Mapping the human resource focused enablers with sustainability viewpoints in Indian power sector

Abstract

Sustainability is defined a triple bottom line approach, which concentrates on economic, social and environment growth of any organisation. In order to achieve sustainability objective, the human resource focused enablers are playing a significant role in optimising expenses, improving productivity and quality of work. Therefore, the present study seeks to build a model for the enablers of human resource development for sustainability in India power sector. The study findings help the sector to improve the productivity of their workers and establish all the enablers, which can be seen to improve quality of work life in the Indian power sector. Improved human resource capabilities and work conditions provide not only much needed motivation to power sector employees to improve their efficiency but also assist to accomplish social-ecological-economic organizational sustainability. Total Interpretive Structural Modelling with Matrice d'Impacts Croisés Multiplication Appliqués à un Classement (MICMAC) analysis has been applied to build a structural model and to identify the driving force and dependence power of enablers. Validation of relationships among the enablers and managerial implications are also discussed. According to the findings, the enablers 'work safety and healthy working conditions' have the highest driving power. The outcomes of this study can help the power sector to enhance human resource capabilities and quality of work life within the organization through provision of a benchmark model and help to accomplish sustainable development initiatives in its business.

Keywords: Sustainability; Environmental Management; Human resource development; Enablers; Total Interpretive Structural Modelling; Indian Power Sector.

1. Introduction

For sustaining in today era of completion, every organization is putting effort towards sustainability. Now the businesses understand that sustainability is not only the element of economic growth but also social responsibility (Jabbour et al., 2015a; Teixeira et al., 2016; Tooranloo et al., 2017). In research gate (a social networking platform for researchers), one positive and strong debate is going on the research question '*Is it time we shift emphasis from technological solutions to climate change & focus on the 'Human Dimension'*? which is posted by researcher Raveendra Nath Yasarapu from Technische Universität München, Germany. In

this question total number Reads (9100), Followers (396), Answers (2880), Recommendations (79) have been achieved till date which shows the significance role of human dimensions in climate change and sustainability. Even in the literature, the empirical evidence are increasing to support that human resource development factors an important role in sustainability of organizations responsibility (Jabbour et al., 2015a; Jabbour et al., 2015b; Jabbour and Jabbour, 2016; Tooranloo et al., 2017). However, less attention has been given by researchers for measuring the relationship link between sustainability and human resource development and relevant studies (Kramar, 2014; Jabbour and Jabbour, 2016; Tooranloo et al., 2017).

With fierce competition for attracting the best talent, organizations are focusing on human resource development to have an edge over competitors in attracting and retaining valuable and qualified human resources (Yadav, 2014; Amui et al., 2017; Tooranloo et al., 2017). The behavioural approach originated with Hawthorne experiments (1924-1933) carried out by Elton Mayo and F.J. Roethlisberger; this can be considered the root of quality of work life in the context of human resource development enablers. These experiments diverted the focus of management from core productivity to employees and their welfare. These studies proved that sole economic benefits or physical activities are not the only motivators for employees to increase productivity. These enablers are generally quite detailed and a premeditated program which is focused upon enhancing satisfaction among employees. It also targets the feeling of fulfilment in the employee's mind which further adds to high productivity, adaptability and even organizational effectiveness. According to Sirgy et al. (2001), there are four levels of need consideration, i.e. need satisfaction from job requirement; work environment; ancillary programs and supervisory behaviour (Yeo and Li, 2011). These must be considered to achieve quality of work life in the context of human resource development enablers. When an employee's basic expectations of their job and work are fulfilled, then a feeling of quality can arise in their minds. Maslow has categorized these expectations in the need hierarchy from physiological needs to self-actualization (Sirgy et al., 2001).

This study is based on Indian power sector, which is going through a rapid technological sophistication, demands a skilled workforce to realize the planned growth; however, factors such as the hard physical climate, excessive workload, low salary etc. makes the power sector one of the least preferred places to work. Ever growing productivity has been achieved by reducing man/MW ratio of 9.4 in the 9th five year plan to the expected level of 4.9 in the 12th five year plan (Government of India, Ministry of Power, 2012); this shows sustainability every employee in this sector. Expert committee reports on the Indian power sector (Deloitte, 2012;

KPMG, 2010) also emphasize achieving employee efficiency. However, in current literature no discussion is available related to human resource development enablers for sustainability in Indian power sector perspective. The human resource development enablers are playing an important role for improve the productivity of power sector workforces. These reports talk in detail about diversity in manpower but say little on how to create the synergies to improve efficiency in the sector through sustainability concept (Lee et al., 2015). The present study is related to find the enables of HRD for achieving sustainability and help power sector organizations to improve the productivity of their workers and establish all the enablers which can be seen to improve quality of work life in the power sector. Therefore, the present study the following questions:

RQ1: What are the key enablers to HRD for sustainability in the Indian power sector?

RQ2: Do any mutual relationships exist among the enablers?

RQ3: What are the driving and dependence power of the enablers?

Above mentioned questions motivate us to conduct this study and set the following objectives:

I.   To identify the enablers of HRD for sustainability in Indian power sector;

II.   To establish mutual relationships, relative importance and interdependence of each enabler with the help of a TISM technique;

III. To analyze the driving and dependence power of the enablers in the power sector by using MICMAC analysis

To achieve the above mentioned objectives, Total Interpretive Structural Modelling (TISM) with MICMAC analysis has been applied to build a structural model and to identify the driving force and dependence power of enablers. Although most of the steps involved in TISM are similar to ISM but what makes it unique is interpretations assigned to the hierarchical structure's links. The interpretations provides much needed direction to otherwise intricate model (Dubey and Ali, 2014). TISM not only assign value in constructing more interpretive structural model; but also provide logic by creating a knowledge base. It can be considered as "a stepping-stone in enhancing the interpretiveness in the structural modeling, thereby making the logic of the model more transparent rather than leaving it open to multiple interpretations by various users" (Yadav, 2014; Yadav and Sushil, 2014). Though new, it's a promising technique used by many researchers (Yadav and Sushil, 2014; Narkhede and Gardas, 2018).

The entire study is organized as follows. Section 2 focuses on the literature review and an overview of conditions for manpower in the Indian power sector. In section 3, a solution

methodology framework in discussed. The analysis of the research is carried out in section 4. Section 5 covers the discussion and implications of the research while section 6 focuses on conclusions and future directions.

2. Literature review

This section introduces human resource development and sustainability, the manpower conditions in the Indian power sector and literature gaps.

2.1 Human resource development and sustainability

In literature, sustainability is defined a triple bottom line approach which concentrates on economic, social and environment growth of any organization (Luthra et al., 2015; Dubey et al., 2017). However, the concept of sustainability is still vague, complex but ultimate objective of sustainability is to motivate the organization not only for achieving economic performance but also social and environment (Luthra et al., 2015; Jabbour et al., 2016). To achieve sustainability objective, the enablers of human resource development are playing a significant role in optimizing expenses and improving productivity and quality (Jabbour et al., 2016). In 1926, Follett had proposed theory in which she mentioned that any management is incomplete without careful attention on human relation and their development. Thus, human resource development process of the organization plays paramount important role to achieve sustainability and provides platform and flexibility to the employee for exploration (Kramar, 2014; Luthra et al., 2015). In literature many studies support this in the context of different fields. Jabbour et al. (2015a) determined that human critical success factors are playing an important role in eco-innovation and to make more sustainable supply chains for a low-carbon economy with multiple case study of Brazilian leading companies. In the same year, Jabbour et al. (2015b) measured the role of human dimensions in green product development and the company performance. Jabbour et al. (2016) linked two emerging i.e. Green human resource management and green supply chain management and provided a huge of future research. Kramar (2014) explained that for sustainability we should think beyond strategic part now the time has come for implementation of sustainable human resource management (SHRM). Dubey et al. (2017) further developed a model where they integrated the hard (strategy, technology and policy) and the soft (human-resources) related dimensions in acceptance of the GSCM. They emphasised that for examining and evaluating both the dimensions both soft and hard dimensions must study separately in future studies. Tooranloo et al. (2017) studies about factors affecting implementation success of SHRM. They emphasised that strong SHRM can

help the organization to achieve sustainability objective. In the same year, Amui et al. (2017) explained that stainability as a dynamic organizational capability and it is very much require for any organization enhance their dynamic capabilities for sustainability. They also emphasised that these capabilities will be playing a major role in future sustainable transition.

2.2 Indian power sector and manpower conditions

India stands 5th in the generation of power with a consumption of around 4 percent of the world's total energy. The national electricity policy (2005) and the tariff policy (2006) have revived the interest of national as well as international organizations in the power sector. Bidding documents have been standardized with competitive bidding routes. Leaving aside atomic energy, India has allowed 100 percent FDI in nearly all segments of the power sector (Government of India, Ministry of Power, 2012). The Indian power sector is in constant and urgent need of committed, self-driven and multi-tasking employees to take up the challenge of ever increasing power demands.

Basically, the Indian power sector's manpower needs are met by vocational institutions like Industrial Training Institutes (ITIs) and Industrial Training Centre (ITCs); these bodies are entrusted to impart relevant vocational skills but are deficient of infrastructure to train manpower for the power industry. Because of the mismatch between the needs of the power sector, which is expected to grow at a very fast rate, and the vocational and educational training curriculum, a challenge has arisen to produce fresh manpower for power companies who are entering or expanding into the Indian power sector. Even the working group report of the Planning Commission on Power Sector (Government of India, Ministry of Power; 2016) mentioned the importance of skill development. This is apparent not only in conventional energy (KPMG, 2010) but there is a shortage of skilled manpower in the renewable energy sector as well. This has been acknowledged by Indian power firms who have now come up with an initiative of establishing their own training centres or adopted ITIs to meet their own particular needs. Indian power firms like NTPC, Reliance Power, Jindal Steel & Power are a few of the companies who have taken these initiatives. The Indian power sector's problems do not end with just securing fresh talent, but also re-employing manpower with low levels of skill that need updating. The power sector deals with new adoptions in technologies and techniques on a day to day basis and it becomes difficult for employees who don't have up-to-date knowledge and the skill levels needed. The Institute of Energy Management and Research (2012) suggested that employees should be given more

freedom and autonomy in terms of working styles, flexible working hours and better quality of work life to motivate employees to work towards up-skilling and hopefully to remain with the organization. Based upon many reports by the Government of India, the Ministry of Power has established a National Training Policy (NTP) and National Power Training Institute (NPTI) for carrying out research on how to improve conditions for the workforce and how to train employees to meet present and future needs.

2.3 Research gap and problem definition

Kotzé (2008) and Rathi (2009) found that people use what they do at work in defining themselves; therefore accepting quality of work life factors are the main enablers in the context of HRD as a fundamental determinant of quality of life, establishes that work and work related activities are important.

Since inception, extensive research has been conducted on HRD and sustainability; still, its definition remains vague. In an attempt to capture HRD's essence, Hannif et al. (2008) divided these definitions into three concepts: concerning job satisfaction; concerning subjective well-being beyond job satisfaction. HRM has evolved a lot from initial health and wellbeing concerns to providing best working experience, including financial and non-financial incentives while at the same time fulfilling organizational goals (Moghimi et al., 2013). To capture the components of HRD, Adhikari and Gautam (2010) mentioned three approaches: first, scientific management era considering safety, hygiene and other extrinsic rewards; second, the human relations approach covering both intrinsic as well as extrinsic rewards like autonomy, challenges, task contents etc.; third, orientation to work approach *i.e.* focusing on the contingent effect of extrinsic or extrinsic reward on the individual. Adhikari and Gautam (2010) also highlighted that achievement of HRD programs mainly depends upon open communication, environment of trust and openness and partnership between management and employees. It shows constant efforts from both sides to make these programs a success.

Conservation of Resources (COR) theory suggests that employees are motivated to not only protect the current resources but also to obtain new ones. In doing so, they adapt and cope with difficult situations, achieve success in the workplace and make them remain with the organization (Kim et al., 2017). In simple terms, employees armed with enriched personal resources will have better HRD. Inspired by COR theory, Dechawatanapaisal (2017) also suggested that organizations can retain employees by providing intrinsic resources obtained

through social contexts of individual generated through HRD practices managed by a HR system which creates an obligation in the minds of employees to stay with an organization. Supervisors and leaders have also been found to be instrumental in HRD practices for sustainability. Kara et al. (2018) has highlighted the importance of leadership styles in creating positive HRD. Both transformational and transactional leadership styles had a positive impact in creating quality of work life. HRD has been found instrumental in improving employee performance in a transnational context by global leaders (Hermawati and Mas, 2017).

HRD has already been established as having huge implications for the employee as well as the employer, with contributions noted to various organizational behaviours such as organizational effectiveness (Donaldson et al., 1999); employee commitment and sense of efficacy (Louis, 1998); firm performance (Morin and Renaud, 2004). Chatrakul et al. (2017) stated that in challenging times around the world, there is a reduction in HRD for sustainability of employees due to a reduction in investment in HRD for sustainability practices. A positive work environment has a positive impact on employees' productivity (Akter et al., 2018); this is what emerging economies like India needs. Sirgy and Lee (2018) conceptualized how various roles an employee plays in both personal and professional lives leads to work-life balance as well as HRD for sustainability. However, no study has been conducted related to HRD for sustainability in the power sector. Therefore to fulfil this literature gap, this study is an attempt to benchmark the enablers of HRD for sustainability in the Indian power sector by using expert mining and TISM techniques.

3. Solution methodology framework

To achieve the objectives, a three phased solution methodology framework as presented in Fig.1 is used. In the first phase, after completing an extensive literature review to find the enablers of HRD for sustainability, expert mining has been carried out through interviews with academic and industry experts; the enablers associated with HRD for sustainability in the context of the power sector are then finalized. In the second phase, TISM methodology is used to determine the contextual relationship between enablers. The third phase is dedicated to development and validation of a contextual TISM model.
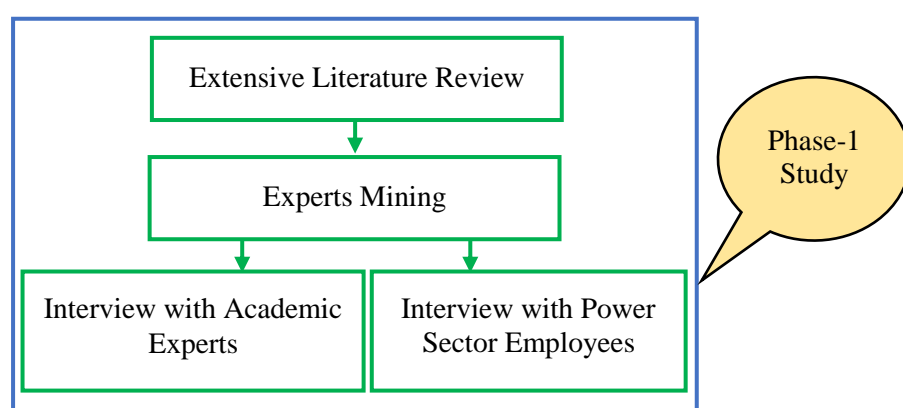
Fig.1: Methodology framework of the study

4. Analysis and discussions

The analysis and discussion of the study has been divided according to the proposed study framework.

4.1 Experts mining

15 HR experts were contacted in the first phase of the study, out of which 8 experts agreed, leading to a response rate of 53.33 percent. 5 experts (62.5 percent) were from the public sector and 3 experts (37.5 percent) from private organizations. Out of these 8 experts 3 (37.5 percent) were from junior managerial level, 3 (37.5 percent) from middle management level and 2 (25 percent) from senior level. 4 experts (50 percent) were from hydro power, 2 experts (25 percent) were from thermal power, 1 (12.5 percent) from wind energy and 1 (12.5 percent) from a nuclear energy organization. Group decisions can be affected by the size of the group and to ensure validation of group decisions, 5-20 expert opinions are required (Anderson et al. 2001; Kumar and Dash, 2017; Gardas et al., 2018). Their feedback on a scale of 1-5 were meticulously recorded along with extensive details of experts related to the domain, designation and work experience as given in Table 1. The final list of variables (factors) along with experts mining score for each variable and their brief definitions are presented in Table 1 with mean scores above 3.5.

4.2 Self-Structured Interaction Matrix (SSIM) Formulation

There are 9 steps involved in conducting TISM (Banwet and Deshmukh, 2010; Narkhede and Gardas, 2018):

Step 1: The initial step requires to identify and define all those elements whose relationships need to be modelled.

Step 2: The structure of the model is developed by using the contextual relationships among elements.

Step 3: TISM provides the descriptions of the influence between each element that are found linked. Step 3 helps in achieving in-depth knowledge.

Step 4: An 'Interpretive logic-knowledge base' is prepared with the help of pairwise comparison among elements. Each comparison with positive link is coded Yes (Y) and interpretation is given; otherwise, it is coded No (N).

Table 1. Enablers of HRD for sustainability in Indian power sector

Enablers	Description	Reference	Experts mean score
Supervisor support (E1)	This dimension of human resources is related to the appreciation of employee contributions by superiors and plays an important role for employee sustainability within the organization.	Huy (2002); Surienty et al. (2014); Tooranloo et al. (2017)	4.2
Job satisfaction (E2)	An enjoyable emotional situation resulting from the appraisal of employees' work, it has directly link with employee sustainability.	Brown and Peterson (1993); Weiss, (2002); Tooranloo et al. (2017)	4.5
Compensation and benefits (E3)	Compensation and benefits is a sub-discipline of human resources, focused on employee compensation and benefits policy-making so that they can get timely promotion and benefits.	Lissy (1993); Surienty et al. (2013) Kaur (2016)	4.3
Freedom from work related stress (E4)	This enablers is related to the work flexibility of employee. Freedom from work related stress enabler play an important role for sustainability of employee	Mosadeghrad et al. (2011); Ganster and Rosen (2013); Van Yperen et al. (2016)	4.5
Work safety and health (E5)	This enabler is related to the safe and healthy work environment for employee which impact on their happiness and productivity as well.	Gillen et al (2002); Christian et al. (2009)	3.9
Job involvement (E6)	This related to enhancement of employee engagement with their job.	Igbaria et al. (1994); Cooper-Hakim and Visweswaran (2005)	3.8
Teamwork and communication (E7)	This enabler is related to the good working relations with colleagues and richness of communication, place an important part in working life	Mosadeghrad et al.(2011); Leitão and Greiner (2017); Tooranloo et al. (2017)	3.8
Learning opportunities (E8)	This dimension of human resources is related the available learning opportunities for the employee which can enhance their skills sets.	Maurer and Tarulli (1994); Kanten (2014); Nurmi and Hinds (2016)	4.2

Social integration (E9)	This enabler is all about interpersonal openness, supportive group, mobility of employee.	Farid et al. (2014); Chen et al. (2015)	4.1
Social relevance (E10)	This dimension is related to the social relevance of the employee, they must understand the benefits and harmful effect on the society of the work roles.	Chen et al. (2015); Klappenbach (2016); Macke and Genari (2018)	3.6
Career growth opportunities (E11)	This enabler is related to the career growth for employees within the organization.	Sundaray et al. (2013); Nawaz and Pangil (2016); Hamdoun et al. (2018)	3.9
Autonomy (E12)	It is referred to as the degree of control an employee has over his/her tasks and immediate scheduling	Posig and Kickul (2003); Liu et al. (2005); Bolumole et al. (2016)	4.1
Job equity (E13)	This enabler is all about equitable relationship with each employee so that they can ready to give their best.	Bender et al. (2006); Narkhede et al. (2014); Pinzone et al. (2016)	4.3
Work flexibility (E14)	This is related to flexibility of work for employee so that they are able to arrange one's work hours	Hill et al. (2001); Hyland and Prottas (2017)	4.4
Recognition and work identity (E15)	The enabler is related to recognition in terms of monetary or non-monetary benefits for the work performed by the employee.	Hale and Maehling (1993); Luthans (2000); Houston (2016); Macke and Genari (2018)	4.3
Creativity at work (E16)	This dimensions of human resource is all about the capacity of employees to produce effective solutions to the problems faced at work and also to give novel ideas.	Amabile et al. (2005); George (2007)	4.2
Work life balance (E17)	This enabler is all about personal and professional lives of employees is a crucial factor of work.	Edwards and Rothbard (2000); Allen et al. (2000); Pinzone et al. (2016)	4.6

Step 5: The Y and N codes are replaced with 1 and 0 respectively in the reachability matrix. The transitivity rule is checked and coded as Y-interpreted as 'transitive' in the knowledge base.

Step 6: Similar to ISM, level partition is also carried in TISM to establish the place of elements in the hierarchy.

Step 7: Graphical arrangement is performed for elements in levels and the links are made according to the relationships established in the reachability matrix. The diagraph is used to illustrate between the elements according to the number given to them through the matrix.

Step 8: Through binary interaction matrix, translation of the final diagraph is provided.

Step 9: The nodes in the diagraph are replaced with elements in the boxes and interpretations are provided to the links, leading to the TISM model.

30 HR experts were contacted in the second phase of the study, out of which 20 experts agreed, leading to a response rate of 66.67 percent. 11experts (55 percent) are from public organizations with the remaining 9 (45 percent) from private organizations. Out of twenty experts, 5 (25 percent) are working at junior management level, 9 (45 percent) are from middle level and 6 experts (30 percent) are working in senior positions in organizations. Out of 20 experts, 7 experts (35 percent) are from hydro power, 6 experts (30 percent) are from thermal power, 3 experts (15 percent) are from organizations working with wind power and 4 (20 percent) are from nuclear power companies.

As contextual relationship 'Enabler A will influence/enhance enabler B', the knowledge base was created. With 17 enablers, there were 17*16=272 relationships in the knowledge base. Expert help was again taken to interpret the relationships in the knowledge base. The responses from experts were used to chart out a reachability matrix. In pairwise comparison, out of 8 experts, if 5 have given a positive response, then it was taken as Y, otherwise N was taken. Then, interpretations were provided to Y in consultation with experts. These interpretations were a crucial to the interpretive logic-knowledge base. Interpretations can be seen in Table 2.

Table 2. Interpretive logic-knowledge base

S.no.	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17
E1	Y	N	N	N	N	Y	N	N	Y	Y	Y	N	Y	Y	N	N	Y
E2	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y
E3	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
E4	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
E5	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y
E6	Y	Y	N	N	N	Y	N	N	Y	Y	Y	N	Y	Y	N	N	Y
E7	Y	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y
E8	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
E9	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y
E10	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y

Table 3. Reachability matrix

S.no.	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17
E1	1	0	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1
E2	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1
E3	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
E4	0	1	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1
E5	0	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1
E6	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1
E7	1	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	1
E8	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1
E9	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1
E10	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1
E11	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1
E12	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1
E13	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1
E14	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1
E15	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1
E16	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1
E17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 4. Final reachability matrix transitivity

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	D. P
E1	1	1ª	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1	9
E2	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	5
E3	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	16
E4	0	1	1	1	0	1ª	1	1	1	1	1	1	1	0	1	1	1	14
E5	1ª	1	1	1	1	1ª	1	1	1	1	1	1ª	1	1ª	1ª	1	1	17
E6	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1	9
E7	1	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	1	12
E8	1	1ª	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	13
E9	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	5
E10	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	5
E11	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1	8
E12	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	13
E13	1	1	0	0	0	1	0	0	1	1	1	0	1	1	0	0	1	9
E14	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	5
E15	1ª	1	1	1	0	1	1	1ª	1	1	1	1	1	1	1	1	1	16
E16	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	13
E17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Dep*	11	16	4	4	1	12	8	8	16	16	11	8	12	15	4	8	17	

ª transitive relation; Dep*= Dependence Power, D.P = Driver Power

Table 5. Level matrix

Codes of enablers	Enablers	Levels
E1	Supervisor support	III
E2	Job satisfaction	II
E3	Compensation and benefits	V
E4	Freedom from work related stress	V
E5	Work safety and healthy working conditions	VI
E6	Job involvement	III
E7	Teamwork and communication	IV
E8	Learning opportunities	IV
E9	Social integration	II
E10	Social relevance	II
E11	Career growth opportunities	III
E12	Autonomy	IV
E13	Job equity	III
E14	Work flexibility	II
E15	Recognition and work identity	V
E16	Creativity at work	IV
E17	Work life balance	I

As mentioned in the second step, the transitivity links were checked to complete the reachability matrix. The basic difference in reachability matrix and the final reachability matrix (Tables 3 and 4 respectively) is transitive links. In ISM, transitivity is under basic assumption so as to maintain conceptual consistency (Sushil, 2005b; Abuzeinab et al., 2017). In order to decide the levels among the enablers, a reachability matrix charted out reachability and antecedents sets. The enabler, along with other enablers it helped to realize, was placed in the reachability set. The enabler, along with other enablers that helped it to realize, were placed as an antecedent set. Those enablers which are common to both antecedent sets as well as reachability sets are listed in the interaction set. Those enablers where the interaction set and reachability set are exactly the same are placed at the top level. Further, already placed enablers are not involved; the process is reiterated until all enablers are placed in levels (Mangla et al., 2018). In this study, the process which took place grouped all 17 enablers in six levels. The final level secured by enablers is listed in Table 5.

4.3 Interpretive Structural Model (TISM) Development

With the help of a driver-dependence matrix (Figure 2), the enablers were divided into: autonomous, linkages, drivers and dependents; the following insights are drawn:

None of the enablers fall in the I[st] quadrant i.e. autonomous. This means that all enablers stand interrelated with each other. None of the enablers show weak relations. To achieve sustainability in the power sector, management has to give equal importance and value to all

enablers (Luthra et al., 2015; Jabbour et al., 2016; Macke and Genari, 2018).

The IInd quadrant contains enablers of which are attributed to the basis of HRD for sustainability program. E3 (compensation and benefits), E4 (freedom from work related stress), E5 (work safety and healthy working conditions) and E15 (recognition and work identity) were placed under the driver category. These are basic needs which serve as a foundation for HRD sustainability initiatives. All higher level needs will be appreciated by employees; remedial action will be needed if these basic needs are not provided to an expected level. Management should think about it how to facilitate these needs, so that employees feel content and can move on to more productive behaviors (Jabbour et al., 2016; Filleti et al., 2017; da Silva César et al., 2019).

The IIIrd quadrant deals with linkage enablers. Linkage enablers are those enablers which depends on lower level enablers as well as higher level enablers dependent upon them. Here, E1 (supervisor support), E6 (job involvement) and E13 (job equity) have clearly made it to the IIIrd quadrant, but also E11 (career growth opportunities) from the IInd quadrant; this was on the margin and so, can be considered in linkage enablers. From the IVth quadrant, E7 (teamwork and communication), E8 (learning opportunities), E12 (autonomy) and E16 (creativity at work) were found on the margin and were considered as linkage enablers. All these enablers are crucial as the non-fulfillment of these needs of employees may take down the whole HRD for sustainability programs of the organization (Macke and Genari, 2018). All these elements deal with enriching the work behavior of employees, signifying the importance of enriched work experience in serving a link from basic needs to higher social needs (Tooranloo et al., 2017; Amui et al., 2017).

The IVth quadrant marks dependent elements. They do influence from many other lower or same level factors. Enablers E2 (job satisfaction), E9 (social integration), E10 (social relevance) and E17 (work life balance) together make the dependent element set. These elements have the power to define an organization's existence. Properly satisfied, they can define an organization's brand (Kumar and Dash, 2017; Ivanaj et al., 2018). Since these are end needs representing all the enablers which influence them, employees satisfied with these parameters will be content with all the other lower level elements. Both management as well as employees can evaluate their positions with respect to HRD for sustainability provided and demanded (Jabbour et al., 2016; Filleti et al., 2017; Ivanaj et al., 2018).
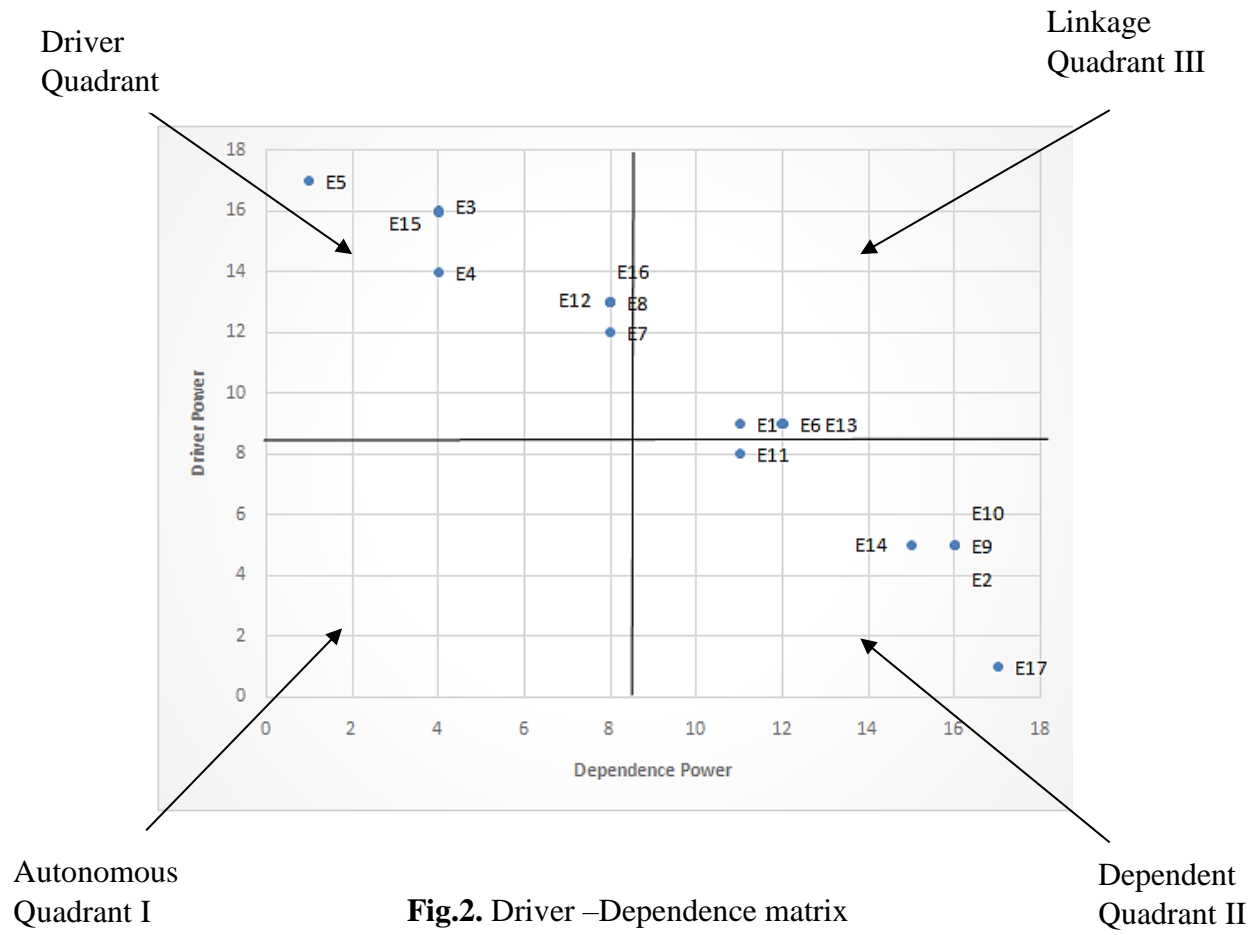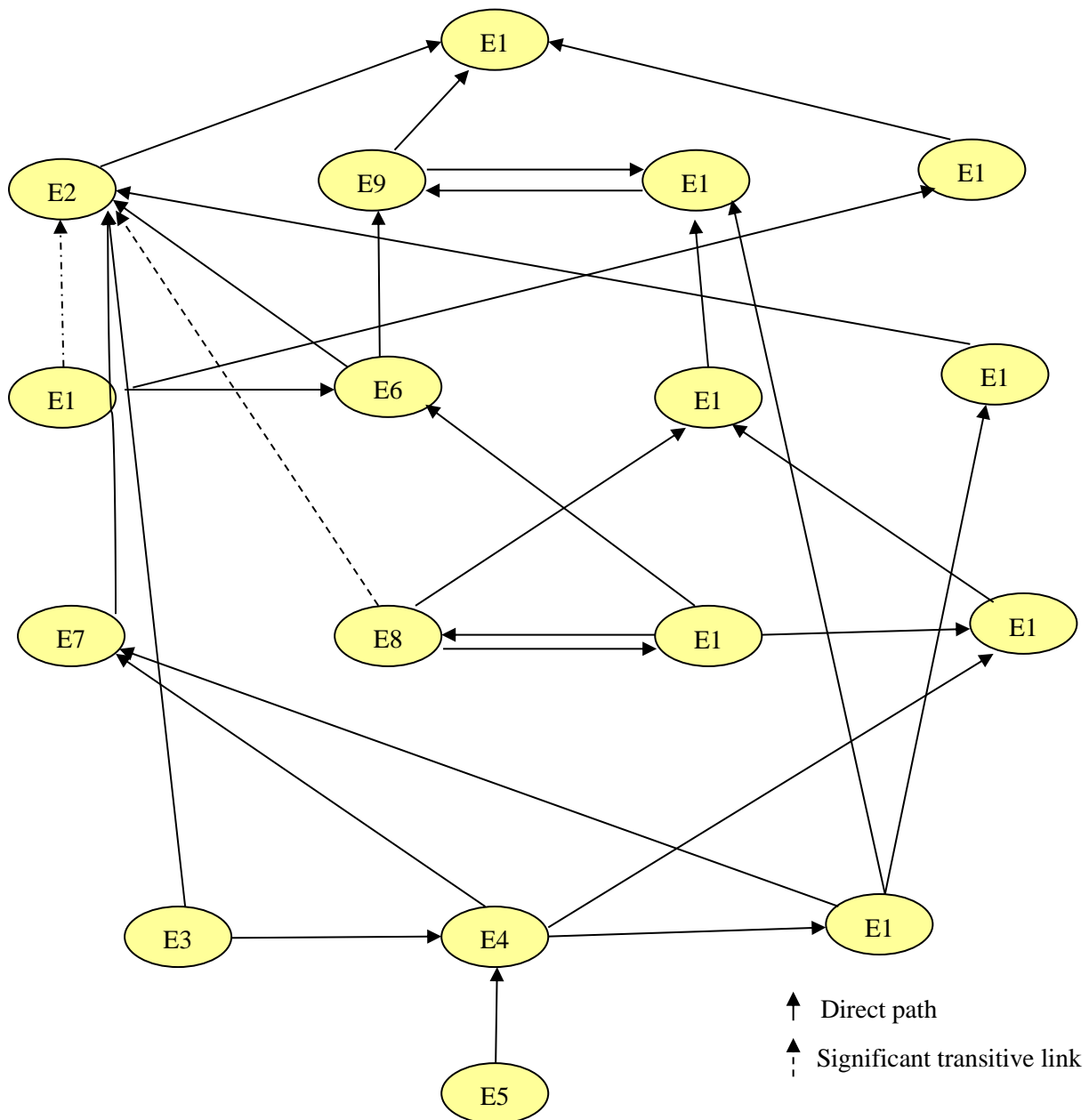
Fig.2. Driver –Dependence matrix

Fig.3. Digraph with significant transitive links

4.4 Total Interpretive Structural Model (TISM) Development

In the first step, a general level of awareness was created while interviewing the experts from the power sector. Once this was done, data relevant to our study was collected from an expert panel with the help of brainstorming techniques (Bocken et al., 2011; Luthra et al., 2015). The various dimensions were talked about in the exercise, enablers which are crucial to creating HRD for sustainability in the sector. The topics under discussion helped in drafting initial

enablers for the study. Eight HR experts from different power sector organizations were contacted for the study. TISM helped in establishing inter-relationships between dimensions. Based on the levels allotted to enablers of HRD for sustainability, a diagraph (Fig.3) is drawn to show the link between various enablers and levels. Only significant transitive links were given a place in the diagraph. The transitive links were marked with dotted lines in the diagraph. The diagraph with significant transitive links was later translated into a binary interaction matrix. The information drawn from the binary interaction matrix, diagraph and interpretive logic- knowledge base were used to complete TISM as presented in Fig.4.

4.5 Validating TISM model

The present study not only developed a TISM model, but also validated the model by collecting responses from the experts; this is missing in most previous studies based on TISM (Mosadeghrad et al., 2011; Sagar et al., 2013; Mangla et al., 2014; Yadav, 2014; Dubey and Ali, 2014; Khatwani et al., 2015; Nguyen et al., 2017). Validation gives weight to the model by confirming the findings of the model. Although, TISM has more meaning compared to ISM, it required a lot of input from an expert panel. The expert's role is not limited to defining the contextual relationship between enablers and giving interpretations to the response. For validation of the TISM model, data from power sector's employees has been collected. To evaluate the response, a 5-point scale is used with 1-"strongly disagree" to 5-"strongly agree" to evaluate the 31 linkages. A sample hypothesis is:

H_1: There is a positive significant difference between the observed and specified opinion of experts on supervisory support influence on job involvement.
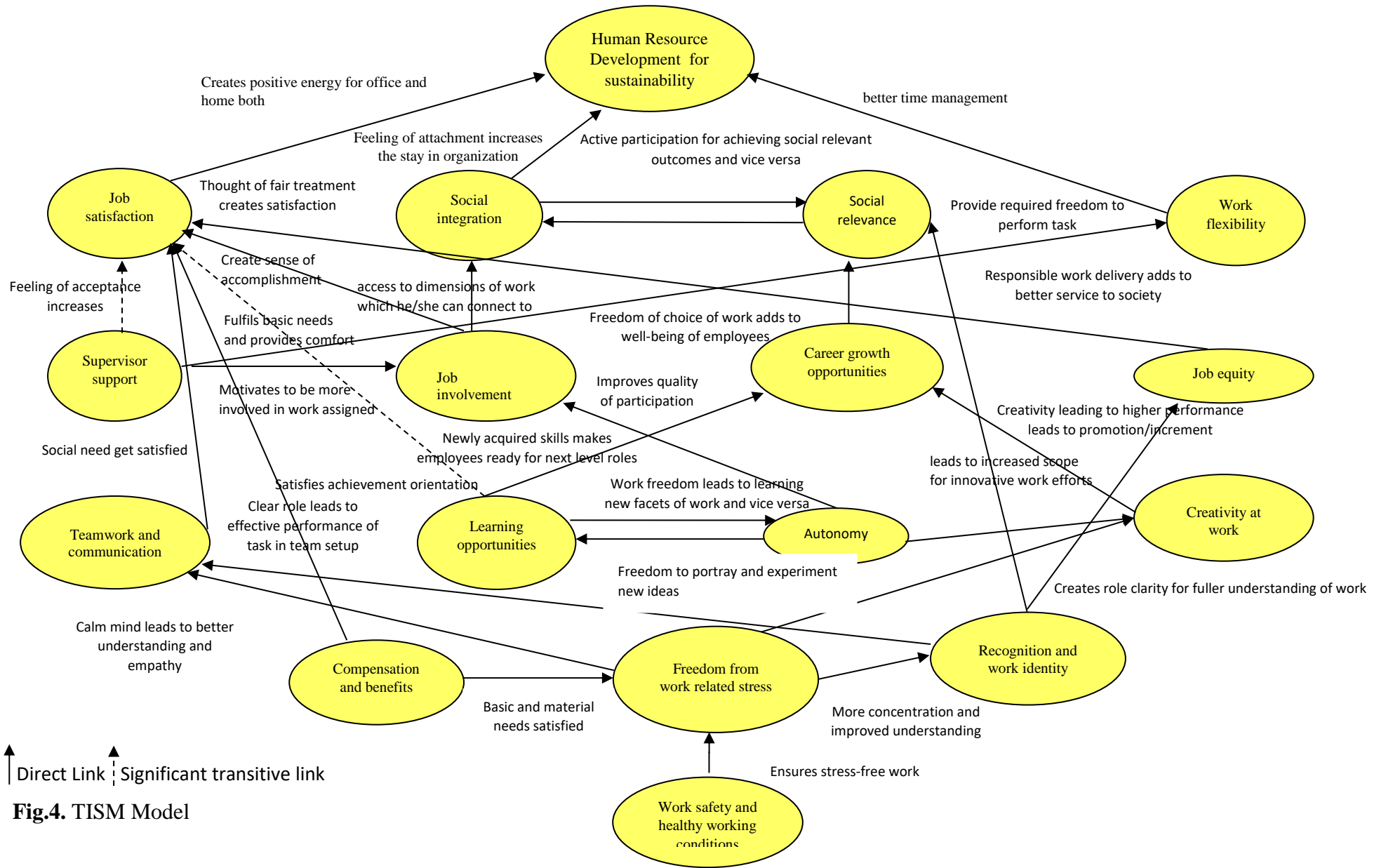
Fig.4. TISM Model

The figure shows a TISM (Total Interpretive Structural Modeling) Model with the following nodes connected by directional arrows:

- Human Resource Development for sustainability
- Job satisfaction
- Social integration
- Social relevance
- Work flexibility
- Supervisor support
- Job involvement
- Career growth opportunities
- Job equity
- Teamwork and communication
- Learning opportunities
- Autonomy
- Creativity at work
- Compensation and benefits
- Freedom from work related stress
- Recognition and work identity
- Work safety and healthy working conditions

Link labels between nodes:

- Creates positive energy for office and home both
- better time management
- Feeling of attachment increases the stay in organization
- Active participation for achieving social relevant outcomes and vice versa
- Thought of fair treatment creates satisfaction
- Provide required freedom to perform task
- Create sense of accomplishment
- access to dimensions of work which he/she can connect to
- Responsible work delivery adds to better service to society
- Feeling of acceptance increases
- Fulfils basic needs and provides comfort
- Freedom of choice of work adds to well-being of employees
- Motivates to be more involved in work assigned
- Improves quality of participation
- Creativity leading to higher performance leads to promotion/increment
- Social need get satisfied
- Newly acquired skills makes employees ready for next level roles
- leads to increased scope for innovative work efforts
- Satisfies achievement orientation
- Work freedom leads to learning new facets of work and vice versa
- Clear role leads to effective performance of task in team setup
- Freedom to portray and experiment new ideas
- Creates role clarity for fuller understanding of work
- Calm mind leads to better understanding and empathy
- Basic and material needs satisfied
- More concentration and improved understanding
- Ensures stress-free work

Legend: | Direct Link | Significant transitive link

Similarly, another 30 hypotheses were drawn up for the other 30 links. A one-tailed one sample t-test is used to test hypotheses (Yadav and Sushil, 2014). Table 6 shows the values on responses along with significance levels and decisions of acceptance or rejection.

Table 6.Validation of TISM model

S.no.	Linkages	Mean	SD	Sig.	Accept/Reject
1	Supervisor support will enhance/influence job involvement	4.12	0.991	.000	Accept
2	Supervisor support will enhance/influence work flexibility	4.00	0.534	.000	Accept
3	Compensation and benefits will enhance/influence job satisfaction	4.75	0.462	.000	Accept
4	Job involvement will enhance/influence job satisfaction	4.37	0.517	.000	Accept
5	Teamwork and communication will enhance/influence job satisfaction	4.75	0.462	.000	Accept
6	Job equity will enhance/influence job satisfaction	4.12	0.834	.000	Accept
7	Job satisfaction will enhance/influence work life balance	4.37	0.744	.000	Accept
8	Compensation and benefits will enhance/influence freedom from work related stress	4.12	0.640	.000	Accept
9	Work safety and healthy working conditions will enhance/influence freedom from work related stress	4.37	0.744	.000	Accept
10	Freedom from work related stress will enhance/influence teamwork and communication	4.62	0.744	.000	Accept
11	Freedom from work related stress will enhance/influence recognition and work identity	4.25	1.164	.000	Accept
12	Freedom from work related stress will enhance/influence creativity at work	3.75	0.462	.000	Accept
13	Job involvement will enhance/influence social integration	3.75	0.462	.000	Accept
14	Freedom from work related stress will enhance/influence compensation and benefits	4.12	0.640	.000	Accept
15	Recognition and work identity will enhance/influence teamwork and communication	4.50	0.925	.000	Accept
16	Learning opportunities will enhance/influence career growth opportunities	4.62	0.744	.000	Accept
17	Learning opportunities will enhance/influence autonomy	4.37	0.744	.000	Accept

18	Autonomy will enhance/influence learning opportunities	3.62	0.916	.000	Accept
19	Social integration will enhance/influence social relevance	3.75	0.462	.000	Accept
20	Social relevance will enhance/influence social integration	3.62	0.517	.000	Accept
21	Social integration will enhance/influence work life balance	4.37	0.744	.000	Accept
22	Career growth opportunities will enhance/influence social relevance	4.37	0.744	.000	Accept
23	Recognition and work identity will enhance/influence social relevance	4.37	0.517	.000	Accept
24	Creativity at work will enhance/influence career growth opportunities	4.00	1.195	.000	Accept
25	Autonomy will enhance/influence creativity at work	3.75	0.462	.000	Accept
26	Recognition and work identity will enhance/influence job equity	3.50	0.755	.000	Accept
27	Work flexibility will enhance/influence work life balance	4.25	0.886	.000	Accept
28	Work safety and healthy working conditions will enhance/influence freedom from work related stress	4.00	0.519	.000	Accept
29	Job involvement will enhance/influence supervisor support	4.62	0.644	.000	Accept
30	Supervisor support will enhance/influence job satisfaction	3.25	0.75	.000	Accept
31	Learning opportunities will enhance/influence job satisfaction	3.62	0.59	.000	Accept

5. Implication and contribution for theory and practice

5.1 Implication and contribution for theory

This work find the enablers of human resources development (HRD) for sustainability in the Indian power sector which future help to improve quality of work life of employee. The concept of sustainability is well discussed in the literature in the context of different fields (Mangla et al., 2013; Luthra et al., 2015; Jabbour et al., 2015b; Jabbour and Jabbour, 2016; Tooranloo et al., 2017; Dubey et al., 2017). No discussion is available in literature about to find the enablers of HRD for sustainability in the context of power sector. In this regard, this study signifies its contributions to the theory in three key aspects. First, the study is an attempt to focus on enablers related to quality of work life which are playing major role for improving organizational social-ecological-economic sustainability. These findings extend the past work of e.g. Schlesinger and Oshry (1984); Hale and Maehling (1993) and Igbaria et al. (1994) and

findings support the studies of, of instance, Jabbour et al., 2015b; Jabbour and Jabbour, 2016; Tooranloo et al., 2017; Macke and Genari, (2018). Second, after synchronization with previous research, the present study confirms the influence of 17 enablers identified through a literature review for improving the quality of work life in the Indian power sector. After that, expert mining was conducted to finalize the enablers of HRD for sustainability. Further, our study supports the literature how enablers of quality of work life are playing a significant role for long term sustainability of organization (Nguyen et al., 2017; Carmeli et al., 2017; Delmas and Pekovic, 2018). Third, we have developed a structural model by ISM and future the inter-relationships tested using TISM from data collected from the Indian power sector. Thus, this study contributes to the literature by addressing the need to find the enablers of HRD for social-ecological-economic sustainability in the context of power sector.

5.2 Implication and contribution for practice

Since the power sector comes under the category of safety critical organizations, therefore, safety and healthy working conditions become critical enablers for improving social performance of an organization. A healthy and safe working environment is significant for higher performance (Nordlöf et al., 2017). Government regulations are also strict in a country like India that deals with a safe and healthy working environment for employees. Work safety is the primary enabler influencing the entire HRD for sustainability model and is the driver of the model in dependence relationships (Nordlöf et al., 2017; Karakhan and Gambatese, 2017; AIBAGHI-ESFAHANI et al., 2017).

Other than work safety, other factors which act as enablers for HRD for sustainability and are at level 5 in the TISM model are compensation and benefits, freedom from work related stress and recognition and work identity. Surienty et al. (2013) stated that compensation and benefits, which is still a major reason of work for most of the employees, has influenced from how well this need is satisfied in the workforce. In terms of developing economies like India, monetary benefits are still considered as one of the most significant factors to HRD for sustainability (Nguyen et al., 2017; Cai and Yu, 2018). Stress is present in all forms of jobs, but its intensity varies (Nguyen et al., 2017). Recognition in terms of monetary or non-monetary benefits for work well performed by the employee boosts confidence of the employee, benefiting himself as well as the organization (Jabeen et al., 2018). According to Hale and Maehling (1993), recognition is a valuable tool of management and gets translated into time, money and personal commitment to the program. In recent work, Mayne (2017) suggested that recognition and

work identity have become important and have now been included by various organizations in the performance review process. Considering these enablers, an organization can provide a solid foundation in their efforts to improve the working conditions of employees.

Focusing on the linking enablers, which act as a catalyst to reach the higher level of HRD for sustainability, has provided the insight about the eight linkage enablers. Influenced by the driving factors, these enablers are broadly the attitudes and behaviors of colleagues, leaders or the organization; these are required by employees to create a healthy work life (Mone and London, 2010). At level 4 in the TISM model are teamwork and communication, learning opportunities, autonomy and creativity at work and the positive impact are supported by previous studies (Lewis et al., 2001; Mosadeghrad et al., 2011). Smooth communication between team members provides relatively higher people satisfaction. Recent studies have established the importance of employees' voluntary learning and development attitude in organizational effectiveness (Mosadeghrad et al., 2011; Maletič et al., 2018). Therefore, organizations have started focusing on providing platforms for employees to learn new skills and techniques (Mone and London, 2010). Learning opportunities refer to creating a work environment to use an employee's capabilities to high potential and also to facilitate the development and learning of new skills; this in turn reduces stress levels and increases productivity levels (Kanten, 2014). Creativity at work means the capacity of employees to produce effective solutions to the problems faced at work and also to suggest novel ideas for social relevance (Harcourt and Ateke 2018; Rafique et al., 2018). It becomes crucial for organizations to have creative employees to gain a sustained competitive advantage in this cutthroat environment (Lam et al., 2017; Harcourt and Ateke 2018). Autonomy gives an employee a sense of control in his work life. Absence of job autonomy is found to have various negative effects, such as reduced personal accomplishment (Rafique et al., 2018) and low decision making initiatives (George, 2007).

At level 3 are another set of linking enablers' i.e. superior support, job involvement, career growth opportunities and job equity. These factors touch upon comparatively higher level needs, which an employee requires to enhance his/her work capacity (George, 2007; Dumont et al., 2017). This relationship offers the foundation of trust within the organization (Whitener et al., 1998). Supervisor support has been found to reduce turnover intentions in employees (Surienty et al., 2013). Job involvement involves internalization of values and work in an employee's life (Mo and Shi, 2017). Manifestation of job involvement includes the level to which work expectation of employees is met Chaughtai (2008); job involvement is also linked

performance of the employee. Schlesinger and Oshry (1984) and Igbaria et al. (1994) have found links between job involvement and HRD for sustainability. Apart from support from supervisors and involved job, career growth is very important for those employees who are achievement oriented (Sundaray et al., 2013). If an organization fails to provide career growth opportunities to employees, it ought to fail in retaining them and leads to lower business performance (Mone and London, 2010). Another important linker is job equity. In line with equity theory, employees seek equitable relationships to work. Inequity creates tension among employees as well as organizations (Sundaray et al., 2013).

Finally, in line with previous researches, the present study proposes that job satisfaction, social integration, social relevance, work flexibility and work life balance exert positive influence on implementation of HRD for sustainability practices in the power sector. As all these factors are at level 1 and 2 in the hierarchical structure of TISM, much of their influence on quality of work life is because of other factors in the model placed at lower levels. Job satisfaction have impact on employee productivity and organizational sustainability (Mo and Shi, 2017; Nguyen et al., 2017). Hence, directly or indirectly, job satisfaction exerts influence on the quality of work life of employees. Since work comes under the social organization framework, integrating with the organization becomes important to employees (social integration) while integrating the organization with society (social relevance) is equally crucial. Experiences like interpersonal openness, supportive groups and mobility constitute social integration (Chen et al. (2015). Social integration has also been considered an important element of quality of work life (Farid et al., 2014). The benefits to society of specific work roles and also any harmful effects of an organization's activities have now become important issues for business. The organizations which follow a path of social irresponsibility witness reduced perceived quality of work life in employees (Chen et al., 2015). Work flexibility, in recent times, has gained much needed attention from organizations and has been classified as an employee perk or benefit. In terms of efficiency, work flexibility adds to productivity as an employee can shift its work efforts (Öge et al., 2018). At level 1 of the TISM model is work life balance. Balance between the personal and professional lives of employees is a crucial factor for sustainability, as today's employees desire a balanced harmony between both (Lee et al., 2018).

6. Conclusion and future directions

The Indian power sector, which is going through a transformative stage, needs to focus on how

to attract and retain scarce skilled manpower. This study sheds light on how to satisfy employees' needs so as to make the power sector an attractive place to work. HRD for sustainability is really important for employees but unfortunately in-depth research on how the human resources for sustainability mechanism should work is missing in literature. This research is an attempt to fill this literature gap and make a significant contribution in this direction; we have set the objective to evaluate the enablers of HRD for sustainability in the context of the Indian power sector.

To achieve the objectives of the study, a four phased study solution methodology framework is used, a combination of both qualitative and quantitative methods. In the first phase of the study, interviews of HR professionals/experts (working in the power sector) are conducted to identify the enablers of HRD for sustainability; experts mining finalized the enablers with literature support. After finalization of enablers by expert mining, in the second phase, twenty experts were contacted to collect the data and TISM with MICMAC has been applied to build a structural model and to find the driving force and dependence power of enablers.

To benchmark the enablers of HRD for social-ecological-economic sustainability in the context of the Indian power sector, the contribution of this is significant through the establishment of a TISM model i.e. inter-relationships between various enablers. TISM also helped us to determine the level of importance on which each enabler stands. The enablers of HRD that were drawn from expert responses meet the objectives of the study to focus on accomplishing sustainability orientation in the Indian power sector. The hierarchical structure of enablers provided us with insight on how driver-dependent relations work. The present study provides a holistic view of the framework for how a model HRD for sustainability program should prioritize on various initiatives. The outcomes of this study can help the power sector to enhance quality of work life within an organization and helping to achieve sustainable business development.

This study has some limitations and can be considered for future research. Firstly the study is based on experts' data; future research can examine empirical validation of the TISM model by collecting data from a large number of respondents from the power sector. The results of the study can be extended to other sectors like textile, retail, banking etc. Comparative studies can also be conducted between various emerging economies. Based on inter-relations, in future research some hypotheses can be set and validated through a structural equation modeling approach.

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