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Research paper

An integrative analysis of workforce agility of police officers

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Abstract

The adaptive evolution in relation with the dynamics in the environment is inevitable for an organization to grow and keep up the pace. Or-ganizational intelligence is a crucial factor for such a growth. It is known that workforce agility is related with Organizational intelligence. This paper tries to find the factors influencing on workforce agility amongst the police officers in India. The methodology employed for the study is interpretive structural modelling (ISM). For the case study purpose, the data has taken from the selected police officers from the state of Kerala,India. The paper concluded that the wok experience, age, health condition and work environment are the crucial factors which influences the workforce agility.

Keywords: *Workforce Agility; Work System; Organizational Intelligence; Interpretive Structural Modelling*.

1. Introduction

Workforce agility is defined as an approach that assists success in quickly altering, and indefinite production and service atmospheres. Workforce agility is concerned with the performance of the workforce. Study of workforce agility would help the organization gives in identifying the causes and provide long-term benefits.

The paper is set in the context of work system of police officers in India. Studying about workforce agility in such a context would open up new horizons. The study has more prominence in this context as the schedules of the police officers are stricter and longer. For an efficient discharge of duty the agility of the workforce have to be maintained.

The workforce agility offers different benefits such as customer service, quality improvement, learning curve speeding up (Sherehiy et al., 2007). Organizational agility wants development of a flexible workforce that can deal with the unexpected and rapid changes in the work environment. In this paper, attempts to find the relationship between the workforce agility factors using ISM approach.

2. Literature review

The literature is comprised of two parts, namely workforce agility factors in organisations and it is followed by ISM approach.

2.1. Literature review on workforce-agility

Breu et al. (2002) discussed the emergent information and the collaboration requirements of agile workforce, flexible IT organizations need to be in place in order to maintain the speedy opening of latest systems. Schultz and Edington (2007) discussed in their work about health conditions such as arthritis, allergies are related with presenteeism and health risks which are conventionally calculated by health risk evaluation, especially physical action and body weight. Sherehiy et al. (2007) identified that the global features of agility which is applicable to all parts of an enterprise namely speed, culture of change, responsiveness, integration, flexibility, low complexity, high quality and personalized products and mobilization of core abilities. Sherehiy,(2008) proposed a model which delivers a framework for forecasting and understanding potential things of management practices mainly focused on the achievement of agility of employees and their performance. Sarker et al. (2009) discussed the importance of different types of agility based on various information systems and success measures. Sohrabi et al. (2014) have mentioned in their work that variables like position in an organization, age and work experience, had an affirmative important relationship with the workforce agility.

2.2. Literature review on ISM

Interpretive Structural Modelling approach has applied in the various areas and it has depicts in Table1.

Table 1: ISM Applications Areas

Sl. No	Authors	ISM application areas
1	Govindan et al. (2012)	Identifying the relationships between specific factors for selecting finest third party reverse logistics provider
2	Azevedo et al. (2013)	Identify and performance metrics to support the assessment of performance of automotive supply chain.
3	Mehta et al.(2014)	Identify the hierarchy of activities, which has to be taken to expand the excellence of engineering education.
4	Talib et al. (2011)	Analyse the behaviour of barriers, which obstruct the implementation of TQM in organizations.
5	Alawamleh and Popplewell(2011)	Identifying the threats and number of risk sources in the virtual organizations, which may have adverse effects on the time, cost, and quality or may cause failure of the cooperation.
6	Govindan et al. (2013)	Identifying the relationship of dependence and driving factors that exists among the green

		supply chain management practices with respect to acceptance within Brazilian electrical or electronic industry.
7	Saleeshya et al.(2012)	Framework developed for agility assessment in supply chain network using ISM with analytic hierarchy process
8	Ambika Devi Amma et al. (2015)	Applied ISM for analyzing major threads of cloud computing
9	Patri and Suresh (2017b)	Applied total ISM for analyzing agile factors in healthcare organization.

3. Methodology

3.1. Data collection

A Survey has been conducted among 10police officers from Kerala. A face to face interview has been conducted with these officers and from this interview the data has been obtained regarding the influence or impact of identified factors on workforce agility. From the data, by ISM methodology, the association among these factors has been identified.

3.2. ISM approach

The following steps are used to illustrate modelling procedures of ISM (Patri and Suresh, 2017a):

1) Identification of factors through literature survey. Following Table 2 showing the factors which related to workforce agility.
2) Deriving appropriate relationship between the pair of factors which mentioned below:

V: Factor i alters/influence factor j
A: Factor j alters/influence factor i
X: Factor i and factor j are mutually reaches
O: Factor i and factor j aren't related

The comparisons of factors are captured from 10 expert's views. The highest mode of view is selected from the all expert's views. The self-structured interaction matrix (SSIM) resulting from mode of views of each pairs and its shown in Table 3.

3) The initial reachability matrix development (Table 4) from SSIM and the conversion steps are mentioned below:

From SSIM (i, j) entry	V	A	X	O
To initial reachability matrix (i , j) entry	1	0	1	0
To initial reachability matrix (j,i) entry	0	1	1	0

4) Final reachability matrix: It is developed through transitivity analysis of initial reachability matrix. Example: if, D=E and E=F, then D=F (Table 5).
5) Partition of final reachability matrix: Partitions of the final reachability matrix are mainly grounded on three sets, i.e. reachability set, antecedent set, intersection set. Iteration-1, the intersection elements are only present in the reachability set, those enablers are removed from the set and designated as level-1 factors. Then go to next iteration, repeat the process until all the factors are removed from the set. At the end of this process we get partitioned reachability matrix in to different levels and it is depicted in Table 6, 7, 8, 9, 10, 11and 12.
6) Digraph creation: Directed graph (Digraph) is created using information from final reachability matrix and level partitions. In digraph factors are placed in ascending order i.e. first level factor at top of the digraph and the second level factor at second position and so on until lowest level factor is placed at lowest level in the digraph. The ISM method is depicted in Figure 1

Table 2: Identified Factors on Workforce Agility

S. No.	Factor	Definition	References
1	Work Experience (F1)	Experience that an employee gains while he/she working in a specific field or occupation.	Sohrabiet al.(2014)
2	Flexibility (F2)	Ability of an employee to perform a variety of jobs and different functions within a company.	Breu et al.(2001)
3	Responsiveness (F3)	Reactive or respond in a desired or positive way.	Breu et al.(2001)
4	Adaptability (F4)	Ability to change work in some situations or for some purpose.	Sherehiy et al.(2007)
5	Work Environment (F5)	Workspaces integrate organizational needs , information, physical, and cognitive	Sherehiy et al.(2007)
6	Age (F6)	The physical age of an employee.	Sohrabi et al.(2014)
7	Health condition (F7)	Physical ability to perform duties in an organization	Schultz andEdington (2007)
8	Effective Collaboration (F8)	When two or more employees work together by sharing and thinking ideas to accomplish a certain goal.	Sarker et al.(2009)
9	Intelligence (F9)	The ability of employees to learn or understand new things, or to deal with new situations or difficult situations.	Suofi et al.(2014)
10	On Time Completion (F10)	Efficiency to finish the project within the specified time.	Sarker et al.(2009)

Table 3: SSIM for the Factors Influencing Workforce Agility

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	V	V	V	O	O	O	V	O	V
F2		1	O	X	O	A	O	O	O	V
F3			1	O	O	O	O	A	A	V
F4				1	O	O	A	V	O	V
F5					1	O	V	O	O	V
F6						1	O	O	O	O
F7							1	O	O	V
F8								1	V	V
F9									1	V
F10										1

Table 4: Initial Reachability Matrix

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	1	1	1	0	0	0	1	0	1
F2	0	1	0	1	0	0	0	0	0	1
F3	0	0	1	0	0	0	0	0	0	1
F4	0	1	0	1	0	0	0	1	0	1
F5	0	0	0	0	1	0	1	0	0	1
F6	0	1	0	0	0	1	0	0	0	0
F7	0	0	0	1	0	0	1	0	0	1
F8	0	0	1	0	0	0	0	1	1	1
F9	0	0	1	0	0	0	0	0	1	1
F10	0	0	0	0	0	0	0	0	0	1

Table 5: Final Reachability Matrix

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	1	1	1	0	0	0	1	1*	1
F2	0	1	1**	1	0	0	0	1*	1**	1
F3	0	0	1	0	0	0	0	0	0	1
F4	0	1	1*	1	0	0	0	1	1*	1
F5	0	1**	1***	1*	1	0	1	1**	1***	1
F6	0	1	1***	1*	0	1	0	1**	1***	1*
F7	0	1*	1**	1	0	0	1	1*	1**	1
F8	0	0	1	0	0	0	0	1	1	1
F9	0	0	1	0	0	0	0	0	1	1
F10	0	0	0	0	0	0	0	0	0	1

Table 6: Iteration-1

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2,3,4,8,9,10	1	1	
2	2,3,4,8,9,10	1, 2,4,5,6,7	2,4	
3	3,10	1, 2,3,4,5,6,7,8,9	3	
4	2,3,4,8,9,10	1, 2,4,5,6,7	2,4	
5	2,3,4,5,7,8,9,10	5	5	
6	2,3,4,6,8,9,10	6	6	
7	2,3,4,7,8,9,10	5,7	7	
8	3,8,9,10	1, 2,4,5,6,7,8	8	
9	3,9,10	1, 2,4,5,6,7,8,9	9	
10	10	1, 2,3,4,5,6,7,8,9,10	10	I

Table 7: Iteration-2

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2,3,4,8,9	1	1	
2	2,3,4,8,9	1, 2,4,5,6,7	2,4	
3	3	1, 2,3,4,5,6,7,8,9	3	II
4	2,3,4,8,9	1, 2,4,5,6,7	2,4	
5	2,3,4,5,7,8,9	5	5	
6	2,3,4,6,8,9	6	6	
7	2,3,4,7,8,9	5,7	7	
8	3,8,9	1, 2,4,5,6,7,8	8	
9	3,9	1, 2,4,5,6,7,8,9	9	

Table 8: Iteration-3

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2,4,8,9	1	1	
2	2,4,8,9	1, 2,4,5,6,7	2,4	
4	2,4,8,9	1, 2,4,5,6,7	2,4	
5	2,4,5,7,8,9	5	5	
6	2,4,6,8,9	6	6	
7	2,4,7,8,9	5,7	7	
8	8,9	1, 2,4,5,6,7,8	8	
9	9	1, 2,4,5,6,7,8,9	9	III

Table 9: Iteration-4

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2,4,8	1	1	
2	2,4,8	1, 2,4,5,6,7	2,4	
4	2,4,8	1, 2,4,5,6,7	2,4	
5	2,4,5,7,8	5	5	
6	2,4,6,8	6	6	
7	2,4,7,8	5,7	7	
8	8	1, 2,4,5,6,7,8	8	IV

Table 10: Iteration-5

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2,4	1	1	
2	2,4	1, 2,4,5,6,7	2,4	V
4	2,4	1, 2,4,5,6,7	2,4	V
5	2,4,5,7	5	5	
6	2,4,6	6	6	
7	2,4,7	5,7	7	

Table 11: Iteration-6

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
1	1	1	1	VI
5	5,7	5	5	
6	6	6	6	VI
7	7	5,7	7	VI

Table 12: Iteration-7

Factors	Reachability Set	Antecedent Set	Intersection Set	Level
5	5	5	5	VII

4. Results and analysis

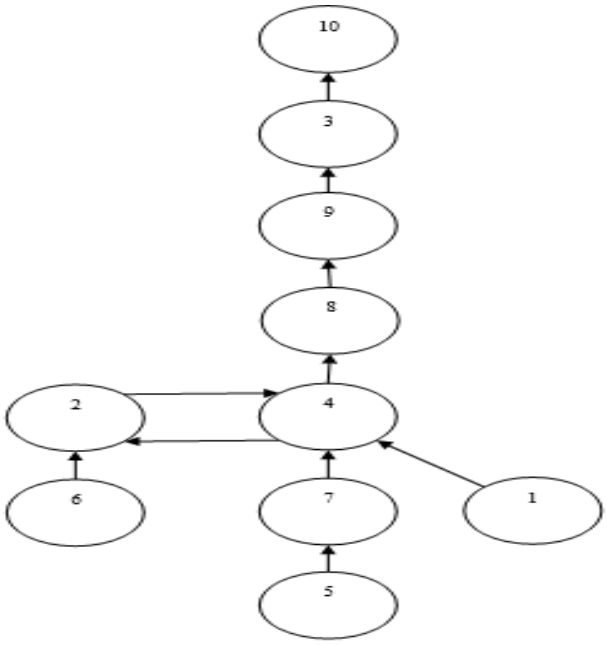

Fig. 1: ISM Model for Workforce Agility.

Level vii factor: f5 (work environment)

The factor F5 is directly influencing the factor F7 from the sixth level. Doing jobs with less facilities and unsecured working condition will affect the health condition of employees and it will reflect it to the productivity of a firm. Better work environment is required for the smooth running of law enforcement especially for police officers. Health condition is always a great constrain for them.

LEVEL VI FACTORS: F6, F7, F1 (Age, Health condition, Work experience)

The factor F6 is directly influencing the factor F2, which means that age of an employee is directly, influences his flexibility that is the ability to perform various jobs and functions in the organization. Age is a main constrain in an organization which directly affects the job, especially which is something more physically doing jobs.

The factors F7 and F1 will impact on the factor F4. Work experience and health condition play a major role in the factor 'adaptability'. Better health condition of the employees support the organization to perform different task at a time and achieve the targets properly. Similarly work experience also influences adaptability of an employee. Person with good work experience can able to change work in specific situations or for some other purpose rapidly.

LEVEL V FACTORS: F2, F4 (Flexibility, Adaptability)

The factors F2 and F4 are interdependent on each other, which means the flexibility of an employee and the adaptability of an employee are influencing each other. Person who is highly flexible with his jobs and functions in an organization should have good ability to change work in some situations or for specific purposes. When adaptability of an employee to accept any kind of jobs increases, it will lead them to flexible with different kind of jobs. In addition to this, adaptability influences the effective collaboration also. The employee who is adaptable with every job can collaborate with every team in that organization to finish a job.

LEVEL IV FACTOR: F8 (Effective collaboration)

Factor F8 influences the factor F9. In an organization, different kind of people from different backgrounds will be there. By effectively collaborate in groups everyone can learn or understand things, or to deal with new or difficult situations easily.

LEVEL III FACTOR: F9 (Intelligence)

The factor F9 is directly influencing the factor F3. For the law enforcement, employees have to be updated with present technologies and solutions. Employee's ability to learn/understand things

will help to make them more responsive to their jobs. It helps to deal with new difficult situations.

LEVEL II FACTOR: F3 (Responsiveness)

The factor F3 influences the factor F10 directly, which means as the responsiveness varies, it will impact on time completion of job. Whenever all employees of an organization do their work sincerely by taking all the responsibility of that job, it can complete it on time.

LEVEL I FACTOR F10 (On time completion)

'On time completion' is the peak factor for measuring workforce agility in an organization. This factor is the one which has come out after the ISM analysis to be directly related to key aim of this paper.

5. MICMAC analysis

MICMAC rank helps to classify the identified factors based on their driving power and dependence power. In this MICMAC analysis, the variables involved in the study are classified broadly into 4 groups viz. autonomous factors(zone-I), dependent factors(zone-II), linkage factors(zone-III), independent/key factors(zone-IV) and corresponding MICMAC graph is presented in Figure 2.

		Zone-IV					Zone-III				
Driving Power ↑	10										
	9										
	8	F5									
	7	F1,F6	F7								
	6						F2,F4				
	5										
	4							F8			
	3								F9		
	2									F3	
	1										F10
		1	2	3	4	5	6	7	8	9	10
		Zone-I					Zone-II				
		Dependence Power →									

Fig. 2: MICMAC Graph.

Table 13: MICMAC Analysis of Factors Rank

Factor	Driving power	Dependence power	Driving power / Dependence power	MICMAC rank
F1	7	1	7.000	2
F2	6	6	1.000	4
F3	2	9	0.222	7
F4	6	6	1.000	4
F5	8	1	8.000	1
F6	7	1	7.000	2
F7	7	2	3.500	3
F8	4	7	0.571	5
F9	3	8	0.375	6
F10	1	10	0.100	8

In the MICMAC graph (Figure 2), no autonomous factors are identified and which means there aren't found any factors that are having feeble driving power and dependency. The factors (F8, F9, F3 and F10) effective collaboration, intelligence, responsiveness and on time completion are the weak drivers but have strong dependency power. So these factors should be considered with care as these factors can influence the workforce agility of a law enforcement organization. The linkage factors (F2 and F4) flexibility and adaptability have sturdy driving power and dependency power. These factors have high significance in workforce agility. The factors in the zone IV (F5, F6, F1 and F7) work environment, age and work experience and health condition have a sturdy driving and frail dependence power and which can create a great impact in the workforce agility.

The following Table13 represents the MICMAC rank obtained by considering the dependence power and driving power of identified factors. According to the table, MICMAC rank 1 represent the most crucial factors which influence the workforce agility and rank 8 corresponds to the least significant factor.

6. Conclusion

This paper aim largely on an outlook of impact factors for workforce agility for police officers by identifying any fruitful drivers by its nature for serving this purpose. The drivers thus acknowledged in this paper are not independent of the organization, these drivers act as a necessary obligation for measuring agility of workforce. The driver's order may change from organization to organization, but the tale of every driver help the organization to fasten the belt on their agility methods. In this case, the observation was that the wok experience, age, health condition and work environment are the crucial factors which influences the workforce agility. Usage of ISM has been of high benefit in this paper, this algorithm is a theory building approach and exactly this aids us to get profound insight by giving answers to the following questions:

1) Deciding factors for improving workforce agility in an organization?
2) The connection with each other and recognition of driving factor and the dependent factor?

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