors resorted to mere word counts. An ambiguous issue is about what is considered and counted as a construct related to the issue. In order to see this as a measure of one's schema,

additionally, some clarification of coding procedure is needed. Finally, the issue elaboration is also an intriguing measure, seeming to be a specific way of looking for the individuals' information which is linked together. However, it seems that the coders are imposed to decide whether or not a link is being made. More impressive would be a measure where the participants themselves marked if and when they saw links between the various pieces of the information. To measure the political schema, Conover and Feldman (1984) made a number of the statements in several different domains (e.g., economic, social, ideological beliefs, racial beliefs) and consequently participants were asked to put each statement into a category from strongly disagree to strongly agree. These Q-sorts were subsequently put into a correlation matrix to find both the individuals and the statements most representative of the factors, showing that the individuals use a number of distinct schemas to represent the political information. While this method captures the specific ideas about a category and connections among schema, it doesn't allow the participants to produce the ideas they personally have about a topic. Additionally, this measure seems to capture the way in which one schema is related to another, rather than connections among ideas within one particular schema. Another way of defining is when the respondents classify the political leaders as a republican, democrat, creating an additive knowledge score (Tiffany Lynn Thomson 2007). By combining the knowledge scale with an additive scale of questions tapping interest in parties and elections, the authors divide their sample into the three groups, with the bottom group labeled aschematic and the top group labeled schematics. While the political knowledge measure may be able to get part of their schema definition, the scale as a whole does not match the definition, as it contains interest and knowledge. In addition, this measure does not necessarily assess the organization of one's political knowledge.

## MATERIALS AND METHODS

This study was carried out in the Yazd city to determine the relationships between the greenhouse farmers' schemas and the communication and information sources use. The Q-sorts method was used to load the diverse kinds of schemas on the factors labeled the human philosophical nature, ideological beliefs, economic beliefs, social beliefs, and environmental-conservation beliefs. The goal was to identify the communication and information sources used by greenhouse farmers, together with determining the relationships among the different schemas per se and the use of the communication and information sources. Using random sampling, a total of 102 greenhouse farmers was surveyed in the four regions of *Yazd*, *Ahmad-Abad Moshir*, *Mohammed-Abad*, and *Fahraj*. A self-

administrated questionnaire was assessed regarding its face validity which was confirmed by the experts who worked in Agricultural Jihad bureau in Yazd city. This questionnaire with both open-ended and close-ended questions included the three folds: the first questions were related to the greenhouse farmers' schemas (Q statements); the second ones related to the amount of the use of the communication and information sources and the third were the questions pertained to the greenhouse farmers' personal characteristics. The data collection research design was a cross-sectional survey. The Q methodology provided a suitable way for us to determine how the participants make up and organizes their meanings, opinions, judgments, and attitudes. It was also desirably considered as a method to achieve the data unveiling the greenhouse farmers' schema. The Q statements were aligned to a forced distribution with 5 Likerts' scale from 'more agree' to 'more disagree' by respondents, indicating that how the respondents organize the statements or knowledge in the varying ways.

## RESULTS

### *The profile of the research participants*

Table 1 indicates the participants' profile e.g. age, education, work experience, distance from the accommodation to the greenhouse, the superficialities of the greenhouse, and the kinds of the greenhouse cover. 102 greenhouse farmers, therefore, participated in the research survey and completed the questionnaire. 57.84% of them are less than 30 years old; while, 42.16% of ones are greater than 30 years old. Educationally, 54.90% of the participants fall into the illiterate and elementary category, 6.86% in the secondary category, and 38.24% in the tertiary one. The greatest portion of the participants with regard to work experience were in the category of <2 years (59 people, 57.84%) and the reminders were in >2 years category (42 people, 42.16%). Of other variables surveyed in this study was the distance of the accommodation location to the greenhouse location. It included the 2 categories (0-1 km) and (>1 km). 58.82% of the greenhouse farmers (60 people) belonged to the former and 41.18% of them (42 people) belonged to the latter. The greatest portion of the participants (42.16%) has a greenhouse with an area greater than 5000 m<sup>2</sup>, and the majority of them have the greenhouse with a plastic cover. In these areas, of course, the privilege coating material used as a greenhouse cover was the transparent plastic material.

the fourth investigates the families of

Table 1: The profile of the respondents

Variables		Frequency (n=102)	
		N	%
Gender	Male	102	100
	Female	Non	Non
Age	<30	59	57.84
	>30	43	42.16
Education	Illiterate and elementary	56	54.90
	Secondary	7	6.86
	Tertiary	39	38.24
Work experience (years)	<2	59	57.84
	>2	43	42.16
Distance of the accommodation location to the greenhouse	0-1 Km	60	58.82
	>1 Km	42	41.18
Area of greenhouse	<3000 m <sup>2</sup>	34	33.33
	3000-5000 m <sup>2</sup>	25	24.51
	>5000 m <sup>2</sup>	43	42.16
Greenhouse cover	Plastic	101	99.02
	Glass	1	0.08

### Results of the Q methodology

Developing the Q methodology by William Stephenson (Stenner et al. 2003; Cuppenet al. 2008; Judge 2008) therefore, a new method was introduced to measure peoples' attitudes, beliefs, and preferences (Conover and Pomela 1984). It allowed the researchers to identify and explain a person's subjective experience by quantifying whose perceptions (Yeun 2005). The Q methodology concerns with the social discourses e.g. the patterns of peoples' views and attitudes; therefore, the range of discourses held by them can be determined using the statistical technique of the factor analysis (Proops 2001). In addition, this methodology is not suitable a large number of cases (Plessis 2008). The Q-methodology relies on the measurable subjectivity of the individual characteristics; as a result, it provides a way to measure the subjective attitudinal structures (Barry and Proops 1999; Yeun 2005; Barker 2008; Chang et al. 2008; Judge 2008). The subjectivity means nothing more than a person's communication of his/her point of view (Yeun 2005). The Q methodology is capable of identifying the relative priorities across a range of the influences in the minds of the respondents, which give a fuller portrait of their concerns when achievement of all goals is impossible (Davies and Hodge 2007). This method encompasses the main four steps as follow: the first defines the influences (or statements); the second detects the survey-arrange influences; the third performs the factor analysis- group influences; and the fourth investigates the families of influences. This method encompasses the main four steps as follow: the first defines the influences (or statements); the second detects the survey-arrange influences; the third performs the factor analysis- group influences; and

influences. It is usual to make the imminent decisions for the participants regarding some statements but to struggle with others that they feel have only slight or subtle differences. Because the Q-sorting technique requires them to make these subtle distinctions by arranging their statements into a forced distribution of the scores; therefore, this technique permits to quantify the subjective understanding (Chang et al. 2008). Two main strategies applied to interpret the results of the Q methodology include 1) the factor loadings point for the *individuals* who best define the factors, and 2) the factor scores indicate that what *statements* are the most characteristic of each factor (Conover and Feldman 1984). A part of the Q-statement used in this study which were adapted from Conover and Feldman's (1984) study, the reminders were adapted from an ecological and environmental viewpoint declared in the Hayati and Rezaei-Moghaddam's (2006) study. As previously pointed out, in this study the factor scores were used to analyze the Q statements to detect which *statements* are most characteristic of each factor. The preferred solution was accomplished with a Principal Component Analysis (PCA) and Varimax rotation with the five factors retained, as far as, 12.19%, 10.11%, 8.16%, 7.02% and 3.73% of the underlying variance in responses were explained by the factors (schemas), namely, the human philosophical nature, ideological, environmental, social and economic schemas respectively (Table 2).

Table 2: the five factors and the varimax rotated solution of the schemas

Statements	Human philosophical nature	Ideological	Environmental	Social	Economic
3	0.856				
5	0.692				
7	-0.734				
8	-0.824				
11	0.909				
14	0.909				
15	0.820				
19		0.730			
21		0.817			
23		-0.708			
24		-0.772			
27		0.732			
28		0.707			
11					-0.624
10					-0.590
13					-0.525
31					0.564
34					0.662
37					0.627
29				0.401	
39				0.420	
42				0.712	
43				-0.772	
44				-0.743	
46				-0.645	
48				0.692	
48				0.483	
49			0.737		
50			0.801		
51			-0.808		
52			-0.807		
53			0.737		
54			0.586		
55			-0.744		
56			-0.741		
Percent of Predicted variance (%)	12.19%	10.11%	8.16%	7.02%	3.73%

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The correlated schemas indicate that they are the independent components and entities (Table 3).

#### *Using of the communication and information sources*

In this section, we determined the amount of the communication-information sources use by the respondents. As depicted in table 4, the communication-information sources were divided

into the three parts: the personal communication-information sources (PCISs), indigenous communication-information sources (ICISs), and electronic communication-information sources (ECISs). The PCISs include the communication with the extension agents, local patriarchs, relatives and neighbors, technical experts, the experts of the central cooperative bureau, peer farmers, the dealers of the poisonous materials and chemical

Table 3: The relationships between diverse schemas in the participants (Pearson correlation)

Schemas	Human Philosophical nature	Ideological	Economic	Social	Environmental
Human Philosophical nature					
Ideological	0.18				
Economic	-0.05	0.18			
Social	-0.03	0.12	0.09		
Environmental	-0.05	0.03	0.05	0.10	

fertilizers and the use of the demonstrative and model greenhouses. The ICISs also encompass the communication channels e.g. storytelling, singing the epics, poetry, humorous anecdotes, local theater, puppet show, local ceremonies, satire, local dances and songs and music. Furthermore, the ECISs content the use of the computer, internet and cell phone. The majority of the participants used the communication channel of the poison and fertilizer dealers (Mean=4.96, S.D=.19), the local music (Mean = 4.98, S.D =.13) and the cell phone (Mean = 4.79, S.D = .85) as the preferred channels to acquire the information. The first finding is consistent with the findings of Shahvali, et al.'s research (2009).

*The direct and indirect relationships between schemas and the communication and information sources use*

In this section, we put the analysis of the direct and indirect relationships between the diverse schemas and the amount of the use of communication-information sources by respondents. It unveils that whether the different schemas affect either each other or the use of the communication and information sources? As a result, AMOS (Analysis of the Moment Structures) was used to fit the best model which indicates the direct and indirect relationships between mentions variables. In this respect, the exogenous variables include the human philosophical, economic, social, ideological, and environmental-conservation schemas and the endogenous variables involve the indigenous, personal, and electronic sources (the ICISs, PCISs, and ECISs). According to the findings, only the environmental schema influences significantly, positively and directly on the PCIRs use ( $\beta = .25, p<0.001$ ). This is an interesting point, reflecting the direct impact of the environmental schema on indigenous sources use. It indicates the importance of the indigenous sources in forming of the new knowledge or retrieving the local knowledge in preserving the environment. In fact, such channels can make an opportunity to recall the greenhouse farmers' own indigenous knowledge to manage the natural resources as the same manner their ancestors have done. For example, although greenhouse systems are known as the modern

innovation, the local Yazdian greenhouse farmers have cultivated the cucumber in the open farms and tunnel-based cultivation for the past decades. As such, they have some indigenous knowledge regarding the control of the plant pests and diseases. Moreover, the other exogenous variables such as the philosophical, ideological, economic and social schemas affect significantly and positively the PCIRs use ( $\beta = .62, p<0.001$ ;  $\beta = .22, p<0.001$ ;  $\beta = .74, p<0.001$ ;  $\beta = .36, p<0.001$  respectively). (Figure 1).

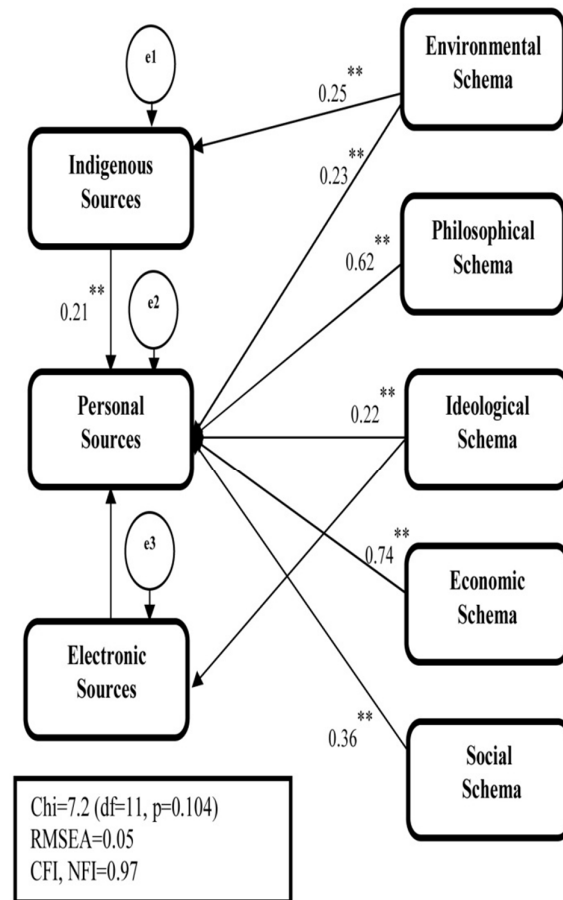


Figure 1: The path coefficients related to the research empirical model

Table 4: Used communication and information sources by respondents

Communication and information sources	Mean	S.D	Ranked	
Personal sources	Extension agents	4.85	0.45	3
	Local patriarchs	1.61	0.90	9
	Relatives and Neighbors	4.93	0.23	2
	Demonstrative greenhouses	2.07	1.30	8
	Model greenhouses	3.83	0.40	6
	Technical experts	4.37	0.83	4
	Experts of central cooperative bureau	3.94	0.27	5
Indigenous sources	Other farmers	3.18	0.41	7
	Poison and fertilizer dealers	4.96	0.19	1
	Storytelling	3.05	0.29	5
	Singing the epics	4.94	0.39	2
	Poetry	3.14	0.29	4
	Humorous anecdotes	2.59	0.53	8
	Local theater	3.96	0.31	3
	Puppet show	3	0.26	6
	Local ceremonies	2.73	0.44	7
	Satire	1.75	0.57	9.5
	Local dances and songs	1.75	0.53	9.5
Electronic sources	Local music	4.98	0.13	1
	Computer	2.08	0.89	2
	Internet	1.95	0.92	3
	Cell telephone	4.79	0.85	1

## DISCUSSION

The purpose of this study was to determine the relationships between the greenhouse farmers' schemas and their amount of the communication-information sources use. The literature review makes a wide variety of the schema definitions that the majority of them express that people's schema contains a block of the knowledge to organize the experiences about themselves and their environment. It directed us to measure the greenhouse farmers' schemas with regard to the organization of the knowledge process. In this respect, the selected procedure to gather the data about participants' schema was the Q methodology using Q sorts. The results indicated that the participants have the different schemas, meaning the diverse ways in which they can organize their

knowledge. This finding is consistent with Lawrence's (2003) research, for example the individual mechanisms of processing the political information and making the voting decisions can vary. Therefore, the schema can be either dependent or independent from each other. Additionally, Lawrence (2003) is convinced that more compatible use of a single schema would be more sophisticated than the use of dissimilar schemas. In this regard, the greenhouse farmers differently give structure their knowledge which pertains to self and their environment, as such; it can affect the use of the communication and information sources. In other words, people with the different schemas use the different sources of the knowledge to gain the needed knowledge and information. In order to understand how people organize their political world, Conover and



Feldman (1984) declared that the individuals have the different schemas to use the certain types of the information; while, some people intend to combine the diverse schemas, and instead other people may require more disintegrated structures for processing the political information. The greenhouse farmers have the independent schemas reflecting that they do not combine their schemas to organize the knowledge about self and environment. Therefore, Kuklinski et al. (1991) argued that the individuals will take note of the only facts relevant to their situations. When an event is perceived as the communicative one, as such, the interpreter starts to search a suitability and relevancy relative to what sent. This opportunity makes the activated current schema as well as to make the relationships to other schema that may be suggested by some aspect of the event such as the physical environment (Ritchie 1991). Of other results were the indirect relationships between the communication-information sources use and the greenhouse farmers' schemas. In this regards, Nishida (1999) is convinced that once a schema becomes tightly organized, as such, the information about the schema would become more usable, starting to be accessed and used as the efficient units of the information among the members of the culture. Furthermore, Nishida argues that when the schema becomes more abstract, organized, and compact, our communication becomes much easier through such the refined schema. These schemas come to characterize the behavior of the members of the culture as well. As such, people's schemas can influence the sources used by people to acquire the relevant information and knowledge.

## CONCLUSION

The focus of the present paper was to develop an empirical model to explain the relationships between greenhouse farmers' schemas and the communication-information sources use in Yazd city. The results indicated that in the same culture, there are the diverse ways through which people organize the knowledge and experiences about their environments. The dissemination of the information for particular region should be consistent with peoples' schemas; therefore, it means that they see their environment differently. It can have roots in the different and special needs the local people have. Consequently, they seek the different communication-information sources to acquire their desirable information. It can be suggested that the agricultural extension service should give attention to the different schemas in whose special target group. By accomplishing this, therefore, the dissemination of the needed information will be facilitated. In fact, the spread of the information should be as consistent with greenhouse farmers' needs as possible.

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**Appendix:** The statements used in the Q methodology

1. You cannot put a price tag on the human life.
2. If you act in good faith toward people, most of them will reciprocate with fairness toward you.
3. All in all, it is better to be important and dishonest than to be humble and honest.
4. An individual's responsibility for the welfare of others extends no further than the boundaries of his or her immediate circle of friends.
5. It's a rare person who will go against the crowd.
6. People are too complex to ever be fully understood.
7. The average person has an accurate understanding of the reasons for their behavior.
8. People usually tell the truth, even when they know they would be better off lying.
9. If people try hard enough they can usually reach their goals.
10. You can't put a price tag on human life.
11. All in all, it is better to be important and dishonest than to be humble and honest.
12. Our success in life is pretty much determined by forces outside our own control.
13. You can't put a price tag on human life.
14. Honesty is the best policy in all cases.
15. All in all, it is better to be important and dishonest than to be humble and honest.
16. The average person has an accurate understanding of the reasons for their behavior.
17. The maintenance of law and order is essential to the sound development of society.
18. Society can be improved by ideas.
19. There should be no interference with business and trade.
20. A better society can only be realized through a radical change of the present social structure.
21. A great deal of government interference can only lead to bureaucracy and economic stagnation.
22. If freedom of enterprise is restricted other freedoms will disappear.
23. A great deal of government interferences lead to planning and therefore a more efficient economy.
24. Efficient and large-scale production requires the government intervention.
25. Society can be improved by the ideas.
26. The maintenance of law and order is essential to the sound development of society.
27. The existence of social classes is necessary for the welfare of all.
28. In present-day society, social classes no longer form an important social conflict.
29. Private ownership of property is as important to a good society as freedom.
30. Competition leads to better performance and a desire for excellence.
31. People would still work as hard at their jobs even if everyone earned the same amount.
32. Private ownership of property has often done mankind more harm than good.
33. Too often in society, success is defined just in terms of how much money you make.
34. Society needs to work harder to ensure real equality of opportunity.
35. Current opportunities for advancement are about as equal as they need to be.
36. Business and industry are generally fair and honest with the public.
37. Some people who don't get ahead in life tend to blame the system, when they really have only themselves to fault.
38. Competition leads to better performance and a desire for excellence.
39. The poor are poor because the wealthy and powerful keep them poor.
40. Competition, whether in school, work, or business is often wasteful and destructive.
41. There is nothing wrong with a married woman working even if she has a husband capable of supporting her.
42. Religious commitment gives life a purpose it would not otherwise have.
43. The Bible is not the actual word of God; it is simply an ancient book of fables, legends, and history recorded by humans.
44. There is no survival of any kind after death.
45. There is no reason why a man should lose respect for a woman if they have sexual relations before marriage.
46. If you lead a good and decent life it is not necessary to go to mosque.
47. Every explanation of man and the world is incomplete unless it takes account of God's will.
48. The story of creation as recorded in Genesis is literally true.
49. In which intimacy and friendship are made between human and nature is not mistaken thing
50. In which intimacy and friendship are made between human and nature is a true thing.
51. Just human has rights to use nature and resources.
52. Humans' food must be produced, although it is accomplished in any price and cost.
53. Humans' life is articulated to other creatures' life, so human must respect them.
54. All of creatures have a right to survive and have future generations.
55. It is the natural right to human who feel about in which just his territory must be important
56. Humans do not prevent the things that threaten the other creatures' life

**Note:** some items related to the domains of the human philosophical nature, ideological, economic, and social beliefs have been adapted from Conover and Feldman, (1984); while, the items which pertain to the conservation and environmental beliefs were adapted from Hayati and Rezaei-Moghaddam's study (2006) with scope of the ecological and environmental perspectives (i.e. Dominant Western Worldview (DWW) and New Ecological Paradigm (NEP). In addition, the 5-point scale from -2 (strongly disagree) to +2 (strongly agree) was used.