# A Study on E-Leadership and the Factors Influencing its Quality in Organisations, with Special Reference to the State of Kerala, India

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## Abstract

These days, leadership needs both technological expertise and vision, as well as the capacity to predict how technology will impact organisational dynamics. In a worldwide context, the emergent paradigm of e-leadership has grown in lockstep with continuous and complicated organisational transformations. This work focuses on the topic of effective e-leadership from the perspective of the organisation's leadership. Furthermore, to better understand the concept of e-leadership and the extent to which it has been adopted in the organisations in Kerala, this research involves the participation of executive and non-executive employees from various industries and work backgrounds to share their perception on effective e-leadership in their respective organisations in Kerala. Within this context, the goal of this study is to develop a model for assessing the fundamental factors that improve the quality of e-leadership in organisations. This research also contributes in exploring the tools that facilitate e-leadership in the organisations and challenges that organisations encounter while implementing e-leadership. The findings of the present study revealed that the respondents' perspectives on effective e-leadership in organisations differed significantly depending on their work experience, job role, and industry. The study proved that the four dimensions, namely strategy, agility, leadership style, and digital literacy, all have a significant impact on the quality of e-leadership in the organisations.

**Keywords:** E-Leadership, Effective E-Leadership, Information and Communication Technology (ICT), Organisations, Challenges, Facilitators, COVID-19

## Introduction

Today, leadership is as much virtual as it is face-to-face; e-leadership is a critical and distinct skill in organisational management that can lead to improved organisational performance. Information and Communication Technology (ICT) refers to both the Internet-connected world and the mobile world powered by wireless networks (Van Wart et al., 2016). Over the next decade, ICT trends are projected to influence the demand for increasingly specialised digital skills and abilities connected to electronic leadership.

The achievement of an ICT-based goal through human resource advice and the usage of ICT is known as electronic leadership (e-leadership). E-leaders having electronic leadership skills are highly recognised in all types of organisations. It is necessary to engrave e-skills that define a leader, and more specifically, an e-leader (Cheol Liu et al., 2018). Mobility, cloud technology understanding, big data analysis, social media technologies, Internet of Things (IoT), customer experience (CXIT), and Information Security Systems are some of the required e-leaders' e-skills. Digitalisation and technology advancement have created new challenges, and e-leadership can be considered a solution and response to these current developments (Avolio et al., 2000).

According to research on e-leadership, there is a gap between our understanding of the effects of e-leadership and its application. There is also a scarcity of literature in the field of e-leadership. Through and within virtual environments, a competent e-leader communicates

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coherently, provides proper social engagement, and exhibits technological know-how (Van Wart et al., 2018). Effective e-leadership, over time, must generate competent teams, establish effective accountability, inspire change, and foster virtual trust. Not only does such a development open the door to new business opportunities, it also provides the prospect of redefining leadership in our minds.

Approaches like Thomas Carlyle's (1841) 'great man theory', which claimed that prominent people like Napoleon Bonaparte shaped history, were the earliest steps towards leadership theory. New leadership parameters have been established with the emergence of virtual teams and e-leadership. Virtual leadership is another term for e-leadership. Additionally, this type of leadership has qualities that distinguish it from leading in a traditional setting (Van Wart et al., 2017).

This work focuses on the topic of e-leadership from the perspective of the organisation's leadership. Furthermore, to better understand the concept of e-leadership and the extent to which it has been adopted in the organisations in Kerala, this research enlists the participation of executive and non-executive employees from various industries and work backgrounds to share their perception on effective e-leadership in their respective organisations. Within this scope, the study is an analysis of the factors influencing the quality of e-leadership in various organisations as well as to explore the challenges and facilitators of e-leadership. The purpose of this study is to propose a model for understanding the basic factors strengthening the effectiveness of e-leadership in organisations.

## Review of Literature

Leadership as an idea is defined in many alternative ways (Van Wart et al., 2016), from broad to narrow. While the term 'leadership' is usually wont to include anything that those responsible do (as well as those that make things happen, like self-led teams and networks), most leadership scholars use the term more narrowly to the study of the important phenomenon of leading, empowering, and coordinating followers to be as effective as possible.

Zaccaro and Bader highlighted that current leaders are facing two new things; first is the increasing globalisation of companies as they are doing business beyond national

boundaries, and second is the innovation and development of new information and communication technologies (Zaccaro & Bader, 2003). As a result, a new style of leadership is required, which involves the new technology and also helps the organisation conduct business beyond the national boundaries, which is possible only through a new leadership type called e-leadership.

Avolio et al. (2000), in their article on e-leadership, stated that "past leadership research has not focused on issues confronting the leadership in organisations where work is mediated by AIT [Advanced Information Technology]" (Avolio et al., 2000). Further, "it is probably too early to spot any empirically based, systematic, patterned variations or to draw any broad conclusions about e-leadership". In a reassessment of the literature 14 years later, Avolio et al. state that the study of e-leadership remains at "very nascent stages of development" (Avolio et al., 2014) and has continued to lag behind its practice substantially; they suggest that it has actually widened in recent years – "advances in AIT and its appropriation in the least levels of organisations and societies have far outpaced the practice and science of leadership".

According to the ideas mentioned above, e-leadership refers to resources related to change of organisational patterns facilitated by the digital revolution. There are two fundamental components of e-leadership: communication and technology; access to computer-mediated communication has become increasingly convenient and affordable (Garcia, 2020).

Information and communication technology (ICT) features a major impact on businesses and society; however, the adoption of ICT has not been well incorporated into leadership theory (Van Wart et al., 2017). In particular, there's a paucity of research on e-leadership in developing countries (Purvanova & Bono, 2009) and, therefore, the factors that direct leadership behaviour towards commercialisation. These interactions and their implementation as managed by an e-leader will enable faster development and commercialisation of latest products and services (Belitski & Liversage, 2019). In addition, advances in information and communication technology is changing organisations, including those in educational settings (Gurr, 2004). Old practices are being altered, and new practices, spaces, and possibilities created (Morgan & Manganaro, 2016).

The challenges faced by virtual leadership are trust building, and task- and relationship-oriented leadership behaviour which are important for perceived project success (Huang et al., 2009; Reed & Knight, 2010). However, the virtual environment creates opportunities that project managers should seek to foster and reduce the constraints of those challenges (Park & Popescu, 2014).

The study by Van wart suggested that a leadership perspective requires a model with more proactive behavioural factors. Specifically, seven antecedent traits and skills were investigated to ascertain if there was a significant relationship with the first behaviours associated with adoption. While all select skills and traits are found significant predictors of individual-level ICT adoption, a separate analysis identified that a need for achievement, willingness to accept responsibility, and analytical skills were important foremost when considered on aggregate. Leaders are also expected to become effective in dealing with and navigating the challenges of leading within the digital space (Van wart et al., 2018).

COVID-19 has changed the planet and, therefore, the way people work. This situation poses a large challenge for companies to survive and thrive in a complex business environment, and for workers, who must adapt to the present new way of working (Contreras et al., 2020). COVID-19 caused companies to go online, compared to the earlier offline way of working. This situation encouraged organisations to add insight into the effectiveness of e-training, e-leadership, work-life balance, and work motivation amid the outbreak of the COVID-19 pandemic, which requires more online working (Wolor et al., 2020; Gonaim, 2021).

## Theoretical Framework

This section focuses on the model and the ideas developed by scholars in the past to illustrate the leadership styles and the evolution of e-leadership in the organisations.

### Leadership

The art of encouraging a group of individuals to work together towards a single goal is known as leadership. This can entail directing workers and colleagues with a strategy to suit the company's needs in a corporate setting. The CEO of a firm, an army general, the leader of a political party, a school superintendent, a department head, and a team coach are just a few examples of organisational leadership. There will always be a demand for competent organisational leaders — today, tomorrow, and in the future. People who can contribute a vision, particularly one of growth and sustainability, will always be welcomed by organisations.

### E-Leadership

*"E-leadership is characterised as a social impact process mediated by AITs that can generate a change in attitudes, feelings, thinking, behaviour, and performance in both proximal and distal contexts"* (Avolio et al., 2014, p. 107).

As a result of technological advancements, the number of 'virtual' modes of working, and so-called virtual teams in organisations, has increased. This has risen dramatically, notably since the outbreak of the COVID-19 pandemic. In other words, in contrast to the traditional workgroup characterised by people 'physically' interacting with each other, Web communication and mobile technology have both become necessary to reduce physical distance among workers involved in the same team. Individual performance in different places and times are all elements describing the features of a virtual team and the need for e-leadership. Previous leadership studies had not focused on difficulties affecting leaders in organisations, where AIT was used to mediate work.

### Advanced Information Technology (AIT)

AIT includes, but is not restricted to, e-mails, Enterprise Resource Planning, video technologies, Internet of Things (IOT), and artificial intelligence. We are seeing a faster and more widespread adoption of AIT in enterprises these days than was expected even a few years ago. This AIT-enabled economy has given rise to a new type of leadership known as e-leadership.

### Information and Communication Technology (ICT)

The infrastructure and components that enable modern computing are known as ICT (Information and Communications Technology). Information and Communication Technologies (ICTs) encompass all communication technologies such as the wireless

networks, Internet, computers, cell phones, software, social networking, video conferencing and other media applications, and services that allow users to access, retrieve, store, transmit, and manipulate data.

## ICT Adoption and (e-) Leadership Theory
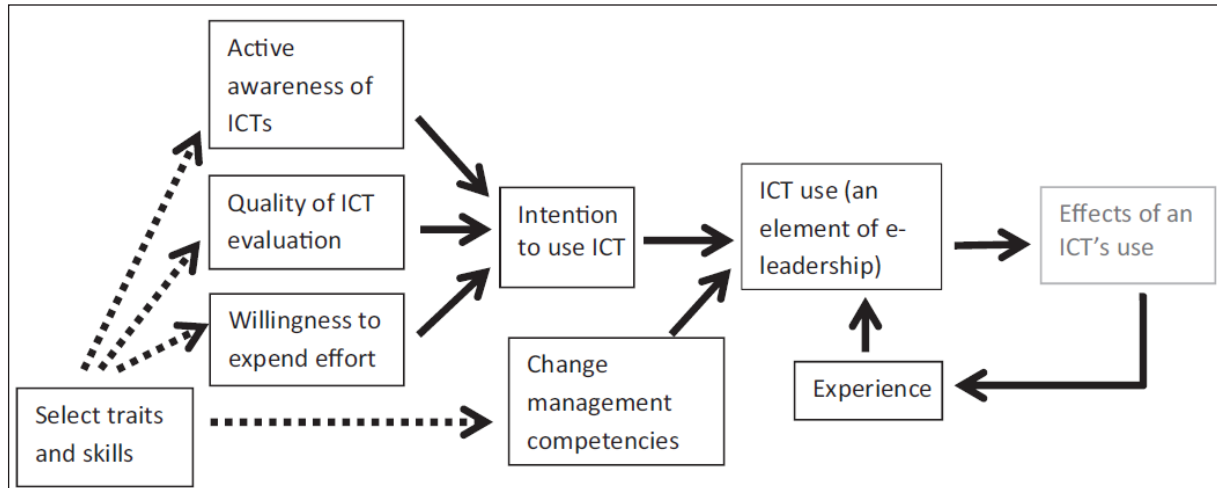


Fig. 1:   **Enterprise-Wide ICT Adoption based on Leadership Competencies**

Montgomery Van Wart, Alexandru Roman, XiaoHu Wang, Cheol Liu (2016) conducted a study on integrating ICT adoption issues into (e-) leadership theory. E-leadership had traditionally focused on effective ICT use through traits, abilities, styles, and behaviour; however, scholars think that this is just half of the equation, and that it should also include ICT adoption. The approach described here adapts the study of Venkatesh et al. (2003) in a leadership setting, with the purpose of discovering individual traits and talents that distinguish people who are more or less successful in implementing effective ICT adoptions.

## Research Methodology

### Objectives

- To examine the degree of adaptation of e-leadership in organisations in Kerala.
- To explore the challenges specific to e-leadership in the organisations.
- To explore the tools that facilitate e-leadership in organisations.
- To find the significant difference in the opinion on effective e-leadership among the employees, with respect to age, gender, work experience, industry, and job role.

- To propose a model for understanding the factors influencing the quality of e-leadership in organisations.

## Hypotheses

### Hypothesis 1

$H_0$: There is no significant difference in opinion among the employees regarding effective e-leadership, with respect to their age.

### Hypothesis 2

$H_0$: There is no significant difference in opinion among the employees regarding effective e-leadership, with respect to gender.

### Hypothesis 3

$H_0$: There is no significant difference in opinion among the employees regarding effective e-leadership, with respect to work experience.

### Hypothesis 4

$H_0$: There is no significant difference in opinion among the employees regarding effective e-leadership, with respect to job role.

## Hypothesis 5

$H_0$: There is no significant difference in opinion among the employees regarding effective e-leadership, with respect to the industry.

## Hypothesis 6

$H_0$: There is no positive significant impact of strategy on the quality of e-leadership.

## Hypothesis 7

$H_0$: There is no positive significant impact of agility on the quality of e-leadership.

## Hypothesis 8

$H_0$: There is no positive significant impact of leadership style on the quality of e-leadership.

## Hypothesis 9

$H_0$: There is no positive significant impact of digital literacy on the quality of e-leadership.

## Research Design

The data for this qualitative study is gathered by assigning numbers to the statements that are meant to measure the attributes of the questions, to convey the degrees of agreement and disagreement. IBM SPSS Amos was used to calculate the value of the association between the variables.

## Sources of Data

### ● Primary Data

Data was collected from 203 employees working in various organisations in Kerala using the purposive sampling technique.

### ● Secondary Data

Information on the topic, e-leadership, has been taken from materials (relevant documents) provided by various websites. All possible existing literature is obtained by reviewing various journals, e-journals, online repositories, magazines, and publications.

## Population

Since the focus of this research is to understand the factors that influence the quality of e-leadership in the organisations, the population includes all the employees working in the organisations spanning across different industries (IT, education, banking, retail, and so on) in Kerala, India.

## Sample Size and Design

The sample size is fixed as 195, which is five times that of the indicator variables considered good for this study; the sample units were selected from different organisations of various industries in Kerala. Considering the sample population, the purposive sampling method is used for collecting the sample data.

## Sampling Method

The purposive sampling approach was employed.

## Method of Data Collection

A structured questionnaire consisting of demographic and close-ended questions regarding e-leadership practices in the organisations was designed. There were 39 Likert scale questions and the application used was Google Forms. The questions were prepared based on the secondary data.

The questionnaire (Google Forms) was sent to the employees working in organisations across different industries in Kerala via social media platforms like WhatsApp and LinkedIn.

## Drafting the Questionnaire

Since there is no validated questionnaire and the study is new, a five-point Likert scale-type questionnaire was designed for collecting data from the respondents.

## Pilot Survey

The questionnaire was administered to a small portion of the total population. Here, the purposive sampling method is opted. The total number of respondents was 203. A pilot research was done to examine the instrument's reliability by gathering responses from 100 people. All of the scales were found to be reliable using SPSS, with Cronbach's α greater than 0.7. As part of SEM, the validity of the scale is evaluated during the confirmatory analysis step.

## Data Analysis Techniques

The following statistical tools were used for data analysis:

- *ANOVA* – ANOVA was employed in this study to see whether there was a significant difference in opinion on e-leadership based on age, gender, work experience, industry, and functional role.
- *Principal Component Analysis (PCA)* – In this study, principal component analysis (PCA) was used to identify the component(s) that best explained the overall variance of the subject under examination, which were the facilitators and challenges of e-leadership in the organisations.
- *Structural Equation Modelling (SEM)* – Structural Equation Modelling (SEM) is a set of statistical approaches for analysing and measuring the relationships between observed and latent variables. SEM dates back to over 100 years and has advanced over three generations (Van Wart et al., 2018; Leschig, 2019).

## Data Analysis and Interpretation

Statistical analysis and relationship testing were carried out using the IBM SPSS Statistics and IBM SPSS Amos statistical tools. Microsoft Excel was used to conduct the demographic and descriptive analysis.

## The Degree of Adaptation of e-Leadership in Organisations in Kerala

This segment of the study included analysing the group of participants who responded favourably to the question on the presence of effective e-leadership in their respective organisations.

The result reflected that 144 out of 203 respondents, that is, 70.93 per cent of the respondents believe that e-leadership is present in their respective organisations. This implies that e-leadership is widely adopted in Kerala.

## The Challenges Specific to e-Leadership in the Organisations

The obstacles to e-leadership adoption in the organisations have been highlighted. The following are some of the challenges that were employed in the research:

Challenge-1: Too many competing priorities.

Challenge-2: Crashes in communication due to the usage of different hardware and software.

Challenge-3: Security concerns.

Challenge-4: Insufficient technical skills.

Challenge-5: Lack of organisational agility.

Challenge-6: Lack of management understanding and overall strategy.

Challenge-7: Lack of a collaborative and sharing culture.

Challenge-8: Lack of employee incentives.

*Principal Component Analysis (PCA)* – The purpose of the principal component analysis (PCA) was to find the component(s) that best explained the total variance of the subject under investigation, namely the challenges of e-leadership in the organisation.

### ● KMO and Bartlett's Test

**Table 1: KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .845 |
|---|---|
| Bartlett's Test of Sphericity Approx. Chi-Square | 938.723 |
| df | 28 |
| Sig. | .000 |

*Interpretation:* Table 1 shows two tests that show if the data is suitable for structure detection.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy achieved is 0.845, which is high, indicating that a factor analysis (principal component analysis) with the data provided could be beneficial. Also, the result of Bartlett's sphericity test is significant (less than 0.05), implying that a factor analysis would be relevant for the data.

● **Proportion of Variance Explained Criterion**

**Table 2:  Communalities**

|  | Initial | Extraction |
|---|---|---|
| Challenge-1 | 1.000 | .420 |
| Challenge-2 | 1.000 | .872 |
| Challenge-3 | 1.000 | .825 |
| Challenge-4 | 1.000 | .698 |
| Challenge-5 | 1.000 | .782 |
| Challenge-6 | 1.000 | .793 |
| Challenge-7 | 1.000 | .714 |
| Challenge-8 | 1.000 | .526 |

Extraction Method: Principal Component Analysis.

*Interpretation:* Table 2 shows the proportion of each variable's variance that can be explained by the components. All of the variables have a high value, indicating that they are well represented in the common factor space.

● **Eigenvalue Criterion**

**Table 3:  Total Variance Explained**

| Comp-onent | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
|  | Total | % of Variance | Cumul-ative % | Total | % of Variance | Cumul-ative % |
| 1 | 4.528 | 56.596 | 56.596 | 4.528 | 56.596 | 56.596 |
| 2 | 1.103 | 13.786 | 70.382 | 1.103 | 13.786 | 70.382 |
| 3 | .849 | 10.610 | 80.992 | | | |
| 4 | .451 | 5.632 | 86.623 | | | |
| 5 | .361 | 4.516 | 91.139 | | | |
| 6 | .270 | 3.375 | 94.515 | | | |
| 7 | .246 | 3.077 | 97.592 | | | |
| 8 | .193 | 2.408 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

*Interpretation:* Table 3 represents the variances of the principal components that are referred to as eigenvalues.

According to the result, only two components have an eigenvalue larger than one and component 1 explains 56.59 per cent of the total variance, while component 2 explains only 13.78 per cent.

● **Component Matrix**

**Table 4:  Component Matrix**

|  | Component | |
|---|---|---|
|  | 1 | 2 |
| Challenge-1 | .645 | −.066 |
| Challenge-2 | .688 | .631 |
| Challenge-3 | .683 | .599 |
| Challenge-4 | .833 | −.065 |
| Challenge-5 | .841 | −.272 |
| Challenge-6 | .840 | −.296 |
| Challenge-7 | .736 | −.415 |
| Challenge-8 | .724 | .051 |

Extraction Method: Principal Component Analysis.

2 components extracted.

*Interpretation:* Table 4 contains component loadings, which are the correlations between the variable and the principal components. The correlation between each input variable and the factors is larger when the values are closer to one, regardless of sign – positive or negative.

Components 1 and 2 are the extracted principal components with eigenvalues greater than one, meaning that these two components capture the most information and are sufficient to describe the data.

## The Tools that Facilitate e-Leadership in Organisations

In this study, the facilitators of e-leadership in organisations have been identified. The following are some of the tools which are used for facilitating e-leadership in the organisations:

Facilitator-1 (F1): Social Media and Collaborative Technologies

Facilitator-2 (F2): Mobile Technologies

Facilitator-3 (F3): Data and Analytics

Facilitator-4 (F1): Cloud Computing Services

Facilitator-5 (F5): Security Services

*Principal Component Analysis (PCA)* – The purpose of the principal component analysis (PCA) was to find the component(s) that best explained the total variance of the subject under investigation, namely the challenges of e-leadership in the organisation.

## ● KMO and Bartlett's Test

### Table 5: KMO and Bartlett's Test

| | |
|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | 0.808 |
| Bartlett's Test of Sphericity Approx. Chi-Square | 608.916 |
| df | 10 |
| Sig. | 0.000 |

*Interpretation:* Table 5 shows two tests that indicate if the data is suitable for structure detection.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy achieved is 0.808, which is high, indicating that a factor analysis (principal component analysis) with the data provided could be beneficial. Also, the result of Bartlett's sphericity test is significant (less than 0.05), implying that a factor analysis would be relevant for the data.

## ● Proportion of Variance Explained Criterion

### Table 6: Communalities

| | Initial | Extraction |
|---|---|---|
| F1 | 1.000 | 0.636 |
| F2 | 1.000 | 0 .673 |
| F3 | 1.000 | 0 .714 |
| F4 | 1.000 | 0.745 |
| F5 | 1.000 | 0.690 |

Extraction Method: Principal Component Analysis.

*Interpretation:* Table 6 shows the proportion of each variable's variance that can be explained by the components. All of the variables have a high value, indicating that they are well represented in the common factor space.

## ● Eigenvalue Criterion

### Table 7: Total Variance Explained

| Comp-onent | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.459 | 69.173 | 69.173 | 3.459 | 69.173 | 69.173 |
| 2 | .714 | 14.287 | 83.460 | | | |
| 3 | .356 | 7.111 | 90.571 | | | |
| 4 | .278 | 5.556 | 96.127 | | | |
| 5 | .194 | 3.873 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

*Interpretation:* Table 7 represents the variances of the principal components that are referred to as eigenvalues. According to the result, only one principal component has an eigenvalue larger than one, and 69.17 per cent of the total variance is explained by this component.

## ● Component Matrix

### Table 8: Component Matrix

| | Component |
|---|---|
| | 1 |
| F1 | 0.798 |
| F2 | 0.821 |
| F3 | 0.845 |
| F4 | 0.863 |
| F5 | 0.831 |

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

*Interpretation:* Table 8 contains component loadings, which are the correlations between the variable and the component. The correlation between each input variable and the factors is larger when the values are closer to one, regardless of sign – positive or negative.

Component 1 is extracted as a principal component with eigenvalue greater than one, meaning that this component captures the most information and is sufficient to describe the data.

## Significant Difference in the Opinion on Effective e-Leadership

One of the objectives of the study is to see if there were any differences in the respondents' perceptions on the factors influencing the quality of e-leadership in the organisations based on demographic criteria such as gender, age, work experience, industry, and job role. ANOVA was conducted to investigate the abovementioned objective.

*Hypothesis 1:* There is a significant difference in the opinion on effective e-leadership with respect to age.

**Table 9:  ANOVA Analysis (With Respect to Age)**

| Effective e-Leadership | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3.250 | 3 | 1.083 | 1.820 | 0.145 |
| Within Groups | 118.457 | 199 | 0.595 | | |
| Total | 121.707 | 202 | | | |

Source: Primary Data.

*Interpretation:* Table 9 shows that there is no substantial difference in the opinion on e-leadership among employees from different age groups, as **sig > 0.05**. This indicates that people from various age groups share the same views on e-leadership in organisations. Hence, the alternate hypothesis is rejected.

*Hypothesis 2:* There is a significant difference in the opinion on effective e-leadership with respect to gender.

**Table 10:  ANOVA Analysis (With Respect to Gender)**

| Effective e-Leadership | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1.557 | 2 | 0.778 | 1.295 | 0.276 |
| Within Groups | 120.151 | 200 | 0.601 | | |
| Total | 121.707 | 202 | | | |

*Interpretation:* Table 10 shows that there is no substantial difference in the opinion on e-leadership among employees of different gender, as **sig > 0.05**. This indicates that people from different genders share the same views on e-leadership in organisations. Hence, the alternate hypothesis is rejected.

*Hypothesis 3:* There is a significant difference in the opinion on effective e-leadership with respect to work experience.

**Table 11:  ANOVA Analysis (With Respect to Work Experience)**

| Effective e-Leadership | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3.889 | 2 | 1.944 | 3.301 | 0.039 |
| Within Groups | 117.818 | 200 | 0.589 | | |
| Total | 121.707 | 202 | | | |

Source: Primary Data

*Interpretation:* Table 11 reveals that the employees' opinion on e-leadership in organisations varied significantly with respect to their work experience, as **sig < 0.05**. Hence, the null hypothesis is rejected.

*Hypothesis 4:* There is a significant difference in the opinion on effective e-leadership with respect to job role.

**Table 12:  ANOVA Analysis (With Respect to Job Role)**

| Effective e-Leadership | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 7.613 | 1 | 7.613 | 13.412 | 0.000 |
| Within Groups | 114.094 | 201 | 0.568 | | |
| Total | 121.707 | 202 | | | |

Source: Primary Data.

*Interpretation:* Table 12 reveals that the employees' opinion on effective e-leadership in organisations varied significantly with respect to their functional role, as **sig < 0.05**. Hence, the null hypothesis is rejected.

*Hypothesis 5:* There is a significant difference in the opinion on effective e-leadership with respect to industry.

**Table 13:  ANOVA Analysis (With Respect to Industry)**

| Effective e-Leadership | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 14.480 | 3 | 4.827 | 8.958 | 0.000 |
| Within Groups | 107.227 | 199 | 0.539 | | |
| Total | 121.707 | 202 | | | |

Source: Primary Data

*Interpretation:* Table 13 reveals that the opinion on e-leadership among the employees from different industries varied significantly with respect to the industry, as **sig < 0.05**. Hence, the null hypothesis is rejected.

## Model Proposal
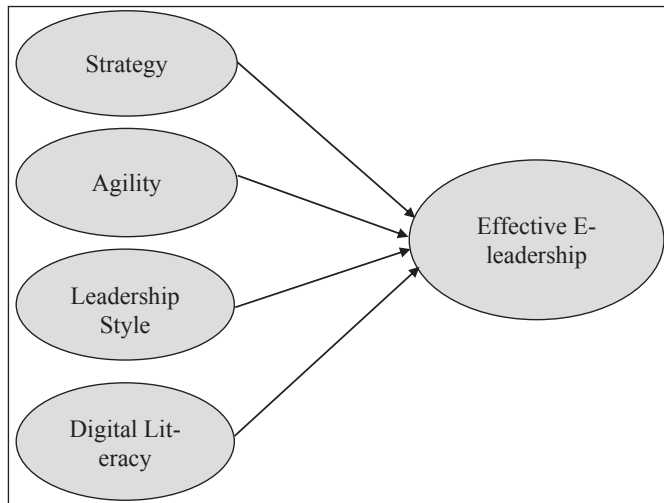


**Fig. 2:   Conceptual Model for the Study**

For this study, the conceptual model (Fig. 2) is proposed. The model incorporates strategy, agility, leadership style, and digital literacy as independent variables, and effective e-leadership as a dependent variable. The model tests the direct influence of the factors strategy, agility, leadership style, and digital literacy on effective e-leadership in the organisations. The conceptual model (Fig. 2) hypothesises that the four factors, namely strategy, agility, leadership style, and digital literacy, directly and positively influence the quality of e-leadership in the organisations, implying that these four factors improve the quality of e-leadership.

### Latent Variables

The latent variables in this study are effective e-leadership, strategy, agility, leadership style, and digital literacy. In the suggested model, effective e-leadership is a dependent variable impacted by the independent variables strategy, agility, leadership style, and digital literacy.

- *Strategy:* In this study, strategy has been evaluated using certain indicators, such as 'organisations' digital transformation strategy is aligned with business growth objectives', 'financial incentives and recognition mechanisms are aligned with the goals of digital transformation', 'employees work in highly coordinated virtual-teams', 'organisation is investing in necessary digital skills and technologies', and so on.

- *Agility:* Refers to the willingness of the organisation to expand their efforts in adopting changes. In this study, agility has been evaluated using certain indicators, such as 'organisation quickly adopts business innovation and transformation', 'organisation tolerates and learns from failure in their digital initiatives', 'organisation is open to exploring and adopting new technologies and innovations', and so on.

- *Leadership Style:* In this study, leadership style has been evaluated using certain indicators, such as 'organisations' leadership takes risks to create technological opportunity and progress', 'leaders act as role models by facilitating the transformation to a digital-centric organisation', 'employees are quickly appreciated for good work done using ICT techniques', 'leaders actively devise creative solutions for organisational growth and success', and so on.

- *Digital Literacy:* In this study, digital literacy has been evaluated using certain indicators, such as 'training concerning the use of technology is provided in organisation', 'organisation receives support from IT consultancy and service providers', 'employees have high technological interest', and so on.

- *Effective e-Leadership:* Refers to the improved quality of e-leadership in the organisation. In this study, effective e-leadership has been evaluated using some indicators, such as 'the use of advanced technology has improved the leadership quality', 'the use of both traditional and innovative skills has improved the quality of e-leadership', 'organisations' leadership has sufficient skills and experience to lead our organisation's digital strategy', 'organisation is digitally enabled and has a digital leader', and so on.

## Measurement Model Assessment

*Objective:* To examine the impact of strategy, agility, leadership style, and digital literacy on the quality of e-leadership in organisations.

*Independent Variables (Explanatory Variables):* Strategy, Agility, Leadership Style, and Digital Literacy

*Dependent Variable (Explained Variable):* Effective e-leadership

## Hypotheses

$H_1$: There is a positive significant impact of strategy on the quality of e-leadership.

$H_2$: There is a positive significant impact of agility on the quality of e-leadership.

$H_3$: There is a positive significant impact of leadership style on the quality of e-leadership.

## Confirmatory Factor Analysis (CFA)

$H_4$: There is a positive significant impact of digital literacy on the quality of e-leadership.

The structural equation modelling (SEM) method was used to assess the relationships between variables. The study was carried out using the statistical package IBM SPSS Amos.

## Assessment of Latent Variables

*Inference:* All the latent variables (constructs) were found to be adequately fit.
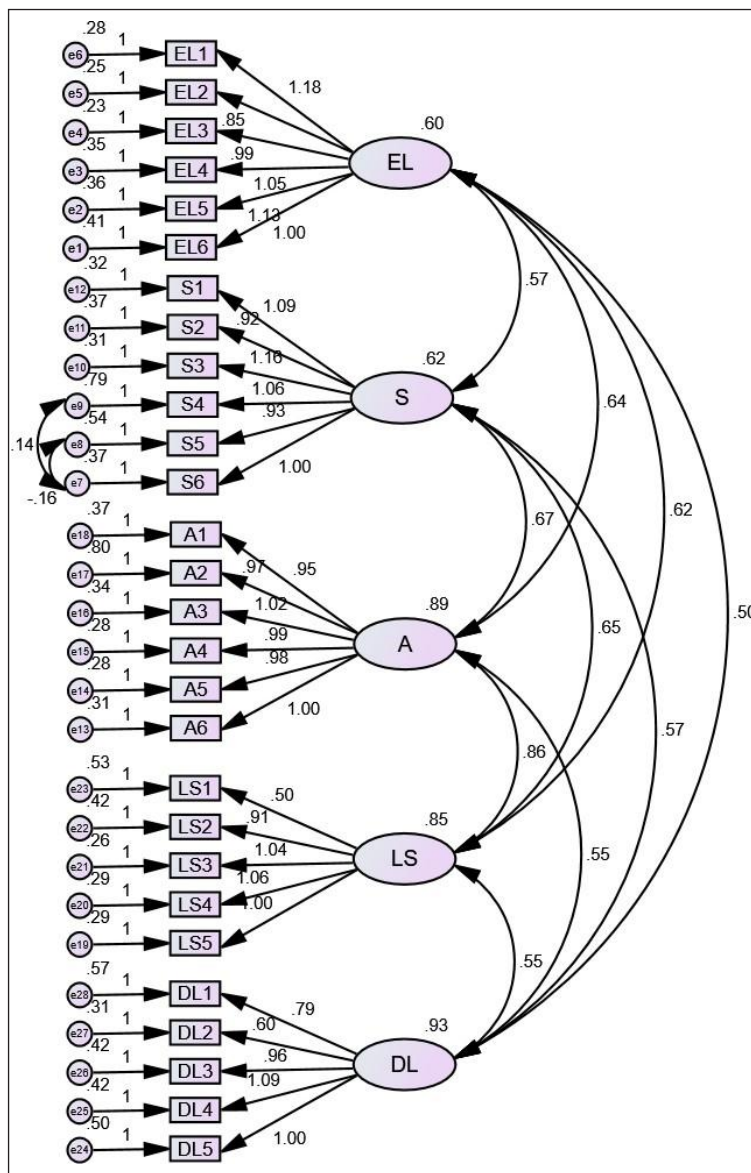


**Fig. 3: Measurement Model (CFA)**

**Table 14:** **Fitness of the Measurement Model**

| Fit Measure | CMIN/DF | RMSEA | CFI | NFI | GFI |
|---|---|---|---|---|---|
| Recommended | < 5 | < 0.1 | > 0.9 | > 0.9 | > 0.9 |
| Achieved | 3.320 | 0.107 | 0.856 | 0.807 | 0.690 |

Note: CMIN/df = minimum discrepancy function chi-square/degree of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; NFI = normed fit index; GFI = goodness-of-fit index.

*Inference:* The fit measures are fairly close to the recommended values. Furthermore, the fit measure,

CMIN/DF, has a good value and is below the recommended value. The model is statistically suitable for further analysis and interpretation.

## Reliability Assessment

The factor loadings of items under each construct are investigated to measure their reliability. Item reliability is deemed good if factor loading is greater than 0.7. Cronbach's α and composite reliability are used to assess construct reliability.

**Table 15:** **Indicator and Construct Reliability**

| Dimension | Item Code | Factor Loadings | Indicator Reliability | Construct Reliability | |
|---|---|---|---|---|---|
| | | | | Cronbach's α | CR |
| Effective e-leadership | EL1 | 0.87 | 0.7569 | 0.905 | 0.92509 |
| | EL2 | 0.80 | 0.64 | | |
| | EL3 | 0.84 | 0.7056 | | |
| | EL4 | 0.81 | 0.6561 | | |
| | EL5 | 0.83 | 0.6889 | | |
| | EL6 | 0.77 | 0.5929 | | |
| Strategy | S1 | 0.83 | 0.6889 | 0.872 | 0.89919 |
| | S2 | 0.76 | 0.5776 | | |
| | S3 | 0.86 | 0.7396 | | |
| | S4 | 0.71 | 0.5041 | | |
| | S5 | 0.68 | 0.4624 | | |
| | S6 | 0.79 | 0.6241 | | |
| Agility | A1 | 0.83 | 0.6889 | 0.897 | 0.93309 |
| | A2 | 0.72 | 0.5184 | | |
| | A3 | 0.86 | 0.7396 | | |
| | A5 | 0.87 | 0.7569 | | |
| | A6 | 0.86 | 0.7396 | | |
| Leadership Style | LS1 | 0.53 | 0.2809 | 0.818 | 0.89575 |
| | LS2 | 0.79 | 0.6241 | | |
| | LS3 | 0.88 | 0.7744 | | |
| | LS4 | 0.88 | 0.7744 | | |
| | LS5 | 0.86 | 0.7396 | | |
| Digital Literacy | DL1 | 0.71 | 0.5041 | 0.868 | 0.88674 |
| | DL2 | 0.72 | 0.5184 | | |
| | DL3 | 0.82 | 0.6724 | | |
| | DL4 | 0.85 | 0.7225 | | |
| | DL5 | 0.80 | 0.64 | | |

Note: CR = Composite Reliability.

*Interpretation:* Table 15 shows factor loadings of items, the squared loadings (for indicator reliability), Cronbach's α, and composite reliability (for construct reliability). Here, all items except two have factor loadings greater than 0.7. In this study, construct reliability (Cronbach's α and composite reliability) have values greater than 0.7, which is the recommended value for strong internal consistency and reliability.

## Validity Assessment

It comprises nomological validity, content validity, and convergent and discriminant validity.

### ● Nomological Validity

**Table 16: Mean, Standard Deviation, and Correlation Coefficients of Latent Variables**

| Dimensions | Mean | Standard Deviation | S | A | LS | DL |
|---|---|---|---|---|---|---|
| Effective e-Leadership (EL) | 3.9663 | 0.83553 | 0.57 | 0.64 | 0.62 | 0.50 |
| Strategy (S) | 3.9516 | 0.81648 | | 0.67 | 0.65 | 0.57 |
| Agility (A) | 3.7848 | 0.96557 | | | 0.86 | 0.55 |
| Leadership Style (LS) | 3.9498 | 0.87746 | | | | 0.55 |
| Digital Literacy (DL) | 4.0857 | 0.90911 | | | | |

Values shown in Table 16 indicate that the variables have sufficient correlation (> 0.5). Hence, the variables have sufficient nomological validity.

### ● Content Validity

Experts have approved 39 questions relating to latent variables that were used in this study. Hence, the variables have sufficient content validity.

### ● Convergent and Discriminant Validity

The average variance extracted for each construct (AVE) should be more than 0.5 to ensure convergent validity. Discriminant validity of the construct is assessed through the square root of AVE.

**Table 17: Convergent and Discriminant Validity (Fornell-Larcker Criterion)**

| Dimensions | AVE | EL | S | A | LS | DL |
|---|---|---|---|---|---|---|
| Effective e-Leadership (EL) | 0.6734 | 0.821 | | | | |
| Strategy (S) | 0.59945 | 0.57 | 0.774 | | | |
| Agility (A) | 0.7005 | 0.64 | 0.67 | 0.837 | | |
| Leadership Style (LS) | 0.63868 | 0.62 | 0.65 | 0.86 | 0.799 | |
| Digital Literacy (DL) | 0.61148 | 0.50 | 0.57 | 0.55 | 0.55 | 0.782 |

Note: Diagonal values are the square root of AVEs. AVE = average variance extracted for each construct.

*Interpretation:* With reference to Table 17, AVEs of all constructs are above 0.5. Discriminant validity of the construct is assessed through the square root of AVE. A greater square root of AVE of a construct than the inter-correlation of that construct ensures sufficient discriminant validity. Hence, it can be concluded that all the constructs have sufficient convergent and discriminant validity, and the measurement model is good for further statistical analysis.

*Inference:* All the scales have sufficient validity and reliability. Hence, the measurement model is good for further statistical analysis and structural modelling.

## Assessment of Structural Model

**Table 18: Fitness of the Structural Model**

| Fit Measure | CMIN/DF | RMSEA | CFI | NFI | GFI |
|---|---|---|---|---|---|
| Recommended | < 5 | < 0.1 | > 0.9 | > 0.9 | > 0.9 |
| Achieved | 5.236 | 0.145 | 0.732 | 0.691 | 0.651 |

Note: CMIN/df = minimum discrepancy function chi-square/degree of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; NFI = normed fit index; GFI = goodness-of-fit index.

*Inference:* Table 18 indicates that the fit measures are very close to the recommended values. Therefore, the model is sufficiently fit.

## Path Analysis

The regression estimates with CR and p values are given in Table 19.

**Table 19:   Result of the Hypotheses Test**

| Path | B | β | CR | p | Result |
|------|-----|------|--------|-------|--------|
| Effective e-Leadership Strategy | 0.61 | 0.788 | 10.855 | *** | Significant impact |
| Effective e-Leadership Agility | 0.22 | 0.308 | 5.904 | *** | Significant impact |
| Effective e-Leadership Leadership Style | 0.13 | 0.187 | 3.745 | *** | Significant impact |
| Effective e-Leadership Digital Literacy | 0.08 | 0.113 | 2.220 | 0.026 | Significant impact |

B = unstandardised estimate; β = standardised estimate; ***p < 0.001

*Inference:* The dimension strategy shows a significant direct impact (β = 0.788, p < 0.05) on the quality of e-leadership. Moreover, it has the highest impact on the dependent variable, effective e-leadership. The dimension agility shows a significant direct impact (β = 0.308, p < 0.05) on the quality of e-leadership. The dimension leadership style shows a significant direct impact (β = 0.187, p < 0.05) on the quality of e-leadership. The dimension digital literacy shows the least significant direct impact (β = 0.113, p < 0.05) on the quality of e-leadership. The direct relationships between variables are tested using the maximum likelihood method. All the four direct relations are found to be positively significant, with CR > 1.96 and p < 0.05.Thus, it can be concluded that all the explanatory variables significantly influence the quality of e-leadership.

## R Square

From Fig. 4, **R² = 0.76**.

In the model proposed, 76 per cent variance in the dependent variable can be explained by the independent variables.
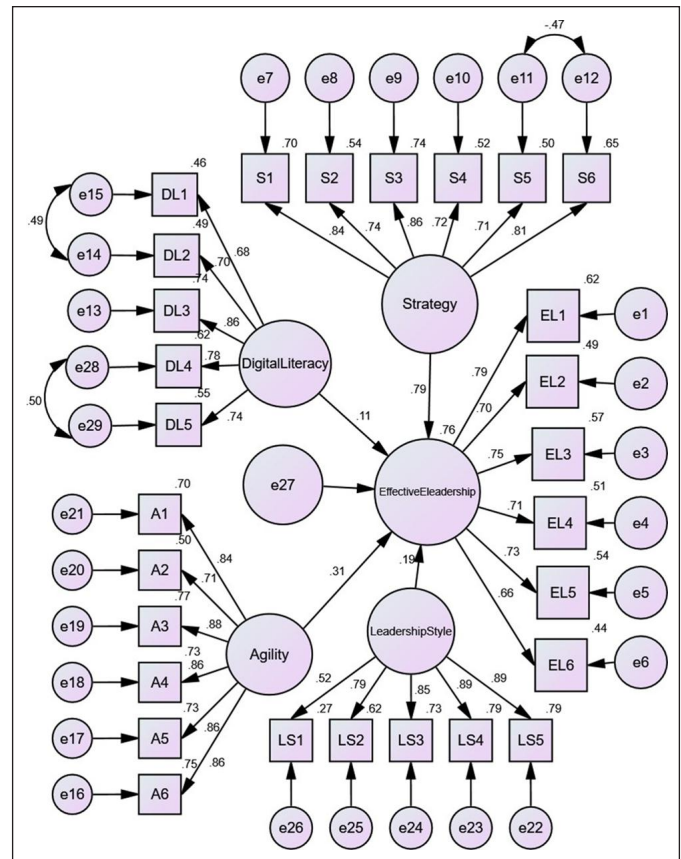


**Fig. 4:   Structural Model for the Hypotheses Test (Standardized Value Graph)**

## Findings and Discussions

The findings of the present study revealed that there is no substantial difference in the opinion on effective e-leadership among employees from different age groups and gender, meaning that they have similar perspectives on effective e-leadership in organisations. On the other hand, the respondents' perspectives on effective e-leadership in organisations differed significantly depending on their work experience, job type, and industry. It may be argued that many IT personnel feel that factors such as leadership style, agility, strategy, and digital literacy influence the quality of e-leadership in organisations, although individuals from other industries may not. Similarly, it can be suggested that a substantial proportion of the executives believe that factors such as leadership style, agility, strategy, and digital literacy influence the

quality of e-leadership in firms. According to the study, a significant number of employees with 0 to 10 years of work experience agree that the four variables influence the quality of e-leadership in organisations. The principal component analysis (PCA) indicated that a majority of the data relevant to the obstacles in e-leadership was captured by two principal components. Similarly, only one variable was identified as the principal component for facilitating e-leadership in the organisations. The assessment of the structural model resulted in the $R^2$ value of 0.76, indicating that 76 per cent variance in effective e-leadership (dependent variable) can be explained by the four dimensions (independent variables) mentioned, which are strategy, agility, leadership style, and digital literacy. As a result, this study proved that strategy, agility, leadership style, and digital literacy all have a significant impact on the quality of e-leadership in the organisations. The findings of this study suggest that the organisations must take into consideration the four dimensions, to strengthen the effectiveness of e-leadership in the functioning of the firms.

## Conclusion

Leadership is a critical management role that aids in maximising efficiency and achieving organisational objectives. In reality, efficient management necessitates the presence of a strong leadership. With the pace of innovation, we now require practical abilities in the use of technology to access, manage, alter, and produce information in an ethical and sustainable manner. Because of the frequent new apps, inventions, and upgrades springing up one after the other, every company is on a never-ending learning curve; however, they will be grateful in the future if they can keep their digital life in order. As a result, a typical leadership style will not be sufficient to endure the current circumstances. This is where e-leadership thrives, fitting into organisations and offering a slew of benefits. To truly comprehend the impact of the four dimensions (factors) – strategy, agility, leadership style, and digital literacy – on e-leadership, a model for improving the quality of e-leadership in organisations is proposed in this study. It is demonstrated from this research that the four dimensions can significantly improve the effectiveness of e-leadership in the organisations. It may be established that the proposed model can be utilised by any company, regardless of the industry, size, or structure to improve the effectiveness of e-leadership.

## Conflict of Interest

The authors hereby declare that there is no conflict of interest regarding any aspect of this study.

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