

Individual Readiness for Change and Affective Commitment to Change: The Mediation Effect of Technology Readiness on Public Sector

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ABSTRACT

Today, changes in the era industry 4.0 can not be separated from the rapid development and application of information systems and sophisticated technology. This study investigates Technology Readiness's role as a mediator in the relationship between Individual Readiness for Change and Affective Commitment to Change. Data were collected from 178 respondents working in the public sector in Indonesia. OLS calculation results using Macro Hayes on PROCESS Procedure for IBM SPSS Version 3.3 shows that Technology Readiness mediates the relationship between Individual Readiness for Change and Affective Commitment to Change. Hypothesis testing used the Hayes approach and the causal path approach from Baron and Kenny as a comparison. This study successfully proves the mediation relationship of Technology Readiness to the relationship between IRFC and AC2C, as partial mediators. The results are expected to provide information for HR management in managing employee commitment as the leading performer in organizational change related to IT implementation.

Keywords: *organizational change, Technology readiness, Commitment to change, Readiness for change*

1. INTRODUCTION

The industrial revolution has changed the way we work manually into automatic or digital processing and innovation. The term Industry 4.0 refers to a new paradigm that transforms computer-controlled facilities into an intelligent new generation production ecosystem, so that information is processed, collected, and transferred automatically [1]. McKinsey defines industry 4.0 as digitalization, with sensors embedded in almost all components of products and equipment, Cyber-Physical Systems (CPS) in each section, and analysis of all relevant data. In other words, industry 4.0 refers to improvements that can be achieved through the use of technology and analysis across operations [2].

The increasing application of innovation, especially technological innovation in services, is not without challenges, and some of the challenges come from the innovation acceptance and technology readiness [3]. This technology readiness is closely related to changes in the IT domain that are carried by organizations for competing in the industry 4.0. The industrial revolution 4.0 affected not only the private sector but also public sector organizations or government institutions.

Industry 4.0 is closely related to Cyber-Physical Systems. However, human factors cannot be ruled out. In contrast, the study of Krugh and Meyer [4] concluded that human factors continue to play an important role that is flexible in the future. Meanwhile, Mangundjaya [5] states 35.5% Affective Commitment to Change influenced by Individual

Readiness for Change, 32% by Attitude Toward Change (ATC), and 32% by other factors. With a gap of 32%, there is still a possibility of other variables that explain or influence a Commitment to Change. This study wants to find out how the role of employee Technology Readiness in explaining the relationship between Individual Readiness for Change and Affective Commitment to Change is related to the rapid organizational change in the industry 4.0, which is mostly inseparable from the use of the latest information systems and technology. The results are expected to assist the HR management to observe the right policies related to increasing employee commitment to the changes carried out, which in turn can support the organization more agile.

2. LITERATURE REVIEW

2.1. Individual Readiness for Change

Individual Readiness for Change (IRFC) is the readiness in the beliefs, attitudes, and intentions of organizational members that are comprehensively and simultaneously influenced by the content, process, context, and characteristics of individuals involved in the change process [6], [7]. Through the dynamics of social information processing, an organization's collective readiness is continuously influenced by the readiness of the individuals who compose it [8].

Holt, Armenakis, Field, and Harris [7] developed the latest scale from the IRFC scale which measures Individual Readiness for Change based on the following 5 dimensions, namely; (a) Discrepancy, is the belief that the organization needs change; (b) Efficacy, is the belief that the organization can implement change; (c) Organizational valence, is the belief that change is beneficial to the organization; (d) Management support, is the belief that the leadership ranks are committed to change; and (e) Personal valence, is the belief that change also benefits individuals as members of the organization.

2.2. Technology Readiness

Technology Readiness (TR) illustrates the tendency of individuals to use new technology for different purposes [9]. This technological readiness is closely related to changes in the IT field that are carried by organizations in competing in the industry 4.0. The combination of positive and negative feelings about technology underlies the domain of technological readiness [10]. Readiness is not a new concept. Some previous studies have investigated the readiness of individuals to adopt technology and information systems [11]. Michaelis, Steigmaier, and Sonntag [12] found that individuals with a high level of readiness to accept significant change tend to be more involved in innovative work behavior.

2.3. Affective Commitment to Change

Commitment to Change is the power of mindset to achieve a target of change with conscious and voluntary action [13], [14]. Commitment to change consists of three dimensions, i.e., affective commitment to change (AC2C) which is defined as the desire to provide support for change based on belief in the benefits of change; continuity commitment to change, the sense of the costs that may arise if the change fails to be implemented; and normative commitment to change, feelings of obligation for someone to support change. Meanwhile, the studies of Michaelis, Steigmaier, and Sonntag [15] and Mangundjaya [5] showed that affective commitment to change is a psychological mechanism that every employee needs to succeed in the organizational change. Furthermore, Heard confirmed that affective commitment, affective identification, affective loyalty, and affective involvement positively correlated with organizational readiness for change [16]. Moreover, Herscovith and Meyer also stated that readiness for change is predicted to be related to job satisfaction, affective commitment, and turnover intention when these factors are measured well after the change is applied. This research focuses on the dimensions of affective commitment to change of employees in government agencies that support changes in the IT domain [13].

2.4. Hypothesis

Mangundjaya states that IRFC is positively correlated to AC2C and constitutes a 64.5% gap that can explain AC2C from other factors [5]. Michaelis, Steigmaier, and Sonntag found that individuals with a degree of readiness to accept more considerable changes require more involvement in innovative work [12]. The innovation service concept also explains the positive relationship between commitment to change with the behavior of implementing innovation [12]. Michaelis, Steigmaier, and Sonntag make it possible to study the gap between IRFC and AC2C through other factors, for example, through the readiness of technology, which is also associated with the readiness of innovation as a mediator between these relationships [12]. The relationship between technology readiness and commitment to change is also stated in [17] that explains innovation implementation behavior is an individual's consistent and committed use of specific innovations. Identifying the commitment, involvement, and readiness of individuals in dealing with change provides additional knowledge and can help organizations in creating strategies that can lead to a successful implementation of change [18].

This study wants to test the mediating role of Technology Readiness on the relationship between Individual Readiness for Change and Affective Commitment to Change. The hypothesis is developed based on the context of Social Exchange Theory, especially employee commitment as an exchanged resource in social exchange relationships in the work setting model. The hypothesis to be tested is as follows,

Hypothesis: Technology Readiness mediates the relationship between Individual Readiness for Change and Affective Commitment to Change.

3. METHOD

3.1. Participant and Procedures

Participants in this study are employees from government agencies that have vertical offices and located in various regions in Indonesia, i.e., Headquarters, Sumatra, DKI Jakarta, West Java, Central Java, East Java, Kalimantan, Sulawesi, Bali/ NTT/ NTB, Maluku/ Ambon, and Papua. Based on power analysis calculations using the G-Power 3.0 application for linear multiple regression research, with F-test calculations, using two predictor variables, and $\alpha=0.05$, the minimum number of samples obtained is 74 participants. The sampling technique used in this research is nonprobability sampling using convenience sampling, which sampling is done by the availability and convenience of getting it. The criterion for the respondent is an employee who works in government agencies that implement change, especially in the IT domain in the past five years. The survey was conducted online and offline by distributing questionnaire booklets. From a total of 211

respondents who participated in this study, only 178 respondents completed the survey (response rate = 84,36%). From 178 respondents, 61% were male and 39% female, aged between 19 - 56 years ($\mu = 35.56$, $SD = 0.66$) and had worked for 1-36 years ($\mu = 13.84$, $SD = 0.20$). 1,7% of respondents are from high school/ vocational education, 70% Diploma I/II/II, 16% undergraduate degree, and 12% postgraduate degree. The average respondent served as staff ($\mu = 1.15$, $SD = 0.03$), and the majority of respondents, 49%, come from vertical offices in the DKI Jakarta region.

3.2. Measurement

3.2.1. Affective Commitment to Change (AC2C)

Herscovitch and Meyer develop the original scale used to measure commitment to change, consisting of 18 items, which are divided into three dimensions, i.e., affective (6 items), continuation (6 items), and normative (6 items) [19]. Instead, this study only uses six items aimed at measuring Affective Commitment to Change that has been modified by Mangundjaya [5]. This scale uses a Likert scale of 1-5 (1= Strongly Disagree, 5= Strongly Agree). Cronbach's Alpha coefficient of this scale is 0.81.

3.2.2. Technology Readiness (TR)

The scale used to measure technological readiness is a measuring instrument developed by Parasuraman, namely the Technology Readiness Index (TRI) 1.0. TRI 1.0 consists of 36 items and divided into four dimensions, i.e., optimism (10 items), innovation (7 items), discomfort (10 items), and insecurity (6 items) [10]. This scale uses a Likert scale of 1-5 (1= Strongly Disagree, 5= Strongly Agree). Cronbach's Alpha coefficient of this scale is 0.86.

3.2.3. Individual Readiness for Change (IRFC)

The scale used to measure individual readiness for change is a measuring instrument developed by Holt Armenakis, Field, and Harris, which consisted of 25 items representing 4 dimensions, namely appropriateness (10 items), management support (6 items), change efficacy (6 items), and personally beneficial (3 items) [7]. This measurement scale has been adapted into Indonesian using the Likert scale 1-5 (1= Strongly Disagree, 5= Strongly Agree). The Cronbach's Alpha coefficient of this scale is 0.91.

3.3. Data Analysis

One of the characteristics of good quality measuring instruments is that they are reliable, which is capable of producing accurate scores with small measurement errors [20]. For practical reasons, this study uses a single trial administration approach by testing internal consistency through Cronbach Alpha on this measurement tool. Coaley recommends that the number of participants for the internal reliability test must be above 100 people so that the reliability coefficient is stable [21]. This study included 178 respondents, so it is expected that the reliability coefficient is stable. This research uses the value of 0.7 as a cut-off limit to determine the reliability of the instrument according to the suggestion of some literature which states that the value is quite sufficient [22], [23]. The instrument validity was tested based on item validity by correlating item scores with total scores through Pearson's Correlation Product Moment technique. Hypothesis testing will be carried out by following a simple mediation of Hayes's, which is any causal system in which at least one causal antecedent X variable is proposed as influencing an outcome Y through a single intervening variable M [24]. This study will also consider step by step testing mediation with the causal path approach proposed by Baron and Kenny, solely as a comparison [25].

4. RESULT

4.1. Validity and Reliability

Each statement representing each dimension of the three variables is proven to be valid and reliable. The reliability of the measuring instrument is based on the Cronbach Alpha value, which surpasses the cut-off limit 0.7. As for the validity of the measuring instrument using the Pearson Correlation value compared with the value of r -table = 0.148 ($n= 175$, $\alpha= 0.05$) [26]. Pearson correlation values were obtained and passed $r= 0.148$, and overall items are significant at $p < 0.001$. It can be stated that the measuring instrument used in this study fulfills the validity and reliability requirements.

4.2. Normality Test

The normality test uses the Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk (S-W) test. The data distribution is proven to be significantly different from a normal distribution (non-normal). From the three variables tested, obtained values of K-S and S-W were significant at $p < 0.05$, this indicates that the data distribution was not normal. The data normality test also considers the visual appearance of data through histograms, P-P, and Q-Q plots, as suggested by Ghasemi and Zahediasl [27]. Although the results of the data normality test prove that

the data are less normally distributed, but the central limit theorem among them states that in large samples ($n > 30$), the sampling distribution tends to be normal, regardless of the shape of the data [28]. This study also considers that the concept of mediation carried out by Hayes [24] does not require data to be distributed normal, so that in this study, the data used are not conditioned for normally distributed and outliers do not have to be excluded.

3.3. Hypothesis Testing

This research uses the 4th model in the Macro Process Hayes [24], which is a simple mediation with one mediator, while the bootstrapping used when running a macro process is 10,000 times to increase the model's power. From the results of statistical calculations using the macro process in simple mediation analysis using ordinary least squares and with a causal path approach, gradually the following results are obtained,

3.3.1. Step 1: Path a

At this initial stage, it is assumed in the model that the independent variable (IRFC) causes a mediator variable (TRI), so both should be correlated. IRFC proved significantly predicts TRI, $F(1,176) = 158.54$, $p < 0.001$, $R^2 = 0.47$, $b = 0.82$, $t(176) = 12.59$, $p < 0.001$. with this significant result, it means that the first mediation pre-conditions are fulfilled, and can be continued for testing at a later stage.

3.3.2. Step 2: Path c

In the second stage, the Baron and Kenny method require a significant relationship between the independent and dependent variables. The initial relationship between IRFC and AC2C can be seen from the total effect in this simple mediation model, and from the calculation results obtained path c, IRFC predicts positively and significantly AC2C, $F(1,176) = 110$, $p < 0.001$, $R^2 = 0.38$, $b = 0.15$, $t(176) = 10.49$, $p < 0.001$.

3.3.3. Step 3: Path b, ab and c'

With the fulfillment of the significance criteria in step 2, in this last step, IRFC indirect effects will be calculated toward AC2C through the TRI mediator. First, determine the relationship between TRI and AC2C by controlling IRFC (path b). From the calculation results, Technology Readiness is proven to be significantly and positively related to Affective Commitment to Change, $b = 0.04$, $t(175) = 2.21$, $p < 0.01$, when TRI rises (positive) then AC2C will also increase. Second, after path b is obtained, the next step can calculate the indirect effect (path ab), i.e., IRFC and TRI together predicting AC2C. It is proven that

IRFC and TRI altogether positively and significantly predict AC2C, $F(2,175) = 58.66$, $p < 0.001$, $R^2 = 0.40$.

Of the three steps based on the causal path approach, the hypothesis proposed in this study is proven, but only partially not fully mediated. Meanwhile, according to Hayes, testing the hypothesis about this mediation model is enough to look at the indirect effect of IRFC on AC2C through TRI mediators without concern to other steps such as the causal path approach by the Baron and Kenny methods, and consider the results of the Upper Level Confidence Interval (ULCI) and Lower Level Confidence Interval (LLCI). From the results of 10,000 times sample bootstrapping, the confidence interval of indirect effect ($ab = 0.12$) is above zero-value with LLCI = 0.0012 and ULCI = 0.0615, so it can tell that the research hypothesis is supported.

Mediation effects based on effect size are selected using Kappa-Squared (k^2) calculations. The calculation results obtained completely standardized effect of the direct effect of $k^2 = 0.4975$; partially standardized effect of the direct effect of $k^2 = 0.0450$; completely standardized effect of the indirect effect is significant at the confidence interval LLCI = 0.0004, ULCI = 0.0219, and the partially standardized effect of the indirect effect is significant at the confidence interval LLCI = 0.0048, ULCI = 0.2421.

From the four gradual path analyzes of Baron and Kenny [25] and Hayes [24], it can be concluded that TRI is proven to mediate the relationship between IRFC and AC2C. The relationship between the three variables can be seen in Fig. 1.

4. DISCUSSION

All respondents stated that they experienced organizational changes in their workplace. The organizational changes felt by the respondents mainly associated with the development and application of Information Technology, especially the use of new service systems, as well as the digitization of services to stakeholders. These results are in line with this research, which wants to see the impact of rapid changes in information and technology in various fields, especially in government agencies that provide public services to stakeholders. One of the variables observed in this study, Technology Readiness, as a mediator, was measured in respondents who were perceived organizational changes related to IT. This study targets respondents from government agencies that implement changes in the IT domain to support the validity of the research model.

From the results of hypothesis testing based on the Baron and Kenny Method, the criteria for each step in this study are met based on the causal step approach, which means that the analysis step can only be continued if the path tested in the previous stage produces a significant relationship [29]. Previous studies have examined the relationship between IRFC and AC2C, which states that IRFC is positively and significantly related to AC2C [5]. Mangundjaya provides an opening way by fulfilling one of the mediation criteria, according to Baron and Kenny [5], [25]. However, even without prior research, even the

simple mediation model proposed in this study can still be tested.

The direct effect (path c') of IRFC toward AC2C is still proven to be significantly related even though the value is lower than the total effect (path c). According to the degree of mediation, this study proves that mediation occurs partially and not fully mediated. Therefore, in addition to using the causal step approach, this study also tested the hypothesis proposed using the Hayes approach, analyzing the role of the mediator by not compelling evidence of a relationship between X and Y as a prerequisite. By using the Hayes approach in testing hypothesis and based on previous literature, it is acceptable to assume that TRI is causally.

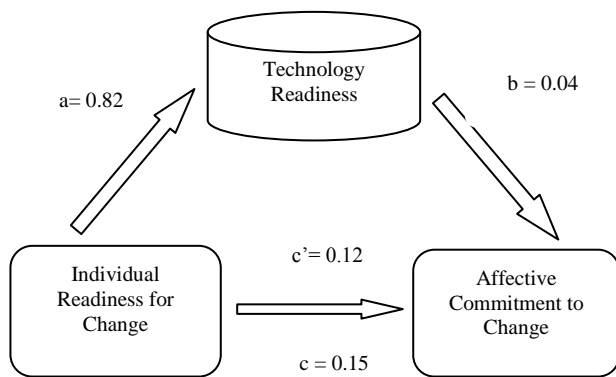


Figure 1 Result of TR simple mediation model

Located between the IRFC and AC2C relationships. This assumption means that IRFC will cause TRI and then TRI will cause AC2C, without first proving the relationship between IRFC and AC2C.

By the results of the macro process and 10,000 times bootstrapping data, it was found that the confidence interval did not include the zero value between LLCI and ULCI. The distance between the two is at the positive pole above the zero value, thus supporting the research hypothesis. In addition to the confidence interval, the strength of the direct effect can also be seen from the effect size based on Kappa-Squared (k^2) calculations [30]. It can be concluded that the mediation model has an effect size that tends to be small.

This study constructs the hypothesis model of mediation in the context of Social Exchange Theory, which states that obligations between parties are generated through a series of interactions and reciprocal relationships [31]. Further, Cropanzano and Mitchell explained the Social Exchange Relationship in work settings models, and this study followed Model 2, *support to commitment* [31]. Eisenberger, Fasolo, and Davis-LaMastro stated that employees tend to exchange commitments to get support from employers [32]. Rhoades, Eisenberger, and Armeli also investigated Affective Commitment in a longitudinal design [33]. Their study is consistent with the SET relational model, showing that perceived support results in higher employee's commitment, in turn, positively

influence performance. These findings are in line with this research, which expects that government employees who are more committed to the changes will bring better performance in providing the best service to stakeholders. Mathieu and Zajac add that commitment can predict broader workplace outcomes [34]. Model-3 on Social Exchange Relationship, namely *adding team support to organizational support*, can be seen from one of the dimensions of IRFC, namely Management Support. Perceived team support is expected to predict employee commitment, which in turn can hypothetically improve employee performance [31].

This research focuses on government agencies that provide better public services to stakeholders by bringing changes in the IT field that can be used by employees to help their performance. From these interactions, there are elements of reciprocity and attachment, both internally and externally. Among the six forms of exchange resources (love, status, information, money, goods, and services), this research suggests information and services as exchanged in a reciprocal relationship between employees and organizations. When the employee feels ready to face change, especially with the support of IT-based infrastructure, they are expected to be more committed to achieving the goals of organizational change together. This is in line with one of the rules of exchange in SET, *Join Gain*, which states that exchanges are not directly transacted from individual to individual, but all things are considered equal, and group benefits are supposed to be achieved together [31]. This also considers socio emotional outcomes that address somebody's social and esteem needs and are often symbolic and unique, such as feelings to be more valued or treated with dignity [35]. In the end, committed workers are expected to be more motivated and willing to maintain their relationship with the employer or the organizations [31].

Among the three variables, the relationship between IRFC and Technology Readiness (path a) is the largest, which means that IRFC can explain 82 percent of TR. This result is in line with Chen, Le, Yumak, and Pu [36], which shows that the readiness of technology is positively influenced by personal readiness in sharing data in social networks, and recommendations. Besides, readiness is significantly influenced by technological satisfaction and the usefulness of technology. The attitude of individuals who are not ready to face changes in an organization is one of the factors causing the failure of the implementation of technology and information systems [37]. Furthermore, in the context of technostress, individuals who are not ready to face changes in using information systems applications will continue to feel that the implementation of IT that is applied will cause problems and cause stress [37]. Sami and Pangannaiah state that technostress occurs when some people feel stressed because too much information is received and must be processed in various formats, and in the end, it can affect their work-life [38].

Sunny, Patrick, and Rob examines technology acceptance through technology readiness with the TRI scale, because according to him, at present, every change cannot be separated from the rapid development of technology [39].

The relationship between IRFC and TR is stable, and it can be seen from the measurement objects of the two measuring scale variables TRI and IRFC, which both measure perceptions of readiness at the individual level related to the changes implemented. When viewed from the construct used in measuring IRFC and TRI variables also have a similarity that is not only measuring from the positive side but also from the negative side, such as construct insecurity in TR similar to the construct of personally beneficial in IRFC, and discomfort in TRI is similar to the construct of change efficacy. Especially according to Wang, Lu, and Hayes discomfort is a vital factor that leads to low perceived benefits [40]. Technology readiness of every employee who is facing changes is quite high, and it can be seen from the average TRI score (see Table I), even though Indonesia has a collective culture (low individualist). While on the contrary, Khalil [41] found that institutional collectivism cultural values were negatively correlated with readiness in implementing changes such as e-Government. This study also found that employees are quite comfortable with changes with the use of advanced IT, as evidenced by the average employee score in the construct of discomforts, which is quite low. It can be said that every challenge that arises from the changes carried out by this organization, especially related to the use of technology, is welcomed by employees with mature individual readiness. It is just that the relationship between TR and AC2C, although significant but not substantial. It is possible that this happened because other factors are better able to explain how IRFC affects AC2C. With an indirect effect (path ab) is positive and significant, it is sufficient to prove the hypothesis in this study, although TR is still weak in mediating the relationship between IRFC and AC2C. As stated by Lee, rapid technological change can put pressure on individuals who utilize the technology, and it can even make individuals feel insecure and fearful when they cannot keep up with the technology [42]. Further technological fatigue can also attack individuals in the process of updating their skills and knowledge. Conversely, if every individual feels ready to face organizational changes related to technology, they will think positively and consciously be involved in the efforts made by organizations to make IT implementation successful [38].

Table 1 Correlations among variables

Variable	Mean	SD ^b	Age	Tenure	TR	IRFC	AC2C
Age	35.56	8.80	-				
Tenure	13.84	8.53	0.96 ^a	-			
TR	128.46	13.24	-0.21	-0.03	-		
IRFC	104.19	11.06	0.14	0.11	0.69 ^a	-	
AC2C	27.68	2.719	0.09	0.08	0.52 ^a	0.62 ^a	-

^aSignificant at $p < 0.01$. ^bSD = Standard Deviation.

With the challenges during the change process, it is possible that employee's commitment to change is not affected, even in terms of individual preparedness and technological readiness is quite high. In this study, the total IRFC effect on AC2C (path c) was shown to be positively

and significantly related and supports the findings of Mangundjaya [5]. The difference between the results of this study and the previous study [5], is the strength of the relationship between IRFC and AC2C, which is smaller. It is possible because the context and areas of change in this study refer more specifically to IT implementation. Besides, the results of this study indicate that AC2C score is seen significant differences in respondents based on the job position context only. Meanwhile, gender, age, tenure, education, and work area do not significantly affect the employee's AC2C. This research considered not able to explain the role of TR as a mediator in the relationship between IRFC and AC2C, although the hypothesis is supported. The result of this study is slightly different from Michaelis, Steigmaier, and Sonntag [15], which states that the relationship between innovative behaviors related to technology is proven to be positively related to affective commitment to change, but the model used is AC2C encouraging individuals to behave innovatively, not vice versa.

There are some limitations to this study. Samples are limited to government agencies that are promoting IT implementation in services, and convenience sampling techniques become obstacles to the use of other data processing techniques besides OLS, for example, by using SEM. This simple mediation model does not consider the possibility of configuring other variables that might affect the model. There is a significant possibility of epiphenomenon in the relationship between TRI and AC2C, when IRFC actually affects other variables that are not in the model (not known before) that affect AC2C, but because TRI is correlated with these variables, it is as if TRI is the one that has the effect IRFC against AC2C.

Replication of this research is crucial to improve the generality of findings regarding this simple mediation model, likewise, with further research that might be able to reach other fields as well as across cultures. Quasi-experimental research with a control group is also expected to help researchers see the difference in results in the comparison group. Replication of research through cross-cultural, longitudinal, and larger samples can be carried out, including other variables, which can be considered as mediators for further research.

5. CONCLUSIONS

This research successfully proves the hypothesis that technology readiness mediates the relationship of individual readiness for change to affective commitment to change, although it is only partially mediated and not quiet powerfull mediated. The results of this study are expected to provide new information and add to the wealth of literature related to the rapid development and use of IT in various fields.

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