

Role Of Emotional Intelligence In Managing Employees In Emerging Technologies

Dr. Lakshminarayana.K¹, Dr. Praveen M Kulkarni*², Dr. Prayag Gokhale³, Dr. Basavaraj Tigadi⁴, Nupur Veshne⁵

¹Visvesvaraya Technological University, Dept of Management Studies, Belagavi
appinarayan@gmail.com

²Professor KLS, Gogte Institute of Technology Department of MBA Udyambag, Belagavi, Karnataka, India,
Email: pmkulkarni90@gmail.com

³KLE Dr. M S Sheshgiri College of Engineering and Technology, MBABelgaum, Karnataka, IN, *Email:*
prayaggokhale07@gmail.com

⁴Visvesvaraya Technological University Belgaum, Karnataka, IN, *Email: drbstvtu@gmail.com*

⁵Assistant Professor KLS, Gogte Institute of Technology Department of MBA Udyambag, Belagavi, Karnataka,
India *Email: naveshne@git.edu*

Abstract

The study is designed to understand emotional intelligence application in emerging technology. The study provides a relationship with emotional intelligence skills presently available among the employees in the emerging technology domain. This study is important as directions are needed to support the employees for managing emotions in new domain work. Using the data from the organizations applying emerging technologies, the study results are analyzed through PLS-SEM method. The emotional intelligence of the employees working in the emerging technologies work be measured through the Emotional Skills and Competence Questionnaire (ESCCQ-21). This scale includes three main areas namely (a) ability to manage & regulate emotion (b) ability to perceive & understand emotion (c) ability to express & label emotion. The respondents for the study include the employees working in the emerging technology areas namely (a) Artificial intelligence (b) Internet of Things (IoT) (c) Additive Manufacturing (d) Nano-technology and (e) Robotics. Our results point to a noteworthy relationship between emotional intelligence in the emerging technology domain. The study would provide deeper information on advantage of emotional intelligence for developing training program for employees. The study would provide an insight into the emotional intelligence required for each sector of emerging technology, such as emotional intelligence related to additive manufacturing, IoT, robotics, Artificial intelligence, and nano-technology. These findings not only support training and development programs but also provide directions to decision-makers for devising the right human resources strategy for coping with changing work environment due to emerging technologies. As the study considers a specific sector i.e., emerging technology, there could be a lack of generalizability of the results. Therefore, future research may consider other conventional industries and compare with emerging technologies domain.

Introduction

Recently, there have been substantial digital technological development in manufacturing and product development, these technologies are called as emerging technologies (Angel,

Rodriguez, and Tirado, 2014). Emerging technologies are categorized by radical uniqueness, comparatively swift growth, consistency, noticeable impact, uncertainty and ambiguity. (Bashir et. al., 2016).

In other words, emerging technologies are

fundamentally new and relatively fast-growing technologies characterized by a degree of coherence that can persist over time and have a noteworthy effect on the socio-economic environment (Bashir et. al. 2016).

Emerging technologies have the capability to identify problems and also offer related solutions to the problems, however, challenges with regards to team development, employee morale management and managing work-life balance requires guidance and support from the concept of emotional intelligence (Christensen et. al., 2000).

In the early 1990s Research on EI was first published in academic journals. Most research on emotional intelligence is self-reported. Despite criticism of self-reported scales, there are various self-reported measures of EI in the current literature.

The key purpose of this research is the construction procedure along with the basic psychometric properties of the ESCQ as a self-report measure of Emotional Intelligence. Initially, this scale was developed in the Croatian environment using the theoretical framework of the Mayer-Salovey model of EI. The ESCQ instrument has been deciphered into several languages (Taksic et. al., 2009). Consequently, we found that the ESCQ has three reliable subscales. They share some commonalities with similar well-established components for example social skills, alexithymia, and personality traits, but do not correlate with cognitive skills. The inherent change remains large. This exclusive variance of the ESCQ scales increasingly contributes to the explanation of life satisfaction and empathy (as a key measure of EI) and real-world variables such as leadership quality, unhealthy behaviors, and school performance (Taksic et. al., 2009).

Hence, the above discussion on emerging technologies and emotional intelligence shows that there is a need for linking the emerging technologies and their relationship with

emotional intelligence. Therefore, this study is structured to understand this relationship and provide directions for improving the emotional intelligence among the employees working in the domain of emerging technologies.

Literature Review

In this section, literature review related to two domains of the study are presented, firstly, growth of emerging technologies, secondly, emotional intelligence in the industry, and thirdly, leadership in emerging technology

Growth of Emerging Technologies

Irrespective of the industry, businesses are exposed to a variety of new technologies that simultaneously create business opportunities and business challenges (Tongur, et. al., 2014).

In this way, an organization's focus on new technologies ensures that it will continue to deliver new products, services and processes that affect the structure of companies and markets. (Sainio, 2004; Bueno et. al., 2012). Research suggest that changes brought about by new technologies that better reveal firm outcome which can enable firms to compete for innovation and thereby differentiate themselves from their competitors. (Hameland, 1994;; Hwang et. al., 2008; Lui et al., 2016; Kassicieh et. al., 2002).

Recognizing that organizations benefit from new technological innovations by enabling them to develop better methods of developing market by innovative processes, expands organizational boundaries and helps in the creation of novel business models (Zott et. al., 2010). The potential for innovation companies should also contend with business models associated with new technology (Pacheco et al., 2016).

However, organizations understand the importance to collaborate with present business practices with latest technology (Markides et. al., 2010). (Gassmann et al., 2013) points out

that competition between firms in the business environment is enabled not only by new products, services or technologies, but also by having the appropriate emotional intelligence to adapt to this technologically changing business environment. In this situation, disruptive business models make important new technologies and innovations, place demands on products and services offered by organizational structures, highlight unique market value propositions, and replace existing business models (Osievskyy et al., 2015; Zhang et al., 2018).

Emotional Intelligence in Industry

Emotional intelligence (EI) is widely recognized as an ideal framework in education because it supports the social and intellectual development of the individual (Mavroveli et al., 2011; Mestre et al., 2006). People with high capacity have higher levels of motivation, stress management, and self-control, which leads to greater achievement (Duckworth et al., 2005; Díaz-Herrero et al., 2018; Elliot et al., 2005; Greenberg et al., 2003).

Emotional skills help individuals not only improve their academic efforts, control their own and others' emotions, and maintain intrinsic motivation to perform better at work, but also have a positive effect on social interaction (Rode et al., 2008; Argyle and Lu, 1990).

Decades ago, the field of EI was developed and developed based on the division of this common model: EI (emotional sensitivity) and EI (or psychological elements) (Mavroveli et al., 2008).

EI competencies often comprise the capability to see, measure, and express emotions, the ability to use emotions to enable thinking, the capability to comprehend emotions & the ability to manage emotions for all (Mayer et al., 1997; Mayer et al., 1999).

EI models examine how people perceive their emotional capacities and abilities, seen as a set

of emotional perceptions measured using a set of questions and scales (Petrides et al., 2007). Studies have suggested a positive effect of EI in work contexts, but the speculative certainty of EI success is not consistent across domains. Study frequently sanctions the accuracy of EI's prediction of individual success, additionally to personality traits and general mental abilities (e.g., Perera et al., 2013; Song et al., 2010; O'Connor et al., 2003; Brackett et al., 2004; Van et al., 2004).

Research has shown that this variability in outcomes can be elucidated by different scoring methods based on different EI hypotheses. Functional models tested by the reporting procedure have little to do with psychological intelligence (Petrides et al., 2004; Song et al., 2010; Costa et al., 2015;).

Theoretical Framework

Emotional Intelligence and Emerging Technology

Changes in operational technology and industries are redefining how manufacturers produce goods in every industry. These changes belong to Industry 4.0 and are categorized by the use of big data, improved statistics, human communication technology and processes of digital transformation to physical production (Sanders, Elangeswaran et al., 2016).

For manufacturers, Industry 4.0 offers productive opportunities through the introduction of new operational technologies and improved implementation of a changing lean culture (Sanders, Elangeswaran et al., 2016).

As Industry 4.0 is expected to contribute \$2.2 trillion to GDP by 2025, manufacturers will have to adapt to a rapidly changing market to remain competitive and maintain market share (Tortorella, and Fettermann, 2018).

This growth will enable the industry through labor productivity, financial efficiency, process performance improvements, and resource management productivity. Roughly a third of

growth comes from increased labor productivity (Tortorella, and Fettermann, 2018).

However, for manufacturing to benefit from the economic and productive opportunities of the workforce, a labor-intensive transformation is needed to ensure that demand for new skills is matched (Tortorella, and Fettermann, 2018).

Accordingly, manufacturers must adopt modern training and staff development strategies to adapt to the evolving industry landscape (Longo, Nicoletti, Padovano, 2017). The ever-changing and rapidly changing conditions of industrial-grade materials will impact the current makes it difficult to adapt to complex real-time situations. Focus on developing new employability skills and competencies. With the increasing focus on cognitive, analytical and social skills development in the job market, organizations will need to adapt the traditional skills focus to future industry needs (Eberhard et. al,2017).

Ha1: There is a substantial association amongst emotional intelligence and emerging technology

Leaders in an emerging technology role in managing employee's emotional intelligence

In addition to the digital awareness and change in society in the last quarter, the rapid growth of technology, and the desire to improve the efficiency of staff, there is much debate in the literature about the success of visible groups (Baltes et al.,2002).

Several meta-analyses comparing the effectiveness of cohesive groups (face-to-face) to virtual cohorts suggest that the latter do not work well. Despite this study, virtual areas have been an important factor in performance models in manufacturing organizations (Bell, 2002).

The Institute for Corporate Productivity conducted a study of 250 organizations in 2018, in which 67% of them showed increased reliance on visible groups in their companies over three years. a separate survey found that 66% of global organizations used emerging

technologies. Researchers have suggested that these technologies provide more benefits to organizations by increasing flexibility in addition to supporting the above performance metrics but the debate continues about the full effectiveness of this non-indigenous function (ICP,2018).

As the rise of visible increases, the qualifications of visible party leaders become an important issue. In particular, it raises the question, "Does the emotional intelligence of a visible party leader affect the level of involvement of visible party members?" In traditional contexts, leadership has been promoted as the basis for group success with emotionally connected and are very good at managing frustration and anxiety associated with obstacles and even failures. Leaders who can see team values while developing positive emotions can form very emotionally intelligent teams (Nandhakumar, 2006).

Linking the domains of leadership, emotional intelligence, and team interaction has the potential to enrich the efficiency of the physical environment. Given the ongoing debate on the effectiveness of visible parties, the question arises as to the effectiveness of traditional leadership theory in this unstable world (Nandhakumar, 2006).

Specifically, by recognizing that a person's basic emotions exist no matter where they are, it can be said that the influence of the wisdom of a real leader is important even in a non-geographic environment. Further evaluation of how to conduct effective operations in the visible groups will help health care organizations (Nandhakumar, 2006).

Ha:2 Leaders in the emerging technology domain manage effectively emotional intelligence

Managing emotional intelligence in emerging technology

Organizations adopt and advance new technologies and methods these days, but their employees do not have the necessary skills. As more and more businesses turn to technology

to gain a competitive advantage, it is even more important for international companies to respond quickly and focus on long-term skills (Kinder, 2002).

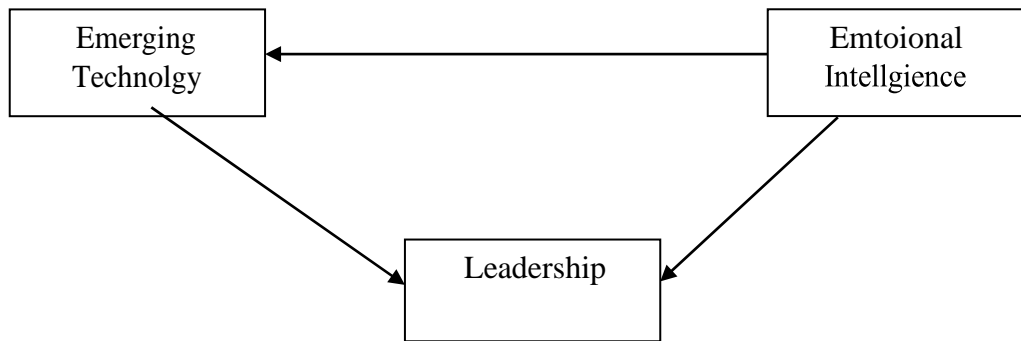
The reason of this research is to develop the skills available to employees to equip them for technology in the workplace. It is also possible that the company is facing a skills shortage and will not be able to meet the current demand. With re-employment, there is an effective way to develop and empower employees (Teece,2010).

The technical staff training program has changed dramatically in recent years, with the technology industry providing certification-based

education programs to train future EmTech employees. These programs often work in partnership with a nonprofit university to provide specialized skills training to different types of students (Shafer et al., 2005).

The study of generational diversity and the effect of generation conflict on the workplace is a matter of apprehension to many institutions, organizations, and businesses. The similar is true of libraries, especially when descriptive aspects of production diversity comprise attitudes toward communication, technology, and collaboration - aspects that play a significant role in the management of a modern organization (Moore, 2004).

Employees show effectiveness in managing emotional intelligence in emerging technology



Research Methodology

The study is conducted at North Karnataka industrial estates and engineering colleges working in the domain of emerging technologies.

There are demographic profiles the industries applying emerging technologies is given in Table I

Table I – Respondents Profile

Gender	N	Percentage
Male	175	70

Female	75	20
Total	250	100
Age Group	N	Percentage
20-21	55	22.0
22-23	81	32.4
23-24	114	45.6
Total	250	100.0
Department	N	Percentage
Computer	98	39.2
Design	43	17.2
Robotics	75	30
Electronics	34	13.6
Total	250	100
Emerging Technologies	N	Percentage
RO	85	34.0
AI	37	14.8
AR	28	11.2
ML	52	20.8
NT	48	19.2
	250	100.0
Industry	N	Percentage
Foundry	137	54.8
Aerospace	7	2.8
Chemical	3	1.2
Electronics	5	2.0
Engineering	98	39.2
	250	100.0

Over 12 months, 8, the study was conducted at North Karnataka to recognize the role of emotional intelligence in emerging technologies. All the data was collected through Google Meet and GoogleForms.

Process

The study recorded the reaction of the participants based on the response in the ESCQ scale to evaluate the emotional intelligence with regards to emerging technologies and leadership constructs related to emerging technologies.

The respondents for the study were included based on their willingness to be involved in the

research project. The research was undertaken in two stages. In the first stage, participants were given a detailed brief about the project, after which they had to fill a study ESCQ questionnaire. The actual study was directed in the second stage when participants participated in the study through the ESCQ scale.

Constructs

The ESCQ was originally developed in the Croatian environment via the theoretical framework of the EI model (Mayer et. al., 1997; Van de Vjver et. al., 1996; Averill et. al., 1991; Mayer et. al., 1989; Stevens, 1994; Salovey et. al., 1995). The reliability results are presented in the

Table. II

Table –II – Reliability Analysis, Composite Reliability, and AVE

Items	Factor Scores	Cronbach Alpha (Actual Score)	Composite Reliability	Average Variance Extracted
P-U8	0.874	0.849	0.826	0.536
P-U9	0.756	0.851		
P-U10	0.842	0.86		
P-U11	0.756	0.844		
P-U12	0.703	0.84		
P-U13	0.814	0.85		
P-U14	0.825	0.845		
P-U15	0.788	0.839		
E-L1	0.815	0.843	0.898	0.574
E-L2	0.649	0.843		
E-L3	0.806	0.847		
E-L4	0.871	0.839		
E-L5	0.754	0.843		
E-L6	0.621	0.861		
E-L7	0.804	0.849		
E-L8	0.73	0.852		

E-L9	0.861	0.86		
E-L10	0.832	0.845		
E-L11	0.811	0.842		
E-L12	0.888	0.85		
E-L13	0.811	0.846		
E-L14	0.73	0.841		
M-R1	0.78	0.844		
M-R2	0.747	0.845		
M-R3	0.796	0.849		
M-R4	0.747	0.841		
M-R5	0.874	0.849		
M-R6	0.756	0.851		
M-R7	0.842	0.86		
M-R8	0.756	0.844	0.882	0.576
M-R9	0.703	0.84		
M-R10	0.814	0.85		
M-R11	0.825	0.845		
M-R12	0.788	0.839		
M-R13	0.815	0.843		
M-R14	0.649	0.843		
M-R15	0.806	0.847		
M-R16	0.871	0.847		
LDR1	0.756	0.845		
LDR2	0.842	0.839		
LDR3	0.756	0.843	0.771	0.539
LDR4	0.703	0.843		
LDR5	0.703	0.847		
LDR6	0.703	0.847		

P-U: Ability to Perceive and Understand the emotion, E-L: Ability to Express and Label

emotion, M-R: Ability to Manage and Regulate emotion, LDR: Leadership

Non-response bias

Non-response was tested by comparing early respondents to late respondents (Armstrong et. al.,

1977; Chen et. al., 2004). We found no significant differences between results

Analysis

The main focus of this research was to know the role of EI in the emerging technologies industry, hence the study applied structural equation modeling to understand the relationship.

Results

The study results are indicated through structural equation modeling, Figure 2 shows the relationship in the SEM process of the study. While Table IV indicates regression analysis from the SEM and the related outcome. Table V shows the results of the hypotheses tested through SEM method and Table VI Structural Equation Modelling Fit is presented.

Results through structural equation modeling show that employees working in the domain of robotics have shown a positive relationship with the ability to understand emotions with a p-value of

$0.01 > 0.005$ and the ability to express emotions with a p-value of $0.02 > 0.05$. while the results with regards to robotics and regulation of emotions have shown a negative relationship with $0.11 < 0.005$.

The results with on the emerging technology artificial intelligence have shown a positive relationship with the ability to express emotions with a p-value of $0.02 > 0.05$. While the results concerning artificial intelligence and the ability to perceive and understand emotions have shown a negative relationship with a p-value of $0.138 < 0.005$ and the same is indicated with regards to managing emotions and regulating emotions with a p-value of $0.007 < 0.05$.

Analysis concerning augmented reality shows a negative relationship with perceived and

understanding emotions with a p-value of $0.868 > 0.005$, while the results with augmented reality and ability to express and label emotions have shown a positive relationship with a p-value of $0.01 > 0.005$ and the results were similar with regards to the ability to manage and regulate emotions in the augmented reality with a p-value of $0.114 < 0.005$.

Results with regards to machine learning technologies and emotional intelligence show that emotional intelligence of understanding emotions shows a positive relationship with a p-value of

$0.02 > 0.05$, while this technology has a negative relationship with expressing and labeling emotion and regulation of emotions with a p-value of 0.06 and $0.775 < 0.005$ level of significance.

Analysis with regards to nanotechnology and emotional intelligence shows a negative relationship with all the aspects of emotional intelligence with a p-value of 0.19 , 0.39 , and $0.913 < 0.05$ level of significance on perceived and understanding emotions, expressing emotions, and managing emotions in nanotechnology.

Results with regards to leadership traits show that robotics, artificial intelligence, and augmented reality show a negative relationship with leadership traits with p values of 0.706 , 0.42 , and 0.193 , while it has shown a positive relationship with machine learning and nanotechnology with 0.02 and $0.01 > 0.005$ level of significance.

The overall results concerning hypothesis testing show that emerging technologies have a negative relationship with emotional intelligence with a p-value at $0.754 < 0.005$, while leadership traits have a positive relationship with emerging technologies with a p-value of $0.01 > 0.005$ and leadership have a negative relationship with emotional intelligence with a p-value of $0.066 < 0.005$.

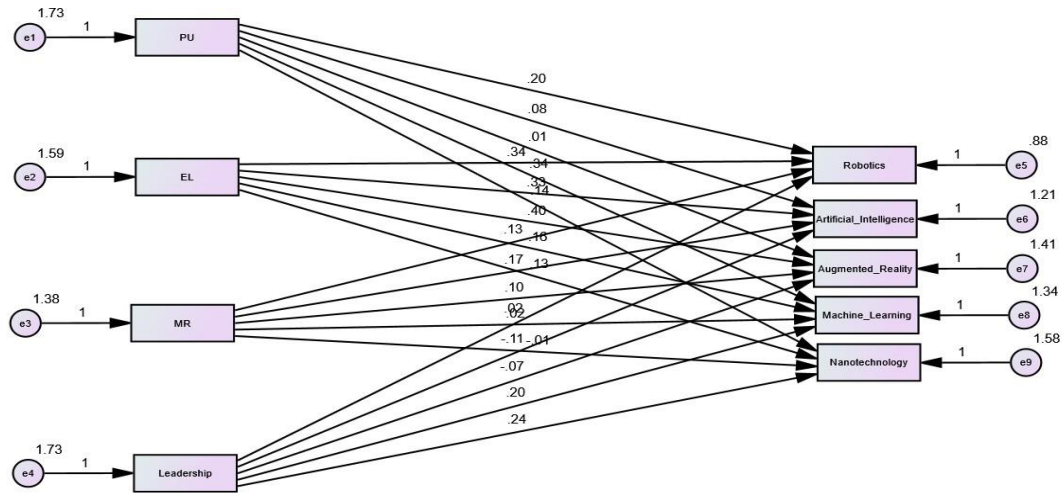


Figure 2 – Final Results of the Study

Table IV – Final Output of SEM

Constructs	Constructs	Estimate	S.E.	C.R.	P	Label
RO	<--- P&U	.202	.045	4.519	0.01	Supported
AI	<--- P&U	.078	.052	1.484	.138	Not Supported
AR	<--- P&U	.009	.057	.167	.868	Not Supported
ML	<--- P&U	.343	.055	6.210	0.02	Supported
NT	<--- P&U	.141	.060	2.349	.019	Not Supported
RO	<--- E&L	.340	.047	7.272	0.02	Supported

Constructs	Constructs	Estimate	S.E.	C.R.	P	Label	
AI	<---	E&L	.330	.055	6.026	0.03	Supported
AR	<---	E&L	.399	.059	6.757	0.01	Supported
ML	<---	E&L	.158	.058	2.738	.006	Not Supported
NT	<---	E&L	.129	.062	2.060	.039	Not Supported
RO	<---	M&R	.127	.050	2.531	.011	Not Supported
AI	<---	M&R	.167	.059	2.846	.007	Not Supported
AR	<---	M&R	.100	.063	1.582	.114	Not Supported
ML	<---	M&R	.018	.062	.286	.775	Not Supported
NT	<---	M&R	-.007	.067	-.109	.913	Not Supported
RO	<---	LDR	.017	.045	.377	.706	Not Supported
AI	<---	LDR	-.106	.052	-2.029	.042	Not Supported
AR	<---	LDR	-.074	.057	-1.302	.193	Not Supported
ML	<---	LDR	.200	.055	3.623	0.02	Supported
NT	<---	LDR	.244	.060	4.080	0.01	Supported

Table V- Results of Hypothesis for the Study

			Estimate	S.E.	C.R.	P	Label
ET	<---	EI	-.022	.070	-.314	.754	Not Supported
LDR	<---	ET	.276	.059	4.715	0.01	Supported
LDR	<---	EI	.121	.066	1.836	.066	Not Supported

Table.VI: Results of Structural Equation Modelling Fit

Sr.No	Parameters	Acceptable Range	Actual Scores	Results
1	AVE	>=0.50	0.28	Not Supported
2	CFI	0.9	0.7	Supported
3	NFI	0.9	0.23	Supported
4	The goodness of Fit Index	0.9	0.41	Supported
5	RMSEA	0.08	0.05	Supported

Discussion

Existing literature on emerging technologies shows (See., Sanders, Elangeswaran, & Wulfsberg, 2016, Mavroveli et. al., 2011; Mestre et. al., 2006; Markides et. al., 2010) that organizations are moving to the new business model due to change in the production and manufacturing process in the industry. This has demanded emotional intelligence with match the expectation of the industry inoperating in these emerging technologies.

As manufacturing organizations place themselves in a position to change the roles, technologies, and expectations of their employees to stay competitive, the ever-changing and fast-paced state of the industry-enabled material will challenge current workers to adapt to real-time and complex situations, emphasizing developing new labor market skills and capabilities (Markides and Oyon, 2010).

Linking the domains of leadership, emotional intelligence, and team interaction has the potential to enrich the efficiency of the physical environment. Given the ongoing debate on the effectiveness of visible parties, the question arises as to the effectiveness of traditional leadership theory in this unstable world. Specifically, by recognizing that a person's basic emotions exist no matter where they are, it can be said that the influence of the wisdom of a real leader is important even in a non- geographic environment (Markides and Oyon, 2010).

Grounded on the discussion above, the results of the study have indicated three areas of findings. Firstly, emerging technology and its relationship with emotional intelligence have shown a negative relationship in the present study. However, results with regards to employees working in the domain of Artificial intelligence have shown a negative relationship with emotional management. Further, the same is indicated in the terms of nanotechnology domain employees have shown a negative relationship with emotional management.

Secondly, leadership traits of employees working

in the emerging technology domain have shown a positive relationship to lead in the area of emerging technologies, however, development is needed in the domain of robotics, artificial intelligence, and augmented reality to develop leadership traits.

Thirdly, the association amongst the emotional intelligence of employees and leadership traits shows a negative relationship in these emerging technologies.

The overall findings indicate that employees working in emerging technologies have a potential area of growth in developing emotional intelligence to work in this domain of technology and likewise this emotional intelligence has impacted the leadership traits of the employees.

Theoretical contributions

The role of emotional intelligence at work place is well discussed in literature (Tortorella, and Fettermann, 2018; Longo, Nicoletti, Padovano, 2017; Eberhard, B. et. al, 2017). What is less clear is how emotional intelligence is related to employees working in the domain of emerging technologies. This study contributes two major insights to the existing literature. This research combines emotional intelligence and leadership in emerging technologies. Past research (Eberhard, B. et. al, 2017) has combined these two factors in other domains of industry such as manufacturing, services, and allied industries. In the same vein, past research has focused on the development of emotional intelligence to match with the expectation of the job (Nicoletti, Padovano, 2017). The study conducted by Nicoletti and Padovano, (2017) mentions that the application of emotional intelligence is important from the changing context of the business environment; hence research directions are needed to train and develop employees to this changing context of business. Secondly, change in the business environment influences leadership management, hence research directions are needed to understand in the context of emerging

technologies.

The present study mentions that the emotional intelligence of employees needs to be studied in the context of emerging technologies and the same is applicable for the leadership management in this emerging technology.

Practical Contributions

The main goal of the study is to understand emotional intelligence and leadership management in the context of emerging technologies. The results from this study provide directions to human resources managers, academics and consultants in the domain of emerging technologies and emotional intelligence. The results provided three practical contributions for developing of emotional intelligence of employees working in emerging technologies. Firstly, training and development of employee's emotional need to be provided for the employees, especially managing and regulating emotions, as these employees work in highly demanding ecosystem such as augmented reality and artificial intelligence. Secondly, leadership training needs to be provided to the employees working in this domain as these technologies are in higher demanding domains of manufacturing, hence, leadership training would support employees to work effectively in this new domain. Thirdly, apart from leadership training, effective practices of manpower need to be implemented for understanding the employees working in this domain of technology.

Conclusion and future research

The present research is prompted by the growing interest in understanding the emotional intelligence and leadership traits of employees in emerging technologies. The findings specify that the emotional intelligence of the employee working in emerging technologies need the training to manage and regulate their emotions and likewise, training is needed for developing leadership traits for

effective management in these technologies.

The present study was undertaken in the domain of manufacturing companies; however, there is a future scope for understanding from the perspective of the service sector and other manufacturing companies in the developed countries and then arrive at the comparison between emotional intelligence in manufacturing from developing economies and developed economies

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