

## THE IMPACT OF DIGITAL LEADERSHIP COMPETENCIES ON VIRTUAL TEAM EFFECTIVENESS IN MNC COMPANIES IN PENANG, MALAYSIA

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### **Abstract**

This research objective is to examine the impact of Digital Leadership competencies on Virtual Team Effectiveness in MNC companies in Penang, Malaysia. The survey was conducted among 150 respondents who are working in MNC companies in Penang, with experience in a virtual team. The diversified range of respondents was chosen to predict the impact of digital leadership competencies on virtual team effectiveness. Data collected was analysed using SmartPLS. Hypotheses were tested based on the structural equation model. The results come out with 2 variables (E-Communication Competency & E-Trust Competency) having a positive & significant relationship with virtual team effectiveness. The remaining four variables, namely E-Social Competency, E-Team Competency & E-Change Competency, found to be no significant relationship towards virtual team effectiveness. Firstly, MNC companies size varies; as such, the study may be slightly biased. As more virtual teams are available to sample this analysis from large MNC companies, the outcome will appear to lean towards them. Secondly, due to the data collection limitation, virtual teams are represented by only one respondent per team in this study. As such, it may represent some bias if the response being used to represent the team. Results of this research can be used as guidance for organization Leaders in managing virtual teams more effectively. The E-Communication competency & E-Trust Competency can be applied and eventually enhance virtual team efficiency. This analysis will benefit future researchers or leaders of organizations to call attention to variables that contribute to virtual teams' effectiveness. This study is to investigate factors that have a positive influence on virtual team effectiveness. Digital Leadership Competency is chosen as independent variables that potentially have a great impact on virtual team effectiveness. As part of measuring Virtual Team effectiveness, Media Richness Theory is taken into consideration to underpin this study.

### **Research paper**

**Keywords:** Virtual teams; Digital leadership competencies; PLS-SEM; Malaysia; Virtual teams' effectiveness

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## **Introduction**

Industry forward National Policy on Industry 4.0 report has mentioned that under a global view, a series of rapidly emerging & converging technologies is at the centre of Industry 4.0. The way IT is used by cloud computing, system integration and the Internet of Things has changed (IoT).

At the national level, a significant strategy & project has been implemented, such as the Multimedia Super Corridor (MSC) & Northern Corridor Economic Region (NCER). Malaysian government set up MSC to accelerate the development of the nation's Digital Economy, the MSC Malaysia status program provides ICT-related businesses, both locally and abroad, with a vast scope of incentives, rights, and benefits to foster continued growth. Malaysia MSC program has pushed the nation's Digital Economy to new heights Since its inception in 1996. As at May 2019, 2954 companies is with active MSC status in Malaysia (MDEC, 2019). NCER in its Strategic Vision 2030, had indicated that embracing the digital economy & Industry 4.0 as one of the key enablers (NCER Strategic Framework, 2020)

Above fast transformation in technology & communication has changed the focus of organizations towards virtual teams. Not to forget that transformation needs a certain leadership style which is also linked to concepts such as virtual teams (Salamzadeh et al., 2019). An example of emerging virtual teams is on Shared Service Centre practice for Manufacturing Companies that have operation around the globe. Shared Service are commonly practice by consolidating certain services in a business function in a region & supporting the rest of the region. Example of shared service centre

by business function is on Finance, Human Resources, IT call centre, Customer Service call centre & other services of a business function that a company think have opportunity to do so (Salamzadeh et al., 2019). This trend is evident in Penang Bulletin Mutiara reporting in 22 Aug 2019 that Global Business Services a booming industry in Penang (Tan, 2019)

The new norm of work remotely & in virtual team is significant to Penang MNC. MIDA insights had reported that Penang is among Malaysia's top investment destinations. Manufacturing Sector Approved Investments reached RM137.9 billion, 1980 - March 2019. 70% of the investment are from manufacturing sector. Big MNC company like Intel, AMD, Lumileds, Keysight, Western Digital, Jabil, Plexus, Flextronics, Micron are part of the big player in the FDI. Majority of the MNC company are head quartered in US or home country but set up factory in Penang. With the current situation & trend towards virtual communication at workplace, this would change the landscape of traditional face to face working to leaner towards virtual teams. Virtual teams are defined as teams “whose members use technology to varying degrees in working across locational, temporal, and relational boundaries to accomplish interdependent tasks” (Martins, Gilson, & Maynard, 2004, p. 808).

While virtual teams' introduction has good advantages, new challenges are emerging with them (Precup et al., 2006). Cascio (2000) claimed that a virtual team has five key setbacks: reduced physical contact, decreased face-to-face synergies, lack of confidence, greater concern for predictability and reliability, and low social interaction frequency.

In order to create a successful virtual team, all these setbacks must be tackled when setting up a virtual team (Hunsaker and Hunsaker, 2008). Virtual teams are challenging because their existence is a virtual environment, and in contrast to face-to-face interactions, they go through computer-mediated communication technologies (Gaudes et al., 2007, Hardin et al., 2007).

The fast-growing trend of organization practising Virtual Team and more challenges in managing virtual team contributed to the significant ground of this studies to examine more into virtual team performance and its impacting factors. The findings from this research will provide an important reference point for organization's leadership in deploying the right factors in influencing their virtual team effectiveness. As such, this research has been carried out to understand the Digital Leadership Competencies influencing the virtual team effectiveness in the context of MNC companies in Penang.

## **Literature review**

### ***Virtual team***

Virtual teams are characterized primarily as a team of individuals working together to achieve a common goal. This understanding is derived from the team concept in which conventional teams are defined as "small groups of independent people who share responsibility for results (Hollenbeck et al., 2012). The most obvious distinction appears to be that a virtual team is a team of geographically scattered team participants that can be spread within one nation or across various countries. Some other distinction

is the heavy reliance on connectivity and IT as part of the everyday flow of information (Piccoli and Ives, 2004).

Stough et al. (2000) clarified that a virtual team is a team of individuals who work together even though they are divided by space, time and institutional factors (including geographical boundaries. The time zone difference is not as important as operating from different locations with very limited face-to-face contact and a heavy dependence on computer-mediated communication, according to Malhotra, Majchrzak and Rosen (2007).

Many companies gain their success from implementing virtual teams in the business world out there, among them Xerox, General Motors, Hewlett-Packard, Procter & Gamble, and General Mills (Griffin & Moorhead, 2012).

### ***Virtual Team Effectiveness***

Regarding team effectiveness, three major measurements were defined by Cohen and Bailey (1997). Namely efficiency of performance measured in terms of quantity and quality of output, attitudes of members such as employee satisfaction and dedication, and behavioural outcomes such as absenteeism, turnover and safety.

This idea was supported by Ross et al. (2008), and he also emphasized that team success is the product of performance, actions, attitude, team member style and organizational culture. Lin et al. (2008) mention that although there is certain level complexity in defining team effectiveness, bottom line, the success, and satisfaction of team members is the indicator.

While a virtual team is contrary in terms of structure to a traditional team, the efficiency that companies demand from teams would still be the same.

Virtual teams are therefore expected to carry out and accomplish the goals set for them, and so the success of the virtual team can also be calculated based on the results and happiness of the team members. Achieving virtual team effectiveness, however, is a challenge (Kawamorita et al., 2020). While current research has shown that there are many factors associated with team effectiveness, relatively few studies explicitly concentrate on virtual effectiveness.

Nevertheless, these selected studies share the result that some of the variables associated with the effectiveness of the virtual team include shared mental model between team members (Xiao and Jin, 2010), trust (Kanawatanchai and Yoo, 2007; Sarker et al., 2011), control Structures (Piccoli and Ives, 2004), and effectiveness of communication (Piccoli & Ives, 2004; de Jong et al., 2008; Radovic Markovic et al., 2013, 2016, 2019).

### ***Digital Leadership Competencies***

Ravesteijn & Ongena (2019) had mentioned that definitions of e-leadership (also referred to as digital leadership) are derived commonly from definitions of leadership in general. This is supported further by Lander (2020) that link Digital Leadership as Technology leadership. In her literature review portion stated that Technology Leaders is term as e-leadership.

In many existing literatures review, Digital Leadership is term as E-Leadership. Avolio et al. (2000) cited, “E-leadership is defined as a social influence process mediated by AIT (advanced information technologies) to produce a change in attitudes, feelings, thinking, behaviour, and performance with individuals, groups, and/or organizations” (p. 617).

However, the original definition of e-leadership may also have benefited from a stronger focus on the significance of the meaning in the original definition that could be updated as follows: “E-leadership is characterized as a process of social influence embedded in both proximal and distal AIT-mediated contexts that can change attitudes, emotions, thought, actions and performance.” (Avolio, 2007; Bass & Bass, 2008).

Jordan (2012) defined competencies as a mix of experience, skillsets & capabilities that is needed by certain job requirement, and which when acquired, enable the leader to carry out a job or assignment to the highest level of proficiency and effectiveness (Tajpour & Salamzadeh, 2019). Competencies can be viewed in personal and professional aspects. Van Wert (2004) and Dole et al. (2005) concur that Skillset, Character, and principle that that is the basis of the work are group under personal aspects sides; while the professional aspect is on the way in which we apply the knowledge to work in an organisational setting. Hunsaker and Hunsaker (2008) commented that virtual team leaders that have shortcomings in basic leadership competencies are typically not effective leaders and hindrance to attaining high performing-teams. A great deal of interest and many Literature bodies have arisen. Nevertheless, according to Mogale (2010), none

have dealt much with the effective leadership competency needed for the virtual teams.

### ***Media richness theory***

Virtual team's challenges are spatial distances, cultural diversity, and diverse organizational backgrounds. According to Beranek and Martz (2005), Communication cues are needed to develop trust, warmth, and other interpersonal affections, but it is found that computer-mediated communication is unable to foster it.

The theory of media richness can also underpin this study's theoretical basis due to the lack of face-to-face interaction in virtual teams. As cited from Daft and Lengel (1986), Lin et al. (2008) pointed the Media Richness Theory reflect that organizational effectiveness has high dependency organization's ability to process information of appropriate richness in order to cut down uncertainty and clarify equivocality. In that sense, the under usage of media in virtual teams may limit the quantity and quality of the information in an organization to pursue their own end. Hambley et al. (2007) pointed out that it would enhance the understanding of the technologies that enable virtual teams to work most efficiently by distinguishing several communication media from each other.

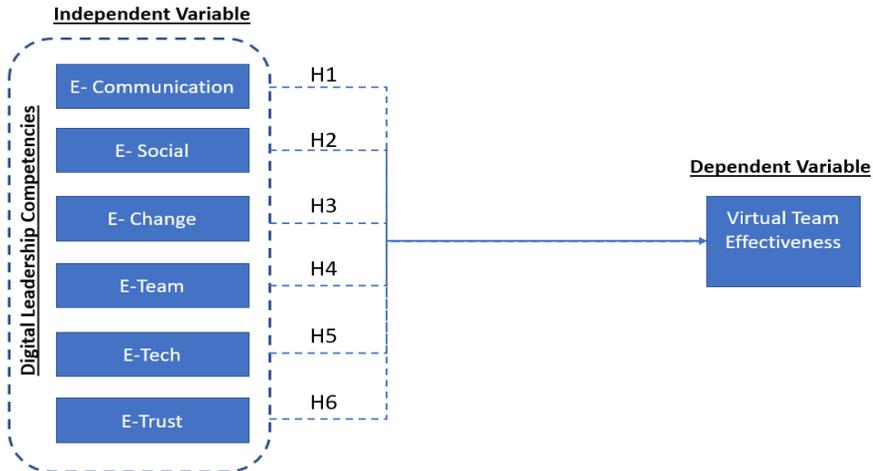
As a result, leaders will gain an advantage in increasing more knowledge flow in virtual teams. Simultaneously, the discovery of key factors from the literature that impacts virtual team effectiveness will give more cues to help virtual teams in upscaling the quantity and quality of in-

formation exchanged, which successively led to a reduction in uncertainty and equivocality in the task performance (Lin et al., 2008).

## Theoretical framework

Competencies are a set of values that can contribute to the ability to do something successfully & efficiently. The framework is adopted from Roman et al. (2019). The Six E-Competencies Model measured Digital Leadership Competencies as 1) e-communication competency, 2) e-social, 3) e-change, 4) e-tech savvy, 5) e-team, and 6) e-trustworthiness that influence virtual team effectiveness.

**Figure 1.** Research Framework



### *E-Communication Competency*

"E-Communication refers to the ability of the leader to communicate in a clear and organized way through ICTs, prevents errors and miscommu-

nication, and is not excessive or detrimental to performance." (Roman et al., 2019, p5). Communication is a key element in virtual teams' operation because of the work of virtual team members across geographically distant locations (Warkentin & Beranek, 1999). Their communication means comprises of telephone, teleconference, messaging, email, etc.

Compared to conventional face-to-face communication, all computer-mediated communication systems face the same disadvantage due to the absence of verbal and nonverbal signs. "The verbal cues (i.e., tone of voice, verbal hesitation, volume) and non-verbal cues (i.e., facial expression, body movement, emotion) are however important sources to process information from team members for tasks" (Warkentin & Beranek, 1999, p10).

Compared to face-to-face teams, virtual teams will solve a problem such as "degrading communication, social interaction and psychological expression". The human and technology aspects need to be managed so that virtual teams with characteristics like high performance, high commitment, and high cooperation and communication (Salamzadeh, 2018; Radovic Markovic & Salamzadeh, 2012, 2018). The result from previous studies explained that individuals in the virtual settings facing constraint due to the absence of informal meetings, and many respondents expressed that cross-border knowledge must be practised as a potential source of competitive advantage (Ebrahim et al., 2012). Therefore, this study hypothesized that:

**H1:** E- communication Skills has a positive influence on virtual team effectiveness.

### ***E-Social Competency***

E-Social Competency refers to the leader's capability to create an optimistic job condition and enhance collaboration & through a variety of virtual communication means (Roman et al., 2019). An effective Virtual Team communicates with clarity, social interaction is encouraged and practices through virtual communication settings. According to the study of Connaughton and Daly (2004), It may be challenging to achieve the social presence of a leader in a virtual environment; therefore, presenting difficulties in team integration, recognition of members and teamwork. Armstrong and Cole (2002) and Piccoli and Ives (2004) found to support this claim that the key difference between mediocre and high-performing virtual teams is the creation of efficient virtual leaders who can build social skills and lead the virtual team to achieve success in project deliverables. Therefore, this study hypothesized that:

**H2:** E- Social Skills has a positive influence on virtual team effectiveness.

### ***E-Change Management Competency***

E-Change Management Competency refers to the leader's ability to handle change management efficiently through Information Communication Technologies (Roman et al., 2019; Moghadam & Salamzadeh, 2018). Example of leadership capabilities in applying change management skills through preparing forward changes, tracking implementation, and consistency of knowledge in technology practice (Montgomery et al., 2016). Bell and Kozlowski (2002) emphasized that the leader need to be hands-on

in handling changes in environmental conditions for virtual team leaders to be effective.

They keep up to stress again that when external situations change (such as changed assignments, requirements, a new deadline, or changes in team goals), virtual team leaders need to promote flexible and effective team variations and ensure that changes are incorporated. Therefore, this study hypothesized that:

**H3:** E- Change Skills has a positive influence on virtual team effectiveness.

### ***E-Team Competency***

E-Team Competency refers to the leader's ability to recognize so that it motivates and, at the same time, hold accountability on team members in a virtual setting (Roman et al., 2019). From the outset, the leader's job is to build this new team into a cohesive and integrated work unit whose self-management capacity is important. Successful leaders must create team orientation in order to accomplish this which is: (a) influencing the perception and cultivating a positive attitude of members; and (b) creating a shared objective. Unit orientation defines or illustrates the connection that binds team members to each other and helps to accomplish the mission of the team. Team performance management & Team development are the two- leadership function that will emerge at the time this environment is being formed (Zaccaro and Bader, 2003; Hunsaker and Hunsaker, 2008).

Most researchers in their literature discussed more about E-team skills and agree that virtual team leaders need to do it more in virtual envi-

ronment” (Kahai, 2013). Fundamentals team competency such as group setup activities, team members feedback, and work planning skills (Cascio and Shurygailo 2003; Fernandez and Jawadi 2015; Malhotra, Majchrzak, and Rosen 2007). In particular in finding ways to hold teams and their members accountable in virtual Settings (Johnson, Bettenhausen, and Gibbons 2009; Wang, Tian, and Shen 2013). Be able to carry out performance recognition & rewards among virtual team member is the most essential part of it (Hunsaker and Hunsaker 2008; Malhotra, Majchrzak, and Rosen 2007).

Referring to Roman et al. (2019), virtual team building has become important factors for a leader to be defined as effective by followers. To support this argument, Kurt (2012) found that an effective virtual team leader builds team orientation and integration that create the ability to self-manage itself. Therefore, this study hypothesized that:

**H4:** E- Team Skills has a positive influence on virtual team effectiveness.

### ***E-Tech Competency***

Refers to the leader’s high technology know-how and always be on top of Information Communication Technologies developments and its security risk (Roman et al., 2019). For instance, Cascio and Shurygailo (2003) stressed that the leader’s capacity in a virtual team to understand how and the best time to use the communications technologies offered is one of the competencies that successful leadership should have to recognize the need to educate members on effective usage.

Virtual Team effectiveness is demonstrated through ICT. As such, leaders need to confirm that their members acquire the awareness of how to operate those technologies so that they are up to standard. To efficiently communicate critical project information effectively, any technology tool selected by a team leader to use for the project must also be relevant to its expertise and the knowledge of the participants (Zigurs, 2003).

E-tech competency equipped leaders with a basic understanding of multiple types of technologies available, whether through self-discovery or Training course (Cascio and Shurygailo 2003; Lareki et al., 2010). An example of lacking technology competency is when the leader high limitation in using important technologies (FTI Consulting 2015; Holland, Malvey, and Fottler 2009). At last, on cybersecurity, Digital Leadership must handle its problem in the organization and not only have good technical expertise (Roman, 2013). Therefore, this study hypothesized that:

**H5:** E- Technology Skills has a positive influence on virtual team effectiveness.

### ***E-Trust Competency***

E-Trust Competency refers to the leader's capability when using Information Communication Technologies to create a sense of trust by being perceived as honest, consistency to everyone, and just (Roman et al., 2019). The category of trust which builds up in a virtual environment is cognitive-based trust (Kanawattanachai & Yoo, 2002). The reason being is: 1) Feelings and emotions can highly influence trust, but it is not transferrable via

information technology and 2) Trust decisions are often based on the skill, honesty, and benevolence of team members, which require virtual team members to share clear proof of their trustworthiness and ethical before other team members trust them. (Kanawattanachai & Yoo, 2002; Ng and Salamzadeh, 2020).

Some researchers have suggested that a virtual team's life cycle is broken into five phases: team forming phase, beginning phase, planning phase, transitioning phase, and the last phase, which is accomplishing the mission. At an early stage, it is an uphill task for leaders to build trust and cultivate trust passing through all these five stages of team life cycle. According to Greenberg et al. (2007), a task is especially challenging because research shows that trust is based on various evaluations at various points of the team's process. Nandhakumar and Baskerville (2006) mentioned that Virtual Team stability relies primarily on a team member's dedication and trust among each other that will slowly deteriorate without face to face or co-located social interact. It is, therefore, challenging for virtual teams to succeed over time if the trust among teammates is not developed firmly.

The study results from Roman et al. (2019) implied that lack of the competency to form the value of trust in the virtual team would not directly lead to short term leadership failures, but it will sufficiently impact the leader's effectiveness in the long term. Therefore, this study hypothesized that:

**H6:** E- Trust Skills has a positive influence on virtual team effectiveness.

## **Methodology**

This study adopts a quantitative approach to investigate the relationships between variables in the virtual team through a self-administered questionnaire. The unit of analysis for this study was the individual with experience working in team. The respondents were employees in multinational companies in Penang. The sample size of 146 individuals is defined based on G-Power analysis. So, the targeted sample size should have at least 146 individuals that having experience working in virtual teams. The sample size of 150 individuals with experience in virtual teams (as the respondent) is collected to ensure statistical analysis accuracy. The selected site for sampling is Bayan Lepas Free Industrial Zone (FIZ) in Penang, Malaysia. The questionnaire distributed through the internet and electronic mail. All measurement of variables was adapted or adopted from previous literature conducted except demographic data. The questionnaire items were adopted from Roman et al. (2019) and Pangil & Chan (2014). It composes of seven main parts and the measurement items are shown in Table I. All were measured using five-point Likert scale to indicate the respondents' level of consensus (1 – Strongly Disagree to 5 – Strongly Agree) on the factor impact on effectiveness of virtual team. To analyse the research model, the partial least squares-structural equation modelling (PLS-SEM) approach was chosen.

The target population was chosen because the new norm of work remotely & in virtual team is significant to Penang MNC. MIDA insights had reported that Penang is among the top investment destinations in Ma-

aysia. Approved Investments in the Manufacturing Sector Reached RM137.9 billion, 1980 - March 2019. 70% of the investment are from the manufacturing sector.

**Table 1.** Measurement Items in Questionnaire

Summary of the Measurement of Independent Variable

Variables	Measurement Items	Adopted From
E-Communication Competency	In his/her virtual communication, the leader is clear, well organized, and allows for feedback to avoid errors and untested assumptions. In his/her virtual communication the leader sometimes conveys unintended messages that leave the receiver feeling insulted or angry because of tone or misunderstandings The leader ensures that his/her virtual communication is not excessive to the point of impeding the ability of employees to get their work done	Roman et al. (2019)
E-Social Competency	The leader does not provide employees sufficient individualized virtual communication The leader uses a rich variety of virtual communication methods. The choices of virtual communication methods used by the leader improve communication and collaboration.	Roman et al. (2019)
E-Team Competency	The leader is ineffective in building teams that are productive in a virtual mode. The leader is able to motivate teams that operate primarily in a virtual mode. The leader is able to hold teams that work in a virtual mode accountable.	Roman et al. (2019)
E-Change Competency	The leader is effective in using virtual communications to plan organizational changes. The leader is effective in using virtual communications to monitor organizational change. The leader is effective in using virtual communications to evaluate change initiatives.	Roman et al. (2019)
E-Tech Competency	The leader does not stay abreast of new information communication technologies (ICTs) and new enhancements of virtual communications. The leader has sufficient skills and inclination to deal with various types of technology breakdowns in both personal and enterprise settings. The leader is aware and active in terms of cyber-security efforts.	Roman et al. (2019)
E-Trust Competency	Within the virtual environment, the leader is able to create a sense of trust. The leader uses virtual communications in a manner that supports honesty, consistency, follow-through, fairness, and general integrity. The leader ensures that support of diversity is present and well monitored in virtual settings.	Roman et al. (2019)
Virtual Team Effectiveness	My team is currently meeting its business objectives I enjoy being a member of this team There is respect for individuals in my team I feel the members of my team value my input Team member's morale is high in my team In the past, my team has been effective in reaching its goals When my team completes its work, it is generally on time When my team completes its work, it is generally within the budget	Pangil, F., & Chan, J. M. (2014)

## Results

Table 2 summarize the demographic information of 150 respondents that participated in this research questionnaire conducted using online google form. On Gender, 49% are male & 51% are Female. On Education Level, 60% are having bachelor's Degree & 27% having master's Degree.

This indicates that respondents have very high literacy to understand & respond to the questionnaire in good quality. In terms of work positions of respondents in their organization, it is found that 6% is upper management, 44% is middle management and the remaining 50% is junior management & below. This distribution indicates a balance respondent in terms working in a team on this survey. 67 % of the respondents have more than ten years working experience; this provides strong support on the reliability of the information provided by the respondents to the questionnaires put forward to them. Most of the respondents for this study are playing the role of team member (64% cent) as they answered not lead a virtual team before. This indicates most of the survey members have worked as an individual contributor in the virtual team.

**Table 2.** Summary of demographic of respondents

Demographic	Frequency	Percentage
<b>Gender</b>		
Male	73	49%
Female	77	51%
<b>Total</b>	150	100%
<b>Age Group</b>		
21 to 29 years old	24	16%
30 to 39 years old	62	41%
40 to 49 years old	53	35%
50 to 59 years old	10	7%
60 years & above	1	1%
<b>Total</b>	150	100%
<b>Race</b>		
Chinese	133	89%
Indian	9	6%
Malay	6	4%
African	1	1%
Eurasian	1	1%
<b>Total</b>	150	100%
<b>Education</b>		
Bachelor Degree	90	60%
Master Degree	41	27%
Diploma	13	9%
Doctorate	3	2%
Others	2	1%
Secondary	1	1%
<b>Total</b>	150	100%
<b>Work Industry</b>		
Manufacturing	82	53%
Engineering	23	15%
Accounting/Finance	11	7%
Admin/ Human Resource	8	5%
Supply Chain/Logistics	7	5%
Sales/Marketing	7	5%
Information Technology	5	3%
Education/Training	3	2%
Media/Communications	2	1%
Hospitality	1	1%
Maritime industry	1	1%
<b>Total</b>	150	100%

Demographic	Frequency	Percentage
<b>Work Position</b>		
Upper Management	9	6%
Middle Management	66	44%
Junior management	33	22%
Administrative Staff	21	14%
Trained Professional	13	9%
Consultant	5	3%
Skilled Labour	3	2%
<b>Total</b>	150	94%
<b>Working Experience (Years)</b>		
Less than 1 year	2	1%
1 to 5	21	14%
6 to 10	26	17%
11 to 15	39	26%
16 to 20	30	20%
More than 20 years	32	21%
<b>Total</b>	150	100%
<b>Working Experience in Virtual Team (Years)</b>		
Less than 1 year	60	40%
1 to 5	44	29%
6 to 10	20	13%
11 to 15	11	7%
16 to 20	14	9%
More than 20 years	1	1%
<b>Total</b>	150	100%
<b>Currently a virtual team member?</b>		
No	46	31%
Yes	104	69%
<b>Total</b>	150	100%
<b>Have you ever been a virtual team leader?</b>		
No	96	64%
Yes	54	36%
<b>Total</b>	150	100%

### Measurement Model

To indicate sufficient convergence or internal consistency, composite reliability (CR) should be 0.7 or greater (Gefen et al., 2000). In order to indicate sufficient convergent validity, AVE should exceed 0.5 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). In table 3, CR & AVE meet the standard guideline. Next the discriminant validity test using the heterotrait-monotrait correlation ratio (HTMT) in Table 4 should be examined. HTMT is measured as a criterion and as a statistical test. As a criterion, HTMT val-

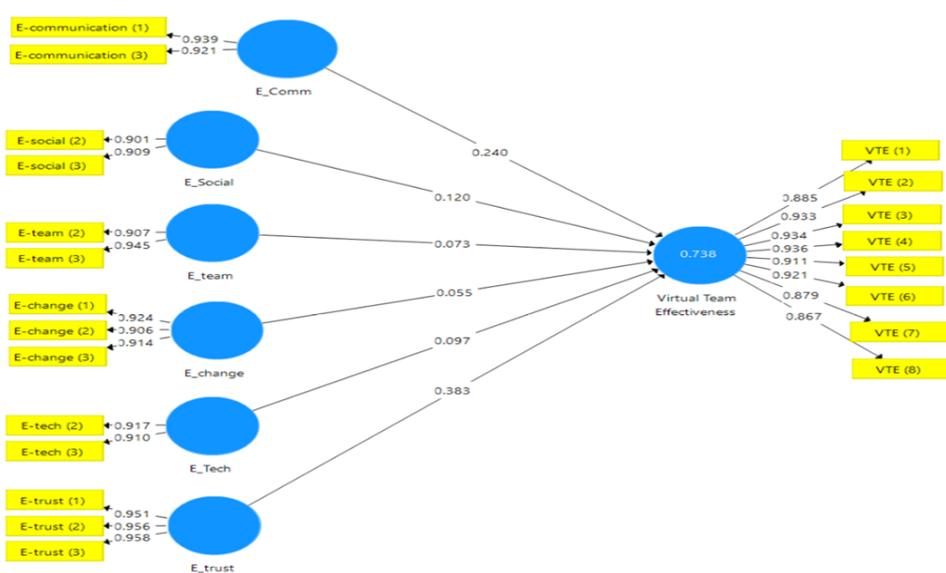
ue greater than 0.90 (Gold & Malhotra, 2001) indicates a problem of a lack of discriminant validity.

**Table 3.** Measurement Model Result

Construct	Items	Factor Loading	CR	AVE
E-Communication Competency	E-communication (1)	0.939	0.927	0.865
	E-communication (3)	0.921		
E-Social Competency	E-social (2)	0.901	0.901	0.819
	E-social (3)	0.909		
E-Change Management Competency	E-change (1)	0.924	0.939	0.836
	E-change (2)	0.906		
	E-change (3)	0.914		
E-Team Competency	E-team (2)	0.907	0.923	0.857
	E-team (3)	0.945		
E-Technology Competency	E-tech (2)	0.917	0.910	0.835
	E-tech (3)	0.910		
E-Trust Competency	E-trust (1)	0.951	0.969	0.911
	E-trust (2)	0.956		
	E-trust (3)	0.958		
Virtual Team Effectiveness	VTE (1)	0.885	0.974	0.826
	VTE (2)	0.933		
	VTE (3)	0.934		
	VTE (4)	0.936		
	VTE (5)	0.911		
	VTE (6)	0.921		
	VTE (7)	0.879		
	VTE (8)	0.867		

Note : CR - Composite Reliability, AVE - Average Variance Extracted

**Figure 2.** Structural Model



Notes: The following items were removed due to outer factor loading less than 0.7 that is caused by reverse coding questionnaire adopted from previous researcher: E\_communication2, E\_social1, E\_team1 & E\_tech1.

**Table 4.** Discriminant validity of constructs

	E_Communication	E_Social	E_Technology	E_Change	E_Team	E_Trust	Virtual Team Effectiveness
E_Communication							
E_Social	0.870						
E_Technology	0.755	0.812					
E_Change	0.755	0.872	0.929				
E_Team	0.742	0.837	0.781	0.876			
E_Trust	0.778	0.781	0.960	0.883	0.863		
Virtual Team Effectiveness	0.810	0.804	0.835	0.794	0.774	0.848	

### Structural Model Result

Based on table 5, in summary, 2 out of 6 hypotheses are supported (H1: P-Values <0.05, T-Value 2.288 & H6: P-Values <0.05, T-Values 2.900) and the rest of 4 hypotheses (H2, H3, H4 & H5) are not supported in the study due to P-Values>0.05.

**Table 5.** Structural Model Result

Hypothesis	Relationship	Path Coefficient	T-Values	P-Values	Decision
H1	E_Communication -> Virtual Team Effectiveness	0.240	2.288	0.012	Supported
H2	E_Social -> Virtual Team Effectiveness	0.120	1.287	0.100	Non Supported
H3	E_Change -> Virtual Team Effectiveness	0.055	0.549	0.292	Non Supported
H4	E_Team -> Virtual Team Effectiveness	0.073	1.132	0.129	Non Supported
H5	E_Technology -> Virtual Team Effectiveness	0.097	0.985	0.163	Non Supported
H6	E_Trust -> Virtual Team Effectiveness	0.383	2.900	0.002	Supported

### Discussion

The first hypothesis (H1) suggested that there is a positive relationship between E-Communication & Virtual Team effectiveness. H1 hypothesis has a  $\beta$  -value of 0.240 ( $p < 0.05$ ). Thus, H1, it is accepted, and it shows that the relationship between communication and the virtual team's effec-

tiveness is significant. The result is in line with a previous study where (Roman et al., 2019) the result point out that short of this competency will not directly lead to short term leadership failures, but it will sufficiently impact the leader's effectiveness in the long term. Respondent feedback on the items questionnaire mostly agree that leader's capability in communicating through information communication technology with clarity & structural, avoiding errors and miscommunication, and is not too much or negative impact to team performance.

The third hypothesis (H3) explained about leaders E-Change competency as the leader has the ability to handle change management efficiently through Information Communication Technologies that will have a positive effect on virtual team effectiveness overallly. E-Change (H3:  $\beta$  value is 0.055,  $p > 0.05$ ) has a non-significant effect on virtual team effectiveness. Therefore, H3 is not supported by the data. Base on demographic data collected from the Penang MNC population, the majority of the respondents are from manufacturing MNC. This is evident from the work industry percentage of the respondent that accounted 70% from the manufacturing & engineering industry. Invest Penang has stated that US company top the MNC in Penang, as such cultural influence of American company have influenced the result. MNC in Penang have set the footprint for at least 5 decades & their culture of transparency in managing change have been prevalence all time. With the advance of ICT, Mass town hall is conducted frequently by the parent company to communicate & manage change virtually within the sites company in Penang. Employee are kept abreast with com-

pany result, challenges & opportunity ahead. When change management is managed so well in the current culture with the high advancement of ICT, E-change competency for a virtual team leader may not be significantly important to ensure virtual team effectiveness.

The fourth hypothesis (H4) explained about leaders E-Team competency as the leader's ability to recognize so that it motivates and at the same time hold accountability on team members in a virtual setting. E-Team (H4:  $\beta$  value is 0.073,  $p > 0.05$ ) has a non-significant effect on virtual team effectiveness. Therefore, H4 is not supported by the data. American culture is very individualism (Aripin et al., 2010) & this has influenced the culture of high self-motivation & accountability on job performance. When self-governing accountability is high due to the influence of American culture, the needs of E-Team competency to hold an accountable team in a virtual environment will not be significant anymore.

The fifth hypothesis (H5) explained about leaders E-Technology competency as the leader's high technology know-how and always be on top of Information Communication Technologies developments and its security risk will have a positive effect on virtual team effectiveness as overall. E-Technology (H5:  $\beta$  value is 0.097,  $p > 0.05$ ) has a non-significant effect on virtual team effectiveness. Therefore, H4 is not supported by the data. Part of the reason of this non-supported result is contributed by high technology industry of manufacturing in Penang. From the demographic data, 70% of work industry respondent (55 % Manufacturing + 15% Engineering) are from a high technology-based company. The maturity of ICT in all these

companies are very high & most of the employee has been the forefront in the industry that adopted the latest ICT as a prerequisite in daily interaction virtually across a different time zone.

The second hypothesis (H2) explained about leaders E-Social competency in creating an optimistic job condition and to enhance collaboration & communication through a variety of virtual communication means will have a positive effect on virtual team effectiveness as overall. E-Social (H2:  $\beta$  value is 0.0120,  $p > 0.05$ ) has a non-significant effect on virtual team effectiveness. Therefore, H2 is not supported by the data. H2 is discussed after H3, H4 & H5 because the later hypothesis is part of the influence that explain the non-significant of H2. H2 argue about the hypothesis that for the team to be effective, communication & collaboration have to be improved by having a Leader with E-social competency creating a positive work environment. Under US culture influence in justification of H3, H4, & H5, communication is carryout effectively & collaboration are most important and manage at the site level within Penang. As such, when both communication & collaboration are at the desirable state it will cause E-Social competency is found to be insignificant.

The sixth hypothesis (H6) explained about leaders E-Trust competency as the leader's capability when using Information Communication Technologies to create a sense of trust by being perceived as honest, consistency to everyone, and just will have a positive effect on virtual team effectiveness as overall. E-Trust (H6:  $\beta$  value is 0.383,  $p < 0.05$ ) has a significant effect & positive impact on virtual team effectiveness. Thus, H6, it is

accepted, and it shows that the relationship between communication and the effectiveness of the virtual team is significant.

Previous studies (Sarker and Sahay, 2003; de Guinea et al., 2005; Roman et al., 2019) also support the current positive outcome, whereby trust is important for virtual teams' effectiveness. Virtual team members work in a highly dependent Information Communication Technology environment. And virtual teams are highly dependent on each other to complete the mission or project assigned to them as opposed to traditional teams.

Compared to the traditional team, however, virtual team members have very small face-to-face meetings or sometimes do not meet at all. As a result, they are unable to personally track each other's progress. Having worked in such a setting requires a great deal of trust among many of the participants, and without trust, a disagreement might occur, which could negatively impact the team's performance.

## **Implications**

Numerous studies have reported the significant effect of communication on organization performance. In a recent study, Anders (2016) and Chatterjee et al. (2017) deemed communication is an essential component for knowledge diffusion, innovation and productivity in organizations; as a result, visibility in communication empowers individuals to promote team processes and drive projects forward. Likewise, effective communication has been found to significantly predict leadership, individual and team performance (Schulze et al., 2017; Aguado et al., 2014).

It is difficult to create trust in new virtual teams, as members cannot track working collectively (Jarvenpaa & Leidner, 1999). When virtual teams are located in various locations, there is a lack of face-to-face contact, operating in different time zones, etc., reducing key measurable indications in assessing team member trust applicable to conventional teams ( Kanawattanachai & Yoo, 2002; Pinjani & Palvia, 2013). Trust is also promoted as essential to successful team processes and success of the various factors that influence team effectiveness (e.g. Petersen, 2004; Brahm and Kunze, 2012).

Trust has actually been asserted to be extremely important for the effectiveness of the virtual team (Bergiel et al., 2008; Sarker and Sahay, 2003), and the research by Brahm and Kunze (2012) also revealed to trust moderates the impact of different variables on the effectiveness of the virtual team. In short, the effect of trust on the performance and effectiveness of the virtual team is not as simple as it seems to be (Kanawattanachai and Yoo, 2007; Brahm and Kunze, 2012). The relation is extremely complicated and very difficult to establish.

## **Limitations**

The pool of sample is drawn from the employees in Penang MNC are consist of 70% from manufacturing sectors in Penang, and that was done in purpose in this study. In that sense, it is not certain that the results obtained can be generalized to employees in other industries like educational, banking and other service sectors. MNC companies size varies; as such, the study may be slightly biased. As more virtual teams are available to sample

this analysis from large MNC companies, the outcome will appear to lean towards them. Moreover, due to the data collection limitation, virtual teams are represented by only one respondent per team in this study. As such, it may represent some bias if the response is used to represent the team. There will be a high tendency for respondents to not work in the same virtual team and respond to the questionnaire based on the same experiences in the teams. Some other areas need to be ascertained and taken into measurement, particularly the characteristics of the virtual team in this study. A virtual team can be set up for a short period and long period and involve multiple sites in a team. Virtual team functionality is another point to be focused in future research. Respondents will respond differently to differences in experience and expectations in various settings of the virtual team. In term for the race in demographic data, 89% of respondents are Chinese. This will somehow create a bias situation if the response is being used to represents the totality of the virtual teams. As such future researcher are recommended to investigate this point & have a better race distribution during data collection.

Although there are studies by other research on virtual team topic in Malaysia, most of the studies do not indicate or measure the level of virtual team effectiveness in their population. Take, for example, two research from (Tan et al., 2019) & (Aripin et al., 2010). However, one research (Pangil & Chan, 2014) highlighted the level of effectiveness, but the research is limited to one MNC company only. As such, this part of limitation for researchers to take note & perhaps can be cover in future research.

## **Conclusion and future research**

The researcher objective is to determine the type of Digital Leadership Competency that will contribute to virtual teams' success. This study had discovered two factors, namely E-Communication Competency & E-Trust Competency, that have a positive impact on virtual team effectiveness via quantitative research. It is important for leaders that during virtual communication, he or she is well organized, the message is clear, and feedback mechanism can avoid mistake and ambiguity. Leaders also need to ensure that virtual communication is not too much until jeopardising employee work efficiency or giving them constraint to get their job completed. As for cultivating trust, leaders need to have the competency within the virtual environment to create a value of trust. Leaders practice virtual communications that supports integrity, persistency, rightfulness, and non-bias. The leaders are to ensure diversity is presence and observed in virtual environment settings.

This study's outcome enables organizations to learn what makes virtual teams more effective can help them attain positive results from virtual teams. For future research, other areas can be improved or considered. One of it is Virtual Team Culture and diversity, and not limiting to this, any factors that are not yet covered in the current framework could be potential for assessing the virtual team.

Apart from that, the general judgement of the findings can be further enhanced by considering a larger mix of respondents from virtual teams of service industries, for example (Mirzadeh et al., 2017). Studies across other

geographical regions are relevant due to the diverse culture and perception of virtual teams that will influence the findings. In terms of respondent sample size, it can increase in future research. The reason being is virtual teams involved members from a wide range of demographics.

Finally, future researchers may look at the opportunity to have a better mix or balance representative in terms of race in a virtual team through data collection. The level of virtual team effectiveness at the current state or the organization can be considered an important factor to be investigated upfront so that it supports the comparison or business case of future studies.

## **References**

1. Aguado, D., Rico, R., Sánchez-Manzanares, M. and Salas, E. (2014). Teamwork competency test (TWCT): a step forward on measuring teamwork competencies, *Group Dynamics: Theory, Research, and Practice*, 18(2), 101.
2. Anders, A. (2016). Team communication platforms and emergent social collaboration practices, *International Journal of Business Communication*, 53(2), 224-261.
3. Aripin, N., Mustafa, H., & Hussein, A. (2010). Critical issues in virtual team working environment in Malaysia.
4. Armstrong, D. J. & Cole, P. (2002). Managing distances and differences in geographically distributed work groups”, In Hinds, P. and Kiesler, S. (Eds) *Distributed Work*, pp.167-186.
5. Avolio, B. J. (2007). Promoting more integrative strategies for leadership theory-building. *American psychologist*, 62(1), 25.
6. Avolio, Bruce J., Surinder Kahai, & George E. Dodge. (2000). E-leadership: Implications for Theory, Research, and Practice. *Leadership Quarterly* 11(4), 615–68.
7. Bagozzi, R. & Yi, Y. (1988). On the evaluation of structural equation models, *Journal of the Academy of Marketing Science*, 16(1), 74-94.
8. Bass, B. M., & Bass, R. (2008). *The Bass handbook of leadership: Theory, research, and managerial applications*. Simon and Schuster.

9. Bell, B.S. & Kozlowski, S.W. (2002). A typology of virtual teams: implications for effective leadership. *Group and Organization Management*, 27(1), 14-49.
10. Beranek, P.M. & Martz, B. (2005). Making virtual teams more effective: improving relational links. *Team Performance Management: An International Journal*, 11(5/6), 200-213.
11. Bergiel, B.J., Bergiel, E.B. & Balsmeier, P.W. (2008). Nature of virtual teams: a summary of their advantages and disadvantages. *Management Research News*, 31(2), 99-110.
12. Brahm, T., & Kunze, F. (2012). The role of trust climate in virtual teams. *Journal of Managerial Psychology*.
13. Cascio, W. F. (2000). Managing a virtual workplace. *Academy of Management Perspectives*, 14(3), 81-90.
14. Cascio, W. F., & Stan Shurygailo. (2003). E-leadership and Virtual Teams. *Organization Dynamics* 31(4): 362-76.
15. Chatterjee, S., Sarker, S. & Siponen, M. (2017). How do mobile ICTs enable organizational fluidity: toward a theoretical framework. *Information and Management*, 54(1), 1-13.
16. Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of management*, 23(3), 239-290.
17. Connaughton, S. & Daly, J. (2004). Identification with leader, a comparison of perceptions of identification among geographically dispersed and co-located teams. *An International Journal Corporate Communications*, 9(2), 89-103.
18. Daft, R.L. & Lengel, R.H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571.
19. De Guinea, A.O., Webster, J. & Staples, S. (2005). A meta-analysis of the virtual teams literature. *Industrial Relations Center, School of Policy Studies, Queen's University*
20. De Jong, R., Schalk, R. & Curseu, P.L. (2008). Virtual communicating, conflicts and performance in teams. *Team Performance Management*, 14(7), 364-380.
21. Dole, W.V., Hurch, J.M. & Liebst, A. (2005). Assessment: a core competency for library leaders. *Librarian Administration and Management*, 19(3), 125-132.
22. Ebrahim, N. A., Rashid, S. H. A., Ahmed, S., & Taha, Z. (2012). The effectiveness of virtual R&D teams in SMEs: experiences of Malaysian SMEs.
23. Fernandez, D. B. B., & Jawadi, N. (2015). Virtual R&D project teams: From e-leadership to performance. *Journal of Applied Business Research*, 31(5), 1693-1708.

24. Fornell, C. & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 18(1), 39-50.
25. FTI Consulting (2015). U.S. Postsecondary Faculty in 2015: Diversity in People, Goals and Methods, but Focused on Students. <http://postsecondary.gatesfoundation.org/wp-content/uploads/2015/02/US-PostsecondaryFaculty-in-2015.pdf>
26. Gaudes, A., Hamilton-Bogart, B., Marsh, S., & Robinson, H. (2007). A framework for constructing effective virtual teams. *The Journal of E-working*, 1(2), 83-97.
27. Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the association for information systems*, 4(1), 7.
28. Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, 18(1), 185-214.
29. Greenberg, Penelope Sue, Ralph H. Greenberg, and Yvonne Lederer Antonucci. (2007). Creating and Sustaining Trust in Virtual Teams. *Business Horizons* 50(4), 325–33.
30. Griffin, R. W. & Moorhead, G. (2012). *Managing organizational behaviour*. South-Western Cengage Learning.
31. Hambley, L. A., O’Neill, T. A., & Kline, T. J. (2007). Virtual team leadership: Perspectives from the field. *International Journal of e-Collaboration (IJeC)*, 3(1), 40-64.
32. Hardin, A. M., Fuller, M. A., & Davison, R. M. (2007). I know I can, but can we? Culture and efficacy beliefs in global virtual teams. *Small Group Research*, 38(1), 130-155.
33. Holland, J. B., Malvey, D., & Fottler, M. D. (2009). Health care globalization: A need for virtual leadership. *The health care manager*, 28(2), 117-123.
34. Hollenbeck, J. R., Beersma, B., & Schouten, M. E. (2012). Beyond team types and taxonomies: A dimensional scaling conceptualization for team description. *Academy of Management Review*, 37(1), 82-106.
35. Hunsaker, Ph. L., and Hunsaker, J. S. (2008). Virtual Teams: A Leader’s Guide. *Team Performance Management* 14(1–2), 86–101.
36. Jarvenpaa, S. and Leidner, D. (1999). Communication and trust in global virtual teams”, *Organization Science*, Vol. 10 No. 6, pp. 791-815.
37. Johnson, S. K., Bettenhausen, K., & Gibbons, E. (2009). Realities of working in virtual teams: Affective and attitudinal outcomes of using computer-mediated communication. *Small Group Research*, 40(6), 623-649.

38. Jordan, M. W. (2012). Developing leadership competencies in librarians”, *Journal of Graduate School of Library and Information*, 38(1), pp.37-46.
39. Kahai, S. S. (2013). Leading in a digital age: What’s different, issues raised, and what we know. *Exploring Distance in Leader–Follower Relationships: When Near is Far and Far is Near*. New York, Routledge, S, 63-108.
40. Kanawattanachai, P., & Yoo, Y. (2002). Dynamic nature of trust in virtual teams. *The Journal of Strategic Information Systems*, 11(3-4), 187-213.
41. Kanawattanachai, P., & Yoo, Y. (2007). The impact of knowledge coordination on virtual team performance over time. *MIS quarterly*, 783-808.
42. Kawamorita, H., Salamzadeh, A., Demiryurek, K., & Ghajarzadeh, M. (2020). Entrepreneurial universities in times of crisis: Case of COVID-19 pandemic. *Journal of Entrepreneurship, Business and Economics*, 8(1), 77-88.
43. Kurt, J. (2012). Virtual leadership: required competencies for effective leadership”, available at:<http://teleworkmanagement.com/wp-content/uploads/2012/11/Virtual-leadership.pdf>
44. Lander, J. (2020). The relationship between principals’ pillars of digital leadership aligned values and actions and teacher technology use.
45. Lareki, A., de Morentin, J. I. M., & Amenabar, N. (2010). Towards an efficient training of university faculty on ICTs. *Computers & Education*, 54(2), 491-497.
46. Lin, Chad, Craig Standing, & Ying-Chieh Liu. (2008). A Model to Develop Effective Virtual Teams. *Decision Support Systems*, 45(4), 1031–45.
47. Malhotra, A., Majchrzak, A., & Rosen, B. (2007). Leading Virtual Teams. *Academy of Management Perspectives*, 21(1), 160–70.
48. Martins, L. L., Gilson, L. L., & Maynard, M. T. (2004). Virtual teams: What do we know and where do we go from here?. *Journal of management*, 30(6), 805-835.
49. MDEC (2019). Multimedia Super Corridor. Retrieved on 5 May 2020, from <https://mdec.my/what-we-offer/msc-malaysia/>
50. Mirzadeh, M. S., Salamzadeh, Y., & Salamzadeh, A. (2017). Identification of factors affecting individual industries. *Economía y Sociedad*, 22(52), 67-87.
51. Mogale, L. (2010). Effective leadership to manage virtual teams in multinational companies (Doctoral dissertation, University of Pretoria).

52. Moghadam, S. J., & Salamzadeh, A. (2018). Do senior bankers care about entrepreneurial behaviour?: case of senior managers of Iranian vanguard banks. *World Review of Entrepreneurship, Management and Sustainable Development*, 14(1-2), 271-287.
53. Montgomery, V. A. N., Roman, A., & Pierce, S. (2016). The rise and effect of virtual modalities and functions on organizational leadership: Tracing conceptual boundaries along the e-management and e-leadership continuum. *Transylvanian Review of Administrative Sciences*, 12(SI), 102-122.
54. Nandhakumar, J. & Baskerville, R. (2006). Durability of online teamworking: patterns of trust, *Information Technology and People*, pp. 371-389.
55. NCER Strategic Framework (2020). Retrieved on 5 May 2020, from <https://www.ncer.com.my/about-ncer/>
56. Ng, Y. N., & Salamzadeh, Y. (2020). The Impact of Ethical Leadership on the Intention to Stay among the Generation-Y Workforce of MNCs in Penang, Malaysia: Mediating Role of Employee Rewards. *International Journal of Business Science & Applied Management*, 15(2).
57. Pangil, F., & Chan, J. M. (2014). The mediating effect of knowledge sharing on the relationship between trust and virtual team effectiveness. *Journal of Knowledge Management*.
58. Petersen, S. (2004). Trust: A neglected variable in team effectiveness research. *Journal of Management & Organization*, 10(1), 38-53.
59. Piccoli, G., & Ives, B. (2004). Trust and the unintended effects of behavior control in virtual teams. *MIS quarterly*, 365-395
60. Pinjani, P., & Palvia, P. (2013). Trust and knowledge sharing in diverse global virtual teams. *Information & Management*, 50(4), 144-153.
61. Precup, L., O Sullivan, D., Cormican, K., & Dooley, L. (2006). Virtual team environment for collaborative research projects. *International Journal of Innovation and Learning*, 3(1), 77.
62. Radović Marković, M., & Salamzadeh, A. (2012). The nature of entrepreneurship: Entrepreneurs and entrepreneurial activities. Lap Lambert Academic Publishing: Germany.
63. Radovic Markovic, M., & Salamzadeh, A. (2018). The importance of communication in business management. In the 7th International Scientific Conference on Employment, Education and Entrepreneurship, Belgrade, Serbia.
64. Radovic Markovic, M., Salamzadeh, A., & Kawamorita Kesim, H. (2016, June). Barriers to the advancement of women into leadership positions: A Cross National Study. In Prepared for the

- International Scientific Conference on Leadership and Organization Development, Kiten, Bulgaria (pp. 287-294).
65. Radovic Markovic, M., Salamzadeh, A., & Razavi, M. (2013). Women in business and leadership: critiques and discussions. In *The Second International Scientific Conference on Employment, Education and Entrepreneurship*, Belgrade, Serbia (pp. 19-31).
  66. Radović-Marković, M., Salamzadeh, A., & Vujičić, S. (2019). Selection of organization models and creation of competences of the employed people for the sake of competitiveness growth in global business environment. *International Review*, (1-2), 64-71.
  67. Ravesteijn, P., & Ongena, G. (2019). The role of E-leadership in relation to IT capabilities and digital transformation. *IADIS Proceedings*.
  68. Roman, A. (2013). Delineating Three Dimensions of E-government Success: Security, Functionality and Transformation. In *E-government Success Factors and Measures: Concepts, Theories, Experiences, and Practical Recommendations*, edited by J. Ramon Gil-Garcia, 171–92. Hershey, PA: IGI Global.
  69. Roman, A. V., Van Wart, M., Wang, X., Liu, C., Kim, S., & McCarthy, A. (2019). Defining e-leadership as competence in ICT-mediated communications: an exploratory assessment. *Public Administration Review*, 79(6), 853-866.
  70. Ross, T., Jones, E.C. & Adams, S.G. (2008). Can team effectiveness be predicted?, *Team Performance Management*, 14(5/6), 248-268.
  71. Salamzadeh, A. (2018). Start-up boom in an emerging market: A niche market approach. In *Competitiveness in emerging markets* (pp. 233-243). Springer, Cham.
  72. Salamzadeh, A., Tajpour, M., & Hosseini, E. (2019). Corporate entrepreneurship in University of Tehran: does human resources management matter?. *International Journal of Knowledge-Based Development*, 10(3), 276-292.
  73. Salamzadeh, Y., Kianmanesh, M., & Vahidi, T. (2019). Transformational leadership style and social responsibility of employees in economic corporations: a study on Sarmayeh Bank of Iran. *International Journal of Sustainable Strategic Management*, 7(1-2), 186-203.
  74. Sarker, S., & Sahay, S. (2003). Understanding virtual team development: An interpretive study. *Journal of the association for information systems*, 4(1), 1.
  75. Sarker, S., Ahuja, M., Sarker, S. & Kirkeby, S. (2011). The role of communication and trust in global virtual teams: a social network perspective, *Journal of Management Information System*, 28(1), 273-309.

76. Schulze, J., Schultze, M., West, S.G. & Krumm, S. (2017). The knowledge, skills, abilities, and other characteristics required for face-to-face versus computer-mediated communication: similar or distinct constructs?, *Journal of Business and Psychology*, 32(3), 283-300
77. Stough, S., Eom, S., & Buckenmyer, J. (2000). Virtual teaming: a strategy for moving your organization into the new millennium. *Industrial Management & Data Systems*.
78. Tajpour, M., & Salamzadeh, A. (2019). The effect of spiritual intelligence on organisational entrepreneurship: case study of educational departments in University of Tehran. *International Journal of Management and Enterprise Development*, 18(3), 205-218.
79. Tan, C. K., Ramayah, T., Teoh, A. P., & Cheah, J. H. (2019). Factors influencing virtual team performance in Malaysia. *Kybernetes*.
80. Tan, Ch. (2019). Global Business Services a booming industry in Penang. *Buletin Mutiara*. Retrieved on 13 Apr 2020, from <https://www.buletinmutiara.com/global-business-services-a-booming-industry-in-penang/>
81. Van Wert, L. (2004). How Do We Know What We Don't Know? Competencies and Staff Development in Special Libraries. *Colorado Libraries*, 30(2), 10-14.
82. Wang, J., Tian, J., & Shen, Z. (2013). The effects and moderators of cyber-loafing controls: an empirical study of Chinese public servants. *Information Technology and Management*, 14(4), 269-282.
83. Warkentin, M., & Beranek, P. M. (1999). Training to improve virtual team communication. *Information systems journal*, 9(4), 271-289.
84. Xiao, Y-C. & Jin, Y-H. (2010). The hierarchical linear modelling of shared mental model on virtual team effectiveness, *Kybernetes*, 39(8), 1322-1329.
85. Zaccaro, S. J., & Bader, P. (2003). E-leadership and the challenges of leading e-teams: Minimizing the bad and maximizing the good. *Organizational dynamics*.
86. Zigers, I. (2003). Leadership in virtual teams: Oxymoron or opportunity? *Organizational dynamics*.