Identification of effective key factors on organisational unlearning: a grounded theory

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Abstract: The present study aims to develop a practical model for identifying effective key factors on unlearning of the North Khorasan province farmers in order to replace the traditional irrigation system with modern irrigation system. The study is based on grounded theory and theoretical sampling, 17 interviews were done with the farmers and experts of the Department of Education of Agriculture Jihad Organization until reaching theoretical saturation. Analyses carried out through continuous comparison showed 300 codes, 42 concepts and 6 categories in actual and theoretical coding process, which led to emergence of a final model focused on the core category, called organisational memory recovery. In conclusion, this study presents effective variables on unlearning about agricultural activities, particularly replacement of traditional irrigation methods with modern methods for optimal utilisation of water resources in the form of a model with an emergent approach. This study develops the first native model of organisational unlearning.

Keywords: organisational unlearning; grounded theory; emergent approach.

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1 Introduction

Recently, adaptation to current market conditions and the market is one of the main concerns of organisations. Organisations tend to use knowledge management (KM) to adapt to environmental conditions and maintain competitive advantage (Gholami et al., 2013). One of the concepts which is very similar to KM and completes it is organisational learning (Gunsel et al., 2011; Noruzy et al., 2013). Existing variables in the environment, including rapid and turbulent changes in technology, increasing complexity and shortening product life cycle, highlight the need to increase organisational learning (Koskinen, 2012). In this regard, learning and knowledge protection has always been emphasised and unlearning has been less considered. Organisational unlearning and learning are equally important; both concepts have emerged in a learning organisation due to an intrinsic philosophy for prediction, response to change, complexity and uncertainty (Abu Khadra and Rawabdeh, 2006). Theoretically, there have been many studies in organisational learning, but few have looked at it from an unlearning perspective.

The philosophy of the concept of organisational unlearning refers to the fact that moving toward change and adaptation to the environment involves abandonment of old unreliable beliefs and rules (Emre and Carl, 2010); therefore, unlearning has a special role in better performance of organisation (Wong, 2011). On the other hand, inability to unlearn is a great weakness of many organisations, because they may spend a lot to improve because of the role of old beliefs and practices in their success (Akgun et al., 2006). Therefore, application of unlearning process and techniques plays an important role in adapting organisations to environmental conditions.. Some believe that unlearning is a necessary process to remove the prevailing knowledge in the organisation in order to get new ideas because organisations can learn new ideas and learn how to quit and forget about previous knowledge due to inadequacy. In fact, unlearning does not only include

forgetfulness processes, but also replacement of old beliefs with new ones (Chao et al., 2011).

According to De Holan and Philips (2004), unlearning process is as important as learning process to achieve competitive advantage. Buchele et al. (2016) emphasise that organisational unlearning focuses on elimination of old routines and creation of new ways (Buchele et al., 2016). Moreover, Rigg (2016) has emphasised 'organisational forgetting' or 'memory elimination' as an advanced cycle which initially expands knowledge, then eliminates and replaces it with new knowledge.

Critical unlearning is more likely to take place when supported by a deliberate and social process such as that provided by critical action learning (Brook et al., 2016). In modern organisations facing a large volume of knowledge, there is a need for a management through which a part of knowledge should be forgotten. Perhaps a main part of managerial challenges in organisations is understanding the unlearning management rather than addressing learning management (De Holan and Philips, 2005).

Public sector and administrative system of a country are important platforms for growth and development and are the main means of implementing government activities and duties. Hence, ineffectiveness of this sector has multiple problems for a society. Over the past three decades, the government has always encountered major problems and challenges in various fields due to numerous economic and administrative problems (Abiavi et al., 2012). In this regard, Rahnavard (2008) emphasised the low performance of government agencies. If these organisations showed better performance in different sub-sectors such as agriculture, the existing gap in performance of public organisations in Iran and successful public organisations in other countries would be lower. According to existing statistics, performance of public organisations in Iran is considerably low and their resource waste is about 5–12% of GDP (Niko Iqbal, 2010). In the meantime, public organisations active in the agricultural sector, particularly Agriculture Jihad Organisation, do not perform well for various reasons, and their performance is below the quantitative targets set out in development plans (Rezaei et al., 2014). In these circumstances, it is necessary to examine the status quo and identify effective factors in order to improve performance of these organisations (Koushazadeh et al., 2012; Ahmadi and Alizadeh, 2018). Statistics and evidence also indicate that the Agriculture Jihad Organization as a ministry has the capacity to take advantage of organisational unlearning. Evidence of this is existence of objective and concrete processes which make it easier to understand unlearning theory. For example, drip irrigation philosophy is to optimise water use in agriculture, which can be similar to organisational unlearning philosophy, because the goal of both is to eliminate inefficient cases to provide more efficiency. On the other hand, water crisis has threatened all of the globe in the last few decades; the global water crisis is one of the main challenges of the 21st century (American Public Health Association, 2008). According to studies by the International Water Management Institute (IWMI), Iran ranked 14 among 116 countries in terms of water scarcity, which indicates poor condition of Iranian water resources. According to Bakhshandeh (2009), one of the most important factors which caused water scarcity in Iran is continuation of traditional management in the agricultural sector. According to Rahimi and Khaledi (2000), one of the most important strategies to prevent water crisis is to provide new and effective methods for water consumption, particularly in agricultural and industrial sectors. North Khorasan is one of the first provinces of Iran encountering with the drought crisis and its consequences, so that the average rainfall in the summer of 2016 was 11.6 mm, which was reduced by 57% compared to the same period last year

and by 40% compared to long-term average (Fakhr Hashemian, 2016). Therefore, experts believe that implementation of new irrigation projects is necessary in agricultural lands of this province; considering the phenomenon of drought and water scarcity, irrigation of agricultural lands should shift from traditional to modern in this province. To realise this, traditional methods of irrigation can be unlearned among farmers. If unlearning does not happen among farmers and they continue their traditional irrigation practices, famine will occur in the not-too-distant future, as more than 90% of surface water and underground water is used in agriculture. Through unlearning process, the farmers will abandon traditional methods such as floodwaters and turn to optimal irrigation methods such as drip irrigation and sprinkler irrigation. In fact, the farmers will be aware of advantages of modern methods and realise the detrimental effects of traditional methods. This awareness, given the large amount of water consumed in agriculture, can have an important effect in avoiding droughts in the future. Therefore, the present study tends to explain the native model of organisational unlearning by using emergent methodology in grounded theory. The purpose of localisation is to adapt theories and models to study the phenomena associated with formation and existence of the phenomenon studied. Using this method, some theories can be considered in their social, cultural, climatic and economic domains and changes required to better explain the phenomena involved should be applied.

2 Literature review

The concept of organisational learning was first seen in the work of Sirt and March (1963), who used adaptive learning theory to describe organisations as human beings with memory. They described organisational learning as a stimulus and response process. Thus, organisational improvements are based on memory by integrating stimuli and response (Koskinen, 2012). Organisational learning process involves a cycle of interactive, reflective and continuous activities which include memory, intelligence, thinking, initiative, conceptualisation and information forming which is significant as well as acquisition, dissemination and implementation of information (Akgun et al., 2006). On the other hand, there are two conceptual problems in unlearning process, which interrupt the learning process. To solve this problem, scholars suggest that unlearning be used in dynamic learning process (Visser, 2017). According to Gustavsson (1999), unlearning is transformation of individual and organisational knowledge structures as well as fundamental change in understanding and eliminating persuasive beliefs. Nonaka and Takeuchi (1995) note violation of cognitive structures, habits and current practices as unlearning. Cincola believes that organisations should learn new rules and forget old procedures in order to adapt to environmental changes. Unlearning is not only processes of forgetting, but replacement of old beliefs with new ones (Chao et al., 2011).

Error management theory is drawn upon to examine how a project-based organisation, which took the form of a program alliance, was able to change its established error prevention mindset to one that enacted a learning mindfulness that provided an avenue to curtail its action errors. The program alliance was required to unlearn its existing routines and beliefs to accommodate the practices required to embrace error management (Love et al., 2018).

Some scholars argue that unlearning is only explained when the organisation faces outdated knowledge and behaviours with potentially negative effects (Headberg, 1981). However, many other scholars have ignored this important aspect of unlearning. Some have considered it as abandonment (De Holan and Philips, 2005). That kind of conceptualisation about learning is incomplete, since abandonment is just one of the learning mechanisms. Some other definitions have also suggested facilitation of learning process (Becker, 2007) and perceptual avoidance or flexibility and structural deviation (Bettis and Prahalad, 1995) as an unlearning goal. Despite these differences, most scholars agree that unlearning is a conscious action which goes back to aspects of old knowledge.

On the other hand, organisations currently face a rapid change in the environment which forces them to adapt and choose selectively (Al-Khalifah, 2018). Rapid technological developments, increasing risks, globalisation and privatisation expectations are the environmental features that current organisations face. Under these circumstances, organisations will survive in the business environment, which will benefit from sustainable competitive advantage and flexibility. In fact, change is necessary for life. As Senge (2011) argue, dealing with changes is inevitable for survival and dynamics. According to Starbuck and Sanghamitra (1996), one of the most important driving factors of the change is individual and organisational unlearning (Nystrom and Starbuck, 1984). Individual and organisational unlearning is the basis for change (Becker, 2007); hence, it is more important than other driving factors. According to Mårtensson (2000), changes in various aspects of an organisation typically encounter resistance. The reason for this is the contradiction which may exist between available knowledge structures in the organisation and the considered changes. While old knowledge can be extracted from the organisation in the form of organisational patterns, no tendency can be created towards the old knowledge at the organisational level; thus, organisational unlearning can reduce resistance to change. An organisation which can remove outdated knowledge from the organisation can increase its ability to accept new knowledge (Akhavan et al., 2011). According to Oxford Dictionary, change is a process through which something becomes different. In this process, transition from one state to another (pleasant or unpleasant) occurs (Stueart and Moran, 1999). In this transition process, organisational change may change a wide range of goals, plans, processes, structures, and alike in the organisation. But the foundation of this transition is based on individual and organisational knowledge. In the pre-change situation, the individual and organisation use knowledge and learning which relate to current status of the organisation to decide on their goals and tasks. But new conditions of the organisation after the change require removing some of the prior knowledge, that is, ineffective, inefficient and obsolete knowledge, and replacing it with new knowledge (Mehrizi and Hussein, 2010). This process, i.e., identifying and removing the obsolete knowledge and then replacing it with new knowledge, is the unlearning which is at the heart of change. Whenever this process takes place on individual knowledge, individual unlearning takes place, and when organisational learning is the basis of this process, organisational unlearning occurs. Since organisational change involves the individual and the organisation, as Becker (2007) argues, success in the process of organisational change is largely related to individual and organisational unlearning. In other words, individual and organisational unlearning are deriving forces of organisational change. The basis for this inference is the underlying logic of the models and the theories proposed in this regard, for example, the Headberg (1981) theory, the Nystrom and Starbuck (1984) model, the Klein (1989) model, the

Azmi (2008) theory, and the like. These models and theories consider unlearning as a mixed process with change and disruption in unlearning as a problematic factor in achieving a successful organisational change. According to experts of this field, factors such as the kind of knowledge (explicit and implicit), perceptual, cultural, motivational, emotional, mental and psychological factors can have a positive or negative effect on unlearning.

In this study, unlearning is considered as a process in which people and organisations set aside their previous learning, including mental assumptions and frameworks, in order to obtain new behaviours and information. According to the studied population, selection criteria for the best farmers are abandonment of traditional methods of irrigation and their replacement with modern and optimal methods.

Examples of studies which are generally related to the subject are as follows.

Yeo and Dopson (2017) studied unlearning by people and retraining as a team. The purpose of this study was to enhance team learning and solve the problems associated with it. Authors tended to find out how knowledge sharing and experimentation could facilitate team learning. Statistical population of the study was the Omega Multinational Company. By analysing the literature and data, a four-step process model was presented which included pause and thinking, conceptual unlearning, test, law, and practical unlearning (Yeo and Dopson, 2017).

Starbuck (2017) conducted a study on organisational learning and unlearning. The purpose of this study was to summarise four decades of research on organisational adaptation, learning and organisational unlearning. Participants were organisations which experienced serious crises. Findings showed that many organisations were exposed to serious crisis and many organisations were weakened and defeated due to these crises. The slow and inadequate response to these crises has led organisations to move towards unlearning which is hard to manage. This study suggests that organisations can use them before and after the crisis (Starbuck, 2017).

Matsuo (2017) conducted a study on exploratory activities of managers and individual unlearning through mediating role of learning orientation and feedback. The purpose of this study was to evaluate the effect of exploratory activities of managers on learning orientation, feedback and unlearning of team members. Data was collected by using a questionnaire on 115 employees in 23 teams from a Japanese pharmaceutical company. The results of multilevel analysis showed that exploratory activities of managers had a direct effect on learning orientation of team members, and consequently had a positive effect on their unlearning with and without feedback. These findings indicate that unlearning of subordinates is influenced by activities of managers through motivational and cognitive processes (Matsuo, 2017).

Leal-Rodriguez et al. (2017) addressed promotion of entrepreneurship through organisational unlearning and innovation considering the moderating role of family business. Innovation is a key to entrepreneurship and it is essential for sustainable competitive advantage. The model used was empirical and examined the relationship between organisational unlearning and innovation with moderating effect of family business. The statistical sample was comprised of 145 companies which were active in Spanish auto parts manufacturing. Structural equation modelling (SEM) and partial least squares (PLS) were used to analyse the relationships between constructs and variables. The results showed that organisational unlearning has a positive and significant effect on innovation (Leal-Rodriguez et al., 2017).

3 Research methodology

To analyse the findings, grounded theory was used. Grounded theory is exploited from a variety of perspectives and by various approaches, most notably the following:

- Straussian or systematic approach
- Glaserian or emergent approach
- constructivist approach.

Among these three approaches, the present study followed the emergent approach, since the emergent or Glaserian approach presents wider and various patterns for data integration. This approach, instead of imposing the theory to data, explores the details of the data; thus, the Glaserian approach gives the researcher a wider insight (Glaser, 1978).

The fact that the present study tends to explain the indigenous model of unlearning of the best farmers in using irrigation methods encourages the use of grounded theory, because a model is developed based on unlearning process. This method is suitable for this study because the objectives of this study are to discover and describe the experiences of people from unlearning of farmers. This method also allows for a systematic review of the data obtained from the interviews for explaining the inductive model of farmer unlearning; given that there is no research on the causes, antecedents and descendants of farmer unlearning, there is another reason to use this method. The grounded theory is appropriate when research and theory are in the early stages of their innovation and there is insufficient knowledge about discovery of this phenomenon based on hypotheses. Moreover, the main objective of the study is to identify and classify the elements and explore their relationship to social situations (Auerbach and Silverstein, 2003). This theory is rooted in data and its result is theory; thus, usefulness of this theory is quite obvious. In this study, farmers' attitudes and ideas when they said that unlearning process took place in them and what they determined as antecedents and descendants provided the basis for data acquisition and model design.

3.1 Population and samples

The statistical population included experts of Agriculture Jihad Organization, who could provide useful information on unlearning of traditional irrigation methods. These experts included the best farmers from the northern Khorasan province in the past 10 years, as well as experts of the Agriculture Jihad Organization of the northern Khorasan province, who were in charge of training and promoting new methods of irrigation to farmers. Among these experts, 17 people were interviewed based on purposive sampling to reach theoretical saturation. Because the interviews were open, they were analysed using constant comparison in the coding process. The coding moves the researcher from experimental level by breaking the data, so that the researcher groups the data into codes which will constitute the final model (Glaser, 2008).

3.2 Qualitative data analysis

Data analysis was done using the Glaserian coding approach, which consists of three open, axial, and selective coding steps. Coding was line by line; accordingly,

the categories were identified and related through constant comparison between them. Constant comparison is simply a continuous comparison of those items of data which are referred to as a specific category with other items in the same category. Finally, unlearning model was developed for the best farmers in order to replace the floodwater irrigation system with pressurised irrigation system.

3.3 Qualification and validation of findings

Once the emergent model is developed, it is necessary to determine whether the theoretical explanation is significant for participants and ensure accuracy of events and their sequence (Creswell, 2012). In order to achieve this goal, review by participants and overview by non-participant experts were used for the model. By receiving corrective comments and advice of advisor and consultant professors, necessary modifications were done and the final model was developed. Using an external diagnostic technique, another researcher was asked to encode some of the interviews.

3.4 Results

Data was encoded based on emergent approach of the grounded theory in three open, axial and selective coding steps. At the open coding step, 300 open codes were obtained; important examples of these codes are listed in the form of concepts in the relevant tables. At this step, categories and concepts were counted. In axial coding step, causes, factors correlated with causes, requirements, mediator conditions, results and environmental context were estimated using results of the open coding step by coding family of 6Cs through Glaserian method. The model was developed in the selective coding step.

3.5 Open coding

At this step, the data from interviews was carefully studied and analysed. All key points of the interviews were titled. During this process, 300 pieces of text of various interviews were coded. For documenting the claims presented, an example of quotes extracted from interviews with people is presented below.

Farmer A. V believes:

> "In my opinion, when administrative problems of farmers in the Jihad is less, in other words, their demands are met faster, they are more willing to accept new technologies. This is also true for credit problems to get a loan; I myself have come to the bank several times. I have been looking for guarantor and collateral, but unfortunately I did not get the loan when I needed it. These problems disappoint farmers. At present, agriculture in this region and, possibly, the entire country, is in a dangerous situation because of the severe shortage of water. If these hardships for receiving facilities are added to the farmers' problems, many of them will leave this job. Timely training of farmers to use irrigation systems is very important because sometimes farmers in distant areas will later become aware of them and do not have much time to make decisions. If farmers know about benefits of these systems, they will definitely be more likely to use them, and this will only be achieved through education and information".

In this regard, the author extracted three labels for facilitating administrative processes, determining educational needs of farmers in order to empower them to use pressurised irrigation system and government policies to support the agricultural sector. After reviewing the data and labelling the events, 42 concepts were extracted.

3.6 Axial coding

At this step, MAXQDA software was used to compile codes which represented similar concepts in a family. These codes or categories correspond to the concept of axial encoding. At this step, it should be noted that no open code is included in more than one family and the families do not have overlapping codes. These codes were gradually and collectively formed and changed by analysing each of the family texts of codes. Among the extracted categories, organisational memory recreation was considered as an axial category and was located in the centre of the model, because its trace could be clearly found in most data. Final output of these analyses after reaching the theoretical saturation can be seen in Table 1.

Table 1 Results of axial coding

Category	*Concept*	*Code*
Causes	Increase water efficiency	Reduce water intake
		Avoid reduction of groundwater table
		Saving water
		Higher efficiency of pressurised irrigation than flooding method
		Minimise water loss between irrigation methods
		Avoid annual waste of water
		Cool the plant environment in hot weather
		Irrigate two hectares instead of one hectare in pressurised systems
Causes	Increase farmer productivity	Raise share of the county in production of crops
		Develop the area under cultivation of gardens in sloping areas
		Increase quality and quantity of crop under pressurised irrigation
		Maximise production with minimal water consumption
		Increase diversity of crops
		Use high yield cultivation pattern
		No need for drainage streams and optimal use of land
	Perceive ease of use	Apply pressurised irrigation without the need for skill
		Ease of irrigation by using pressurised irrigation
		Self-operation of pressurised irrigation
		Tendency to more activity in the agriculture sector

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Causes	Time management	No need to attend in the farm on a certain hour
		Water access at the desired time
		Ability to do other tasks during irrigation
		Need for less time for irrigation
Factors correlated with causes	The farmer's relationship with the outside world	Meet the promoters
		Presence in the community
		Use radio and television
		Communicate with neighbours who accept pressurised systems
		Membership in rural associations
		Presence of farmers in the village's important communities
	Farmer's impression of pressurised irrigation technology	Adaptation:
		Suitability of pressurised irrigation with water and soil
		Suitability of pressurised irrigation with financial status of farmers
		Testability:
		Use promotional test farms
		Trial use of pressurised system in a part of the land
		Consider part of the land as control
		Visibility:
		Determine the result of pressurised system in production
		See the result of pressurised irrigation
Factors correlated with causes	Active participation of farmers	Participation of farmers in executive procedures of irrigation
		Involve farmers in installing and operating the system
		Choose contractors for implementing projects through partnerships with local trusted people
		Apply farmers' opinion on implementation of modern systems
	Enhance education and promotion system	Provide training classes for farmers in different seasons
		Introduce pressurised systems in promotional publications
		Promote new methods
		Educational visits to areas where pressurised irrigation is used
		Clarify the benefits of technology
		Send promoters to villages at appropriate times
		Make and distribute brochures on benefits of modern systems
		Inform farmers about challenges posed by water crisis

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Factors correlated with causes	Farmer flexibility	Use modern technology
		Flexibility
		Adapt the farmer with new methods
	Farmer creativity	Promote renovation
		Power to confront unpredictable conditions
		Use innovative methods
		Forget the old ways
		Have creative thinking
	Foreknowledge and futurism of the farmer	The need for readiness for unpredictable crises
		Farmer's hope for future
		Have a world-wide perspective
		Concern for future generations due to water scarcity
		Drought and rain decline
	Farmer's information	Study hours
		Farmers' awareness of loan conditions
		Farmers' mental background
		Knowledge of history of irrigation systems
		Access to experts
		Have basic information
		Farmer's awareness of critical state of water in the region
		Farmer awareness of soil moisture status
	Demographic characteristics of the farmer	Educational level of farmers
		Age of farmers
		Work experience
	Farmer's risk taking	Optimism of farmers in new ways
		Have the courage to adopt new technologies
		Ability to cope with new environmental conditions
		Power of tolerance
		Trust in new technologies
		Overcome the fear of investing
		The ability to try out new ways
Requirements	Climatic characteristics of the region	Climate conditions and its effect on irrigation methods
		Usability in frostbite of trees
		Adapt type of irrigation with climate zone
		Rainfall in different seasons
	Technical knowledge of experts	Awareness of experts from water resources
		Adequate knowledge of experts from new irrigation systems
		Knowledge of experts about ways to deal with water scarcity
		In-service training of experts

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Requirements	Ability and efficiency of agricultural lands	Convert scattered lands into integrated lands
		Develop irrigated lands
		Convert dry lands to irrigated lands
		Flat agricultural lands
		Rise price of lands equipped with modern systems
	Government supportive policies	Provide cheap equipment
		Low-interest facilities for farmers
		Timely payment of the loan
		Government guarantee for purchasing crops
		Grant subsidies to purchase agricultural supplies
		Long-term loans to farmers
		Introduce contractors to farmers to buy equipment
		Governmental land policy
		Government's large investments in agricultural sector
		Allocate special credit to agricultural sector
		Strategies for implementation of irrigation development policies
		Agricultural land consolidation policy
		Manage and implement government plans in development of new systems
		Suitability of government-run government programs with executive capacity
	Reduce bureaucracy and lubricate processes	Reduce administrative problems for farmers
		Reduce administrative bureaucracy
	Insurance of pressurised irrigation equipment	Insurance of lands covered by new irrigation at a lower price
		Instalment of premium payment
		Early payment of damages by insurance
		Stealing equipment and irrigation equipment
	Promote technical variables	Collaboration of designer and implementer
		After-sales service equipment
		Existence of standards in equipment
		Increase the number of support companies
	Underlying factors	Have a deep well
		Use underground resources
		Own agricultural equipment
		Have a deep well
		Own agricultural lands

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Requirements	Relationship between university and agricultural sector	Use academic specialists in agriculture sector
		Reduce the gap between students' knowledge and reality of agriculture
		Use aware labour in education
		Visit fields during education
	Social factors	Appropriate treatment of pressurised irrigation companies
		Advertisements of vendors of new irrigation equipment
	Supervision and cooperation of trustees	Cooperation of organisations and affiliated organisations with farmers (Ministry of Energy, Agricultural Bank ...)
		Electricity to farms to prevent the dangers of gasoline
		Monitoring and tracking of other organisations except the Jihad on system performance
Mediation terms	Farmer's inclination to use pressurised systems	Farmer's interest in attending Jihad training classes
		Farmer's informed choice to change the irrigation method
		Optional adoption of new system
		Tendency to implement pressurised irrigation on part of the farm
		Tendency to implement pressurised irrigation at a personal expense
	Farmer's mental beliefs	Imitate other farmers
		Attach to the irrigation network
		How farmers comply with social criteria
		Importance of opinions of experts and jihad experts for the farmer
		Importance of opinions of close friends imitate other farmers
	Farmer's mental norms	Farmers' perception of usefulness of new methods
		Sense of competition between farmers
		See the progress of pressurised irrigation and farmer's willingness to accept it
		Gain credit between people and other farmers by using new systems
		Expectations of others from the farmer for using modern systems
		Belief of trusted people in efficiency of modern systems

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Mediation terms	Satisfaction of leading farmers	Satisfaction with farm management
		Satisfaction with water resources management
		satisfaction with performance
		Satisfaction with cost
		The role of local leaders, alderman and council in acceptance of farmers
		How to introduce leading farmers to others
Outcomes	Help improve agricultural inputs	Irrigation in shallow soils
		Use less land to transport water
		Ability to irrigate in steep areas
		Longer plant life
		Deliver food to roots of the plant
		Better plant growth
		Adapt plant to irrigation method
		Reduce pest in pressurised irrigation
		Adjust the water needed for a variety of soils
		Uniform distribution of water on the farm
		Increase fertiliser efficiency
		Time and distance control of irrigation
		Use salty water in pressurised irrigation
		Light and heavy irrigation
	Increased exports of agricultural products	Production of crops more than required amount
		Export crops such as wheat
		Improve crop quality and marketability
	Job creation	Create jobs for equipment repair
		Create jobs for young engineers of village
		Create small pipe manufacturing workshops
		Create jobs in industries and related services
	Help to maintain environmental health	Less soil compaction
		Prevent soil softening
		Prevent soil erosion
		Reduce weed density
		Use less chemical fertilisers and pesticides
		Avoid clogging and maintain soil loss
		Avoid excessive soil washing
		Uniform distribution of poison and fertilisers and maintenance of soil

Table 1 Results of axial coding (continued)

Category	*Concept*	*Code*
Outcomes	Helping crop health	Produce healthier plants without the need for further toxins
		Produce healthy crops and reduce disease
		Reduce animal fertilisers and contaminants
		Produce organic crops with pressurised irrigation
	Contribute to economic prosperity	Reduce water scarcity problems
		Continue sustainable development and production
		Import valuable plants in production cycle
		Reduce irrigation costs in the long run
		Reduce labour costs and less need for workers
		Increase GDP
		Reduce the cost of crop production
		No need for drainage of the farm
		Improve farmers' income
		Increase economic profit
Studied context	Inadequate performance of promoting institution	Distrust benefits of new methods
		Lack of enough knowledge about modern systems
		Lack of underlying information
		Unawareness of benefits of new methods
		Training and information weakness
		Low understanding of pressurised irrigation
		Failure of farmers to access information and results of agricultural research
		Farmers' poor knowledge of pressurised irrigation
		Farmers' distrust to promoters
		Farmers' lack of trust in plans provided by executive agencies
Studied context	Lack of engineering ethics	Farmers' dissatisfaction with poor quality of equipment
		Lack of expert staffing in executive companies
		Lack of quality equipment
		No after-sales service
	Lack of comparative research	Fail to localise systems with environmental and weather conditions
		Fail to check water status of the area before irrigation by experts
		System mismatch with crop type in some farms
		Irrigation planning weakness
		Disregard for climate issues
		Run without preliminary soil and water studies
		Conceal social, economic problems from the planner

Table 1 Results of axial coding (continued)

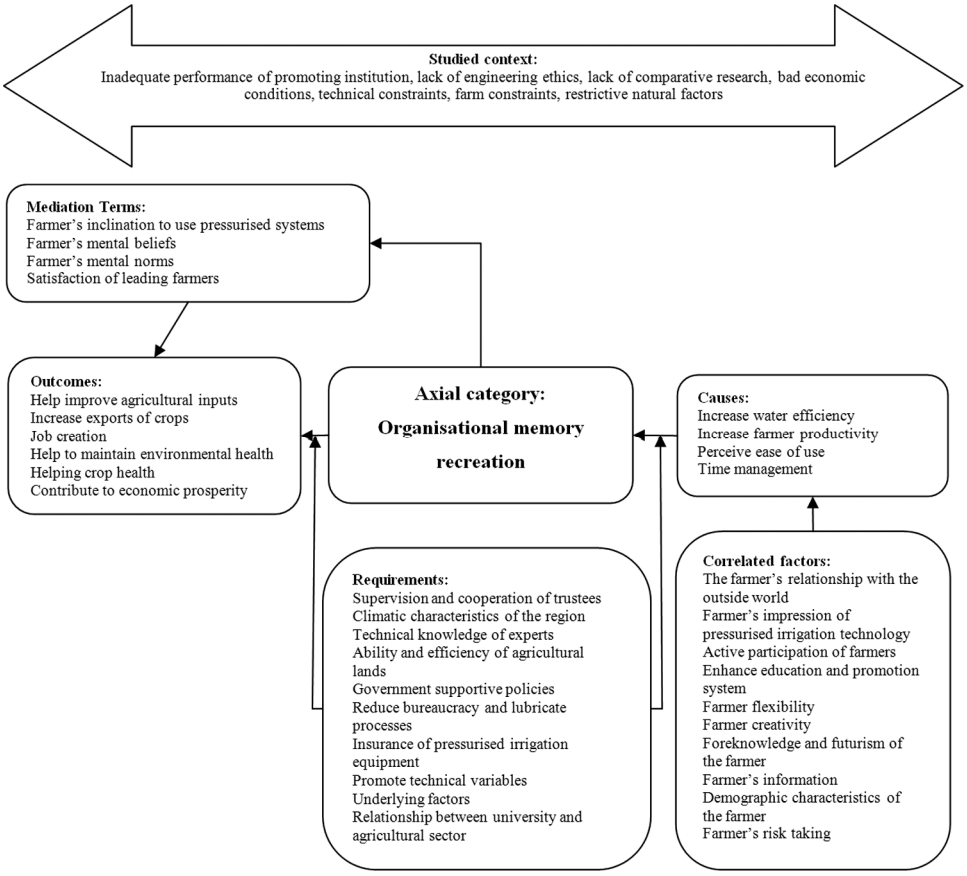
Category	*Concept*	*Code*
Studied context	Bad economic conditions	Higher investment cost
		Insufficiency and inadequacy of supporting institutions
		Late payment of farmers' loans
		Expensive equipment needed to maintain the system
		Expensive spare parts
		Give goods instead of money when buying a product from a farmer
		No guarantee for buying crops
	Technical constraints	Low quality of appliances
		Old irrigation equipment
		Rapid depreciation of equipment
	Technical constraints	Low power of the pump motor relative to the system
		Faulty system installation on the farm
		Lack of staff skills in design of the system
		Weakness of technical knowledge
		Collect and refresh the equipment due to change in farm dimensions
	Farm constraints	Farm size
		Scattered farms
		Farm topography
		Farms with storage
		Abnormalities in farm shape and sizes
		Soil texture
	Restrictive natural factors	Take drops
		Chewed tubes by the mouse
		Incompatibility of some plants with pressurised irrigation
		Growth of bacteria and fungi on plant leaves in sprinkler irrigation
		Difficulty in use in soils with low permeability

3.7 Axial category

As noted in the model, axial category is called organisational memory recreation. In fact, this category refers to process of removing old patterns by identifying old knowledge and behaviour, criticising and reviewing it, and choosing the appropriate action to deal with it. It is a very important point to note that, in the emergent approach, if axial category is a process, it will be called basic social process. Glaser defines a process as follows; process is something which happens over time and is related to change over time. He continues that these changes have detectable breaking point over time and time sequence is understandable in them. As a result, an axial category is considered as a process when it shows basis of change and movement over time and its time dimension can be understood in relation to other categories (Glaser, 2008). According to the model, the axial category is a basic social process because a time sequence is evident. In fact, based on the model

derived from theoretical coding, axial category is called organisational memory recreation, which is a basic social process (Figure 1).

Figure 1 The model derived from the study



4 Discussion and conclusion

Using emergent approach of grounded theory and through constant comparison in real coding and theoretical coding processes, a model emerged with organisational memory recreation as a process. This concept implies replacement of previous knowledge of farmers with new knowledge which leads to positive outputs considering requirements and correlated factors. The term 'organisational memory' was first introduced and used by Headberg in 1981. Most organisations which are highly dependent on their knowledge sometimes encounter downsizing problems and structural reconstruction, followed by departure of old employees and recruitment of new employees; this could lead to loss of a part of organisational knowledge. In this way, the context and conditions under which activities are possible, information used to resolve organisational problems, activities undertaken to solve these problems, results of decisions and outcome of lessons learned from different situations are gradually lost. Therefore, there should be a system that, in

addition to storing all types of knowledge existing in the organisation, always reminds and provides helpful information to employees in a timely manner and is a solid companion for solving problems. This system is called an organisational memory system (Headberg, 1981). Organisational memory system is responsible for accumulation of scattered knowledge at the organisation level and allows its distribution and reuse. In other words, organisational memory is a tool for transferring past knowledge to current activities (Stein and Zwass, 1995). This will allow organisational learning and continuous improvement of processes. The result of using organisational memory is to enhance competitiveness of the organisation by improving its knowledge management and exploring the experiences gained from previous projects and reusing them in order to avoid repeating past mistakes. Therefore, organisational memory can be considered as the core of knowledge management system in an organisation. By creating it, personal and group knowledge of an organisation can be shared and reused. In fact, organisations need to know the reason for shifting from the old to the new one and advantages of the new method or disadvantages of the current method before starting the first learning step which is new knowledge acquisition. This well explains prerequisite of the first phase of unlearning process (i.e., the need for change and perceived inappropriateness of existing knowledge) relative to the first phase of organisational learning process (i.e., new knowledge acquisition). Organisations can only learn and unlearn through people. In the present study, which addresses unlearning of farmers in discussing optimal water consumption, they need to know that new irrigation methods are far better than old ones. Farmers should be aware of causes of drought and water crisis, help reduce its effects, and adapt themselves to this, which is being carried out by experts of the Agricultural Jihad Organization. For example, there are reports that drip irrigation in semi-arid conditions increases irrigation efficiency by up to 95% (Bliss, 2002). With an analytical approach to background as well as the developed models, it is well-known that they are inadequate. Moreover, invalidated model in other organisations indicates a lack of research and empirical findings. In Becker's model, only effective factors have been addressed in individual and organisational levels of unlearning. As in the previous model, explanation of the relationship between unlearning and organisational learning has been neglected. However, this is a complex subject and requires understanding of these processes. Considering the above, this study developed an integrated model based on inquiries in theoretical literature and considering authors' experiences and using imagination which plays an important role in the theorising process. An important point which distinguishes this model from previous models is that it is native. The purpose of localisation is to adapt theories and models to explain the phenomena associated with formation and existence of the phenomenon studied. Using this method, some theories can be reviewed in the context of their social, cultural, climatic and economic conditions, and changes which are required to better explain the phenomena can be applied in them, which is relatively better and more efficient than imported models. This is consistent with Adli et al. (2011), who point to effect of unlearning on success of the organisation and development of new knowledge. These studies will support the results of this study, because this study considered unlearning as an important factor in learning new methods of irrigation by farmers. This is consistent with Starbuck and Sanghamitra (1996) who point out the role of unlearning in turbulent environment of the organisation, because the current study considered unlearning as a stimuli for organisational agility against environmental threats (water scarcity). Becker et al. (2010) agree on important approaches and processes of unlearning. Factors such as perceived need for change, level

of education, abandonment of old knowledge and use of new knowledge were considered as important tools for farmers' unlearning in current study.

On the other hand, a planned organisational change is a complex and multi-step process. These steps, in addition to being solely responsible for organisational change, are effective in determining the success of post-change steps, and therefore they are important. Identifying the effective forces on these three stages, that Levin (1951) identifies in a field model called preventive and inhibitory forces, is an important step in achieving success in managing organisational change. Agricultural Jihad Organization is no exception and, like other organisations, has experienced changes in its system, one of the most important of which is replacement of traditional irrigation systems with modern systems. The drought and crisis of water scarcity, as well as climate change and continuous internal and external changes require the Agricultural Jihad Organization to keep pace with the changes. Like other organisations, there are factors such as knowledge stickiness and lack of unlearning; these factors can affect the success of the change process. Solutions to achieve this success are the concerns of theorists and scholars over the past seven decades since the beginning of organisational change studies. However, the significant failure rate of change projects, according to Kotter (1995) and Yassen and Okour (2011) and similar reports, indicate the factors which have been less considered in studies in this area. Therefore, identification of these factors can help to manage the change process in organisations. As previously noted, organisational change is the final status of transition process. Organisational unlearning also refers to change in perceptions and collective routines which are involved in organisational change. Therefore, it can be argued that unlearning is an effective stage or factor in the change process which makes it more dynamic. In fact, unlearning is to abandon the old procedures to build new procedures in which knowledge is purposefully displaced. For knowledge unlearning, an organisation deliberately eliminates what is fixed in its memory, which can be as important as learning, particularly when an organisation needs to remove the knowledge that undermines its success (Sadeghian et al., 2011). According to Haber, organisational unlearning is conceptually close to organisational learning (Raste Moghaddam and Abbaspour, 2011). Therefore, if organisational learning is to acquire knowledge to increase organisational performance, unlearning is the ability to circumvent knowledge and information which may harm company success (Mashabaki and Setam, 2012). Organisations monitor their environment and their causal relationships in order to identify environmental stimuli and provide appropriate responses. New models result in practical theories which help organisations encountering new situations. From this perspective, unlearning is a process by which knowledge is eliminated for providing new responses and new mental maps. Argyris and Sean (1978) considered unlearning as an awareness of the reduction of some factors, including old strategies of storage of existing knowledge (Raste Moghaddam and Abbaspour, 2011). On the other hand, organisational memory points to a reservoir in which knowledge is stored for future use. The minds of people, organisational culture and information technologies constitute organisational memory (Allameh and Moghaddami, 2010). Akgün et al. (2007) have argued that if unlearning is conceptually defined as memory elimination, research into how organisational memory can be shaped and emerge can help in identifying and deploying unlearning in the organisation. Considering the definition of unlearning presented by Akgün et al. (2007), which is elimination of memory and various forms of organisational memory provided by Moorman and Miner (1997), unlearning logically involves elimination of beliefs, routines and physical constructs in the organisation. In summary,

unlearning is inherent in the process of organisational change Akgün et al. (2007). Thus, the Agricultural Jihad Organization can gradually provide the opportunity for farmer unlearning for abandoning traditional irrigation methods by establishing appropriate platforms for shifting from traditional irrigation system to new methods.

4.1 Limitations

This study suffered from numerous limitations, each of which can impose weaknesses and shortcomings on findings and results. Thus, it is very important to mention these limitations:

1 The findings cannot be generalised: One of the limitations of this study is dependence of the model on the studied context. It limits its ability and applicability in other contexts and other populations; in fact, this reduces the ability to generalise results.

2 Static model: another limitation which can be considered in relation to the model is the weakness caused by the static model presented. Because the model derived from analysis and interpretation of the data emerges with achievement of results and does not return to other categories. Therefore, this model is not dynamic rotationally and does not return to other categories in a static manner by achieving the achievements resulting from organisational memory retrieval. As illustrated in the final model, these steps begin with a time sequence of causes and result in retrieval of organisational memory, so that feedback of results to other categories is not depicted in this model. This as a limitation can represent the weaknesses. Although it is possible to assume a rotational relationship in terms of time sequence between the achieved categories, analysis and interpretation of data presents the model statically.

3 Conservatism of interviewees in transferring information: another limitation which can be addressed in this study is conservatism or suspicions which can prevent interviewees from providing honest information. For example, wheat crop sales are exclusive to Agricultural Jihad Organization which can provide farmers with good crop, because its capacity is low and it is not easy to buy it; but farmers refused to mention this in response to questions. Therefore, some interviewees might provide unrealistic data with intentional bias.

4.2 Implications for future studies

As the findings showed, the concept of organisational unlearning can significantly contribute to explanation of many organisational phenomena. Nevertheless, this key concept in the organisation and management literature remains somewhat neglected. Therefore, future studies are recommended to address this concept regarding key resources of the organisation in order to develop knowledge of management by conducting fundamental research. In addition, future studies are recommended to address this in other contexts to provide comparative comparisons and thus provide a wider understanding of the concept of organisational unlearning for organisations and people.

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