Innovative organizational culture and artificial intelligence on organizational harmony: Basis for enhanced employee engagement framework

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Abstract

Organizational harmony is necessary for organizations, especially enterprises, to achieve innovation. This study aimed to evaluate the innovative corporate culture, artificial intelligence and organizational harmony that were the basis in developing an enhanced employee engagement framework. Each variable was described with three dimensions and 15 questions, and measured by the scores in questionnaires from the respondents in this research. 400 respondents more than 50 enterprises in different cities in Fujian Province in China were invited to participate in this research. Questionnaires were sent to respondents through Internet to study their views on the establishment of innovative organizational culture, the application of artificial intelligence technology, and the current situation of organizational harmony in their enterprises. Based from the results, the respondents agreed that there was innovative organizational culture in the enterprises they serve, and they could get triple support (team support, supervisor support and organization support) from their companies. The study also revealed moderate agreement on the adoption of AI technology as to organization members' self-confidence, innovative awareness and anticipated future in AI era. The respondents agreed that their enterprises were in harmonious organizational atmosphere in terms of reciprocal relationship, organizational citizenship behavior, and employee rapport. There was a high significant relationship among the innovative organizational culture, the adoption of AI technology, and the organizational harmony. An enhanced employee engagement framework was developed for the employees in financial service industry. The framework would encourage managers in organizations to pay attention to the impact of innovative organizational culture and adoption of AI technology on organizational harmony, and provide them an innovative path to achieve enhanced employee engagement in AI era.

Keywords: innovative organizational culture, application of artificial intelligence, organizational harmony, enhanced employee engagement framework

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1. Introduction

Organizational harmony refers to a state of dynamic balance between members of the organization. In this situation, all members of the organization would work together to achieve organizational goals. The opposite of harmony is conflict. Conflicts in the organization include conflicts between different departments, conflicts between different organizational members, conflicts between organization members and the organizational environment. Harmony could be described as "concord, accord, attunement, agreement, togetherness and peaceful contentedness" (Lomas et al., 2022). Organizational harmony is the result of coordination and compromise of organizational members in different departments or with different levels. Taking an enterprise as an example, the owner of the company's refusal to increase employees' salary may cause collective strikes by employees, and in order to restore production, the owner of the enterprise had to negotiate with the employee representatives. In the end, the two parties reached an agreement on the new salary level: entrepreneurs agreed to pay a higher salary, employees agreed to end the strike, and thus the company returned to a harmonious state. This harmony is a balanced state, and the results of employees and entrepreneurs through negotiations and compromises. However, a harmonious state cannot continue. Once the internal and external environment (such as policy, economy, culture and especially technology) of the organizations changes, the original equilibrium state of the organizations may be broken. After the original harmonious state is broken, if the members of the organization cannot establish a new harmonious state through the interaction with each other, the organization will be full of conflict.

Contemporaries are on the brink of the Fourth Industrial Revolution, characterized as a fusion of technologies blurring the physical-digital lines and marked by emerging technology breakthroughs in artificial intelligence, robotics, and quantum computing (Nam, 2019). The change in the technical environment will inevitably impact the enterprises. If the technical environment has not changed greatly, in an enterprise, most of the organization members (including managers and employees) will be in a balanced state: they all have the positions, income, and work prospects that make themselves satisfied. They work hard and cooperate with each other to achieve organizational goals. But with the advent of artificial intelligence (AI), the harmonious atmosphere in many companies will be eroded.

The weakening effect of artificial intelligence (AI) in the organizational harmony is reflected in two aspects. First, AI will replace many workers on the production line. The threat of unemployment will destroy the harmony between workers and entrepreneurs. Compared with human beings, AI has many advantages, such as higher efficiency, higher accuracy, lower cost, longer working hours, and the ability to deal with dangerous work. At present, besides low-end assembly line work, AI is also used for many creative tasks. For instance, AI tools are employed for big data analysis in fashion design to provide creative support tools (Blake et al., 2021), and used for large-scale genetics studies, public health, personalized and precision medicine, new drug development in medical and healthcare sectors (Wang et al., 2020), and help firms to analyze voluminous data quickly and accurately in CRM (custom relationship management) (Chatterjee et al., 2021). Second, AI may cause conflicts between ordinary employees and managers. The manager and entrepreneurs are two different identities, although someone could have the two identities at the same time. Different from the conflict between employees and entrepreneurs, the conflict between employees and managers has nothing to do with the risk of unemployment at employees, but is from the challenges of the authority of the manager. A study of 8,370 employees, managers and HR leaders across 10 countries, found that 64 percent of people would trust AI more than their manager and half have turned to AI rather than their manager for advice. 82% of people think AI can do things better than their managers (Shores, 2019).

An effective way to resist the impact of AI on the organizational harmony is to improve the innovative organizational culture of enterprises. Innovative organizational culture is the perceptions of organization members to foster innovation at work (Malibari et al., 2022). Under the influence of AI technology, the external environment of enterprises changes rapidly, so innovation capabilities are very important for enterprises and their members. When technological improvement is threatening organizational sustainability, innovations would play even more crucial role in the organizations' long-term survival and growth. For enterprises, innovative organization culture can help them quickly develop new business models, products and services in a new business environment. For employees of enterprises, innovative organization culture can help them develop new skills, adapt to changing workplace capabilities requirements, avoid unemployment. The application of AI technology will lead organizations and their members to adapt to the changing business environment, as a result, organizational harmony in enterprises is weakened. But innovative organization culture would help organizations and their members to adapt to the new environment, thus offset the negative impact of AI technology on the organizational harmony. Because innovative organizational culture could help organizations to avoid uncertainty in the operation process and achieve the continuous survival (Bataineh et al., 2023).

At present, there are studies on how to promote enhanced employee engagement by creating a harmonious organizational atmosphere, but most of them are discussed from the perspectives of employee treatment, leadership style, organizational structure, etc., and few are from the perspectives of innovative organizational culture and the application of AI technology. Although some studies have involved one of these two factors, they have not considered the joint impact of the two factors on organizational harmony. In fact, one of the two facts could influence the impact of the other on the organizational harmony. For example, the adoption of AI technologies would lead to replacement of human by AI and then the disharmony in enterprises, and the innovative organizational culture could help employees resist the risk of being replaced by AI and then rebuild the harmonious atmosphere in organizations. Based on this research gap, besides discussing the impact of innovative organizational culture and adoption of AI technology on organizational harmony, this study further analyzed their mutual influence and moderating effect.

This study aimed to explore the relationship among innovative organizational culture, application of AI technology and organizational harmony in financial service enterprises, especially the individual and joint impact of innovative enterprise culture and AI technology on the organizational harmony. It also then proposed a framework to develop the enhanced employee engagement in enterprises by improving their organizational harmony. The framework would encourage respondents to pay attention to the innovative ability and adoption of new technologies in AI era.

Objectives of the Study - This study aimed to evaluate the innovative corporate culture, artificial intelligence and organizational harmony that was made as the basis in developing an enhanced employee engagement framework. Specifically, it aimed to describe the innovative corporate culture as to team support, supervisor support and organization support; determined the impact of AI in terms of organizational member's self-confidence, innovative awareness and anticipated future in AI era; assessed the organizational harmony in term of anticipate reciprocal relationships, citizenship behavior and employee rapport; tested the significant relationship among innovative organizational culture, artificial intelligence and organizational harmony and developed an enhanced employee engagement framework for financial service industry.

2. Methods

Research Design - The descriptive design method was used to assess and measure the innovative organizational culture, adoption of artificial intelligence technology and organizational harmony, showing the evaluation of respondents on the three variables of their enterprises and help researchers to understand what key factors influenced the three variables. Descriptive design can be used in the research on innovative organizational culture, AI, and organizational harmony to provide a comprehensive and detailed picture of the current situation. Descriptive design helps to delve deeper into the complex relationship between innovative

organizational culture, AI, and organizational alignment. The result would be the basis of the enhanced employee engagement framework.

Participants of the Study - There were 400 employees who participated in the study. In order to make the research results more reliable and varied, the diversity of respondents is necessary. For the diversity of region and corporate, the respondents came from more than 20 financial service enterprises, such as accounting firm, financial consulting firm, guarantee company, small loan company, etc. These companies are in different cities in Fujian Province in China, including Fuzhou, Xiamen, Quanzhou, Zhangzhou, Putian, Ningde, Nanping and so on. However, because the questionnaires were all filled in anonymously, the proportion of respondents in a specific enterprise or a region cannot be calculated. For the diversity of employees' position in the organization, the expected respondents were divided into three groups according to the position: ordinary staff, first-line manager, and middle or senior manager. The first-line manager, generally speaking, were workers while also managers. They were engaged in both of production operations and grassroots management. Organization members of different positions often have different views on the innovative organizational culture and the AI technology. In order to make the respondents more diversified in their organizational status, the proportion of respondents in each group should be more than 20%. Therefore, the network link of the questionnaire was not only made public to all employees of a company (looking for random respondents), but also specially sent to some specific employees (fixed respondents). Finally, the number of questionnaires collected from the three groups were 163 (40.8%), 107 (26.8%) and 130 (32.5%).

Instrument of the Study - Survey questionnaire was the main instrument used in the study. By using surveys, researchers can efficiently collect data from large numbers of employees, generating quantifiable information for analysis. This method ensures consistency and reliability of data collection while minimizing costs. Additionally, surveys ensure anonymity, encouraging honest responses. The flexibility to incorporate different types of questions allows researchers to tailor questionnaires to specific research objectives, providing valuable insights into the complex relationship between organizational culture, AI, and organizational harmony.

A self-constructed questionnaire was adopted in the present study and the proponent was able to tailor questions to specific research objectives, delve deeper into specific areas of interest, and ensure accurate data collection. This flexibility allows for deeper exploration of complex relationships between variables, ultimately leading to a more complete understanding of the research topic and a stronger foundation for developing an effective employee engagement framework. The questionnaire for this study was composed of 3 parts. The first section was the Innovative Organizational Culture, including 3 dimensions: team support, supervisor support and organization support. The second section was the impact of Artificial Intelligence (AI) technology, including 3 dimensions: organizational member's self-confidence, organizational member's innovative awareness and Anticipated future in AI era. The third section was the Organizational Harmony, including 3 dimensions: anticipate reciprocal relationships, organizational citizenship behavior and employee rapport.

Reliability test evaluated the consistency and stability of the survey questionnaire used as a research instrument. The Cronbach's alpha (CA) was used to test whether all questions or constructs in a certain dimension of a variable were consistent. The Innovative Organization Culture, Artificial Intelligence and Organizational Harmony Instrument has an Excellent consistency as exhibited by the Cronbach's Alpha value of (0.975). This was validated by the Excellent remark from Innovative Organization Culture (0.939); it was confirmed by the Excellent results from Team Support (0.903) and Supervisor Support (0.940), and Good result from Organization Support (0.799); This was also validated by the Excellent remark from Artificial Intelligence (0.937); it was confirmed by the Good results from Organizational member's self-confidence with AI (0.865), Organizational member's innovative awareness in AI (0.897), and Excellent result from Anticipated future in AI era (0.915); Further, it was validated by the Excellent remark from Organizational Harmony (0.972); it was confirmed by the Excellent results from Anticipate reciprocal relationships (0.953), and Member Rapport (0.945), and Good result from Organizational Citizenship Behavior (0.865) which shows that the instrument at hand passed the reliability index test. Thus, the researcher can now proceed to the actual survey using the

aforementioned instrument.

Data Gathering Procedure - The initial phase of the study involved developing a comprehensive questionnaire that accurately reflected the objectives of the study. This questionnaire deeply examined aspects of innovative organizational culture, artificial intelligence, organizational harmony, and employee engagement. To ensure the validity and reliability of the questionnaire, it underwent rigorous content validation by experts and pilot testing to assess its consistency. Prior to data collection, ethical approval was required and the necessary permissions were obtained from the human resource manager. This step emphasizes the importance of conducting research ethically and respecting the rights of participants. Potential participants were informed about the purpose, benefits, and confidentiality of the study and their informed consent was obtained. Once ethical clearance has been obtained, the data collection process begins. The questionnaire was distributed to the target employee population through various channels. To maximize the response rate, a number of distribution methods and follow-up strategies were used. Throughout the data collection process, strict confidentiality measures were in place to protect the participants' information. The collected data was carefully processed and analyzed. The data were entered into a database or spreadsheet, cleared of errors, and coded for analysis. Statistical techniques were applied to extract meaningful information from the data. The results were then interpreted in relation to the research objectives and hypotheses.

Data Analysis - Weighted mean and rank were used to describe the innovative corporate culture as to team support, supervisor support and organization support; determine the impact of AI in terms of organizational member's self-confidence, innovative awareness and anticipated future in AI era and assessed the organizational harmony in term of anticipate reciprocal relationships, citizenship behavior and employee rapport. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

Ethical Consideration - Conducting ethical research involved a systematic approach to protecting the rights of participants and ensuring the integrity of the research. First, potential ethical issues such as harm, privacy, confidentiality, consent, and deception were identified. Based on this, ethical guidelines were developed to address voluntary participation, informed consent, confidentiality, debriefing, and data integrity. To formalize the process, the necessary approvals from the institutional review board and participants were obtained. Throughout the research process, ethical procedures were followed, including obtaining informed consent, protecting data, and maintaining confidentiality. Ongoing assessment of ethical implications and participant feedback were essential to maintaining the highest ethical standards. The researcher of this study sent a consent statement to respondents that all their personal information recorded in the questionnaire responses would be secured. Respondents could see the statement once they click on the network link of the questionnaire. The statement would be shown first, and then the questionnaire. Questionnaires would be filled in anonymously. The overall response of an enterprise will not be leaked to people other than researcher of this study, including members of this company and members of other companies. By following this process, researchers can demonstrate their commitment to ethical research practices and foster trust between researchers and participants.

3. Results and discussion

Table 1

Summary Table on Innovative Organizational Culture

Indicators	Weighted Mean	Verbal Interpretation	Rank
Team Support	3.06	Agree	3
Supervisor Support	3.08	Agree	2
Organization Support	3.18	Agree	1
Grand Composite Mean	3.11	Agree	

Note: 3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree

Table 1 presents the summary on the three dimensions of innovative organizational culture, including team support, supervisor support and organization support. The variables got the grand composite mean of 3.11 and verbal interpretation of agree. It indicates that many respondents perceived that their organizations had provided sufficient support to promote the formation of innovative culture within the organizations.

The dimension "organization support" had the composite mean of 3.18 and the verbal interpretation of agree, ranking first among all the three dimensions of the variable innovative organizational culture. It was the only dimension whose composite mean was higher than the grand composite mean. This result indicated that most respondents agreed that their organization encouraged and motivated them materially and spiritually. Especially in AI era, organization support is an important driving force for organizational members to master new technologies and new knowledge. According to Zhu et al. (2021), organizations need to position AI as complementary of human activities and knowledge, and the main target of introducing AI as enhancing business value and performance rather than reducing human labor. Meanwhile, organizations should also try to create value-adding jobs for their employees in all job functions and provide support in the form of training to employees who transition to new positions.

The dimension "supervisor support" and "team support" ranked second and third respectively with the score of 3.08 and 3.06, which were both lower than the grand composite mean (3.11). Nevertheless, they both still have the verbal interpretation of "agree". Team support and supervisor support were the keys for an organization to form an innovative culture and a learning organization. Learning and innovation are often inseparable: only through continuous learning can an organization realize innovation, meanwhile, pursuit of innovation is the motivation for continuous learning. For example, Shaik et al. (2023) argued that SMEs with a culture of supportive management are more likely to learn from their innovation failures effectively and improve their innovation performance. The result showed that respondents believed that organizational support had a greater impact on organizational innovation than team support and supervisor support. While the influence of teammates and supervisors is very important in the innovative process, organizational systems usually have a broader and more systemic impact. The organizational support usually provides a structured framework and guidance that can comprehensively influence employee behavior and the way the organization operates. And the influence of teammates and supervisors is more limited to the individual level and within the team. So the role of organizational support in organizational innovation will be more valued than team support and supervisor support.

Table 2

Summary Table on Impact of Artificial Intelligence

Indicators	Weighted Mean	Verbal Interpretation	Rank
Self-confidence with AI	2.72	Agree	3
Innovative Awareness in AI	3.02	Agree	1
Anticipated Future in AI era	2.79	Agree	2
Grand Composite Mean	2.84	Agree	

Note: 3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree

Table 2 presents the summary on the three dimensions of impact of artificial intelligence, including self-confidence with AI, innovative awareness in AI and anticipated future in AI era. As a result, the grand composite mean of 2.84 and verbal interpretation of agree showed that many respondents agreed that the application of AI will affect their work status in the future.

The dimension "innovative awareness in AI" ranked first had a composite mean of 3.02 and verbal interpretation of agree, indicating that to respondents, their innovative awareness would be the one which is most influenced by AI in the three dimensions. Without innovative awareness about AI technology, an employee an employee will not be promoted in position and raised in salary, and even faces the risk of unemployment in the AI era. The job positions AI could take are mainly limited to low skilled and low paying professions. With the rapid development of technology, low skilled workers will be reassigned to tasks that require creativity and

social intelligence. So, in order for workers to keep their jobs in the AI era, employees must maintain the innovative awareness to learn the new knowledge and skills about AI technology.

The dimension "anticipated future in AI era" ranked the second, with a composite mean of 2.79 and verbal interpretation of agree, indicating that respondents were quite optimistic about their situation in the AI era in the future. They believed that with innovative awareness, they would have better (at least not worse) situation in the future than now. Because AI can not only complete some simple work instead of humans, but also help humans cope with some more difficult tasks, and ultimately improve employees' work efficiency greatly. The adoption of AI in the workplace would improve productivity at work with an augmented labor force, increase demand for personalized product and services and higher quality outputs, and accelerate current trends for increasingly-autonomous work practices (Braganza et al., 2021).

Although the dimension "Self-confidence with AI" with a composite mean of 2.72 ranked the least, it still obtained the verbal interpretation of agree. This result showed that although some respondents were still not confident as to whether they can adapt to the occupational needs of the AI era, most of the respondents perceived that they may not be unemployed because of the application of AI. Some respondents believed that the tasks they were engaged cannot be completed by AI, so they will not be replaced by AI. And some other of them perceived that AI will also create new jobs while replacing human positions, therefore, they will not be unemployed, but just be transferred to another jobs. Blake et al. (2021) concluded that the adoption of AI in the engineering sectors (including mechanical engineering, civil engineering, electrical and electronic engineering, etc.) will generate new jobs, create new employment categories and improve productivity without decreasing employment. The result that "Innovative Awareness in AI" got higher score than "Self-confidence with AI" and "Anticipated Future in AI era" showed a situation that although most respondents are quite confident with their innovative awareness, they are not so confident in their future in AI era as they are in their innovative awareness. One possible reason is the changes that will happen in the future are likely to exceed people's expectations. Even if employees have sufficient innovation capabilities, they do not think they can fully adapt to the changes in the future environment. For an example, although some emerging technologies have great potential, their actual commercialization results still face great uncertainty and may differ from expectations. Another example is the ethical issues of AI, such as algorithmic bias and privacy violations. There is still a lot of uncertainty about how to solve these ethical issues.

Table 3

Summary Table on Organizational Harmony

Indicators	Weighted Mean	Verbal Interpretation	Rank
Anticipate Reciprocal Relationship	3.04	Agree	2
Organizational Citizenship Behavior	3.02	Agree	3
Employee Rapport	3.22	Agree	1
Grand Composite Mean	3.09	Agree	

Note: 3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree

The table 3 presents the summary on the three dimensions of organizational harmony, including anticipate reciprocal relationship, organizational citizenship behavior and employee rapport. The variables got the grand composite mean of 3.09 and verbal interpretation of agree. It shows that most respondents agreed that their organization was in a state of harmony and them feel comfortable.

The dimension "employee rapport" ranked first and resulted in the verbal interpretation of agree. Its composite mean was 3.22, much higher than the other two dimensions. It indicated that respondents generally believed that among the three dimensions, employee rapport had the greatest impact on organizational harmony. Cao et al. (2020) pointed out that friendship among organization members goes beyond mere acquaintanceship, could significantly and positively affect team atmosphere, job performance, employee engagement, job insecurity and voice behavior, etc. Therefore, the employee rapport may even become the basis for them to practice organizational citizenship behavior and build reciprocal relationship.

The dimension "anticipate reciprocal relationship" ranked second with the composite mean of 3.04 and the verbal interpretation of agree. This relationship included two factors: the willingness to help other organization fellows, and the expectation to get recompense from the persons they had helped. Reciprocal relationship emphasizes the fairness and justice between organization members, that is, to achieve common goals through mutual help, rather than unilateral interest pursuits. When organization members have formed reciprocal relationship, they are more willing to help and support each other, thereby improving the organizational harmony.

The dimension "organization citizenship behavior" got the lowest score and ranked the last, but it still got the verbal interpretation of agree. It means that there were respondents who believed the organization citizenship behavior could more or less affect the organizational harmony. By participating in organization citizenship behavior, organization members establish contact with others, cultivate trust in others, strengthen the cohesion of their team, and promote the harmonious development of their organizations. According to Organ (2018), the organization citizenship behavior contributes to more salubrious organizational climates and more efficacious organizational practices and outcomes, and is related to satisfaction and justice in an organization.

Table 4

Significant Relationship between Innovative Organizational Culture and Artificial Intelligence

Variable	rho	p-value	Interpretation
Team Support			
self-confidence with AI	0.297***	<0.001	Highly Significant
innovative awareness in AI	0.171***	<0.001	Highly Significant
anticipated future in AI era	0.365***	<0.001	Highly Significant
Supervisor Support			
self-confidence with AI	0.253***	<0.001	Highly Significant
innovative awareness in AI	0.236***	<0.001	Highly Significant
anticipated future in AI era	0.351***	<0.001	Highly Significant
Organization Support			
self-confidence with AI	0.236***	<0.001	Highly Significant
innovative awareness in AI	0.218***	<0.001	Highly Significant
anticipated future in AI era	0.414***	<0.001	Highly Significant

Note: ***. Correlation is significant at the 0.01 level

Although this study was about the impact of Innovative Organizational Culture and artificial intelligence technology on organizational harmony, in fact, there was also a mutual influence between the organizational innovation climate and AI technology. Exploring their relationship can help to determine whether they have a moderating effect on each other's impact on organizational harmony.

As seen in the table 4, the computed rho-values ranging from 0.171 to 0.414 indicate a very weak to moderate direct relationship among the sub variables of innovative organizational culture and impact of artificial intelligence. There was a statistically significant relationship between innovative organizational culture and impact of artificial intelligence because the obtained p-values were less than 0.01. The result means that the stronger an organization's innovative culture, the more optimistic its members were in dealing with the impact on AI technology, vice versa. On the one hand, excellent organization innovative culture (lots of supports employees could receive from teams, supervisors and organization) can enhance the innovation awareness of organizational members, make them more self-confident in responding to the various challenges brought by AI technology, and better adapt to the AI era.

Nam (2019) suggested that organizations should prepare for the expected transition and alleviate the current concerns of members about the transition, such as sharing the long-term vision for the new technology era with employees in advance (especially the new requirements for their abilities in the future), involving employees in the design of new roles, and strengthening new contracts with employees through more communication. Organizations need to focus on transferring human resources to newly transformed functions, achieving a constantly changing role for human resources. On the contrary, a company without an innovative culture often

does not actively guide its employees to improve their knowledge and skills to satisfy the professional competence requirement brought about by technological changes, but rather condones employees' degradation of abilities. The result was these companies can only passively accept the impact of AI and simply and unkindly replace their employees with AI, ignoring their protests. On the other hand, the application and popularization of AI technology will also promote large numbers of enterprises to form or enhance their innovative culture. From the perspective of the organization as a whole, because the current AI technology has been widely used in various operation processes of enterprises, such as decision-making, production, sales, marketing, logistics and after-sales service, an enterprise may lose its initiative in the market competition if it does not form an innovation atmosphere to keep up with the development of AI technology; From the perspective of individual organization members, if they can't maintain innovation and make themselves compatible with the advances of AI technology, their positions might be replaced by AI or robots and face the risk of unemployment.

Cockburn et al. (2019) illustrates two of the reasons why the advances of AI have the potential to impact organization innovative culture. Firstly, at present, AI may be only a new technology, but from a long-term perspective, AI is likely to be a "general purpose technology" (GPT) that promotes technological progress in history; Secondly, although the application of AI in some domains will lead to many existing production processes providing low-cost or high-quality inputs, its application in other domains can not only widely improve the productivity of various departments, but also change the nature of the innovation process in these domains. In addition, the application of AI technology will eliminate companies with insufficient innovation capabilities, forcing employees to gradually move to industries that require more innovation capabilities in order to survive and develop. Employees in the industries which conduct routine and repetitive tasks, such as manufacturing and administrative work, are particularly susceptible to automation; and employees in the industries that require high levels of creativity, social intelligence, and emotional intelligence, such as healthcare and education, are less likely to be replaced by AI (Reabciuc et al., 2023). Therefore, there was a mutually promoting relationship between organizational innovation culture and the impact of AI technology. And it is reasonable to believe that their mutual influence will also have a moderating effect on their respective impact on organizational harmony.

Table 5

Significant Relationship between Innovative Organizational Culture and Organizational Harmony

Variable	rho	p-value	Interpretation
Team Support			
Anticipate reciprocal relationships	0.491****	<0.001	Highly Significant
Organizational citizenship behavior	0.570***	<0.001	Highly Significant
Employee rapport	0.303***	<0.001	Highly Significant
Supervisor Support			
Anticipate reciprocal relationships	0.398***	<0.001	Highly Significant
Organizational citizenship behavior	0.376***	<0.001	Highly Significant
Employee rapport	0.321***	<0.001	Highly Significant
Organization Support			
Anticipate reciprocal relationships	0.465***	<0.001	Highly Significant
Organizational citizenship behavior	0.392***	<0.001	Highly Significant
Employee rapport	0.447***	<0.001	Highly Significant

*Note: ***. Correlation is significant at the 0.01 level*

As seen in the table 5, the computed rho-values ranging from 0.303 to 0.570 indicated a weak to strong direct relationship among the sub variables of innovative organizational culture and organizational harmony. There was a statistically significant relationship between innovative organizational culture and organizational harmony because the obtained p-values were less than 0.01.

Two reasons may lead to disharmony in enterprises the enterprise is at a competitive disadvantage and its employees face the risk of unemployment. When it is necessary for someone to be responsible for the decline of enterprise competitiveness, the members of the organization may shift their responsibilities to each other,

resulting in internal conflicts. When the application of AI leads to layoffs, employees will be hostile to each other because of competition for remaining positions. The organization innovation culture can effectively prevent the negative impact of these two reasons on organizational harmony, because enterprises with strong innovative ability can often obtain competitive advantages, and employees with high innovative consciousness are often more able to adapt to the changes brought about by new technologies. The innovation ability of organizations is considered to be the main source of sustainable competitive advantage, because it can improve enterprise performance by changing the way enterprises use the market and learning mechanism (Mendoza-Silva, 2021). When an organization forms a specific culture (whether good or bad), there is a tendency towards harmony. If it is a conservative and anti-revolutionary organizational culture, it may come at the cost of hindering organizational development to maintain its harmony. For example, employees of a certain company are worried that the introduction of artificial intelligence may lead to layoffs, so with the support of the union, they threaten the management to abandon the use of artificial intelligence through strikes, ultimately forcing the management to compromise. Although the company returned to a "harmonious" state after the management conceded, it came at the cost of damaging the company's development potential. This is consistent with the viewpoint of Egitim (2022) that from the perspective of Japan, organizational resistance to change eliminates potential uncertainties and risks associated with change and hence, harmony is maintained. But if a company has an innovative organizational culture, then when the company needs to make changes (such as introducing artificial intelligence), the members of the organization will spontaneously and consistently support this innovative change without affecting organizational harmony. Sometimes, creativity can turn conflict within an organization from a threat to an advantage. Ferine et al (2021) point out that only for members of organizations with high levels of learning orientation can conflicts have a positive effect on increasing their creativity.

Team support (the first dimension of organization innovative culture) is directly related to, and even the reason for the three dimensions of organizational harmony. Because of the support from team partners, someone will be more willing to communicate and cooperate with others (anticipated reciprocal relationship), provide them with help beyond their own responsibilities (organization citizenship behavior), and establish a friendship beyond working partnership with them (employee rapport). Without team support, an organization may be overtaken by competitors in the market, and its organization members may lose their motivation to work. According to Goswami et al. (2020), team enables people to become a group and understand the importance of the team better by working happily together. Without team support, an organization may be overtaken by competitors in the market, and its organization members may lose their motivation to work. Based on the importance of team support, the creative culture among organization should be particularly encouraged from a managerial perspective since it stimulates internal cooperation and contributes (Zastempowski, 2023). And support by co-workers (team support) and managers (supervisor support) would lead employees to display positive behaviors within their organization, and on the contrary, the lack of support by co-workers and managers would lead to a decline in employee performance (Akgunduz et al.2018).

Organizational support is often reflected in the guidance of organizational systems or behavior conventions on employees' innovative behavior, and is related to the organization members' recognition of the organization's vision, philosophy and Prospects. It will promote some reciprocal behavior among organizational members, such as knowledge sharing. The knowledge sharing behavior can be positively influenced by some organizational support factors, for examples, anticipated extrinsic rewards, the sense of self-worth, and the subjective norm about the knowledge sharing behavior (Bock et al., 2005). If organizational members believe they have excellent communication atmosphere in which they can easily express different views, objections, and criticisms, they will have a higher enhancement of organizational harmony. The positive correlation between superior support and organizational harmony has been proven by many literature and studies, for an example, Ramadhani et al.(2024) indicated that transformational leadership style can motivate employees to exhibit voluntary behavior, and servant leadership style is help to drive organizational citizenship behavior. And the support given by transformational leaders to organization members needs special attention. According to Wu et al. (2022) transformational leadership can create a positive climate leading to intelligent, loyal and committed employees,

and favorably facilitates the development of a harmonious climate benefiting the performance of both members and the organization itself.

Although many literature support the view that organizational innovative culture promotes organizational harmony, many studies show that organizational harmony can in turn improve organizational innovative culture. Firstly, the support for innovative behavior in organization is an embodiment of the reciprocal behavior of organizational members in a harmonious organization. With A review of 88 scientific articles in the period 1997–2018, Arsawan et al. (2020) stated that knowledge sharing is developed from the interaction and exchange of beneficial intangible assets, so it substantially influences the innovative culture. Utomo et al. (2023) determined the innovative work behavior and organizational support has a positive and significant effect on organizational trust, through research with respondents from 546 SME owners in Banten Indonesia.

Secondly, the three kinds of support to innovative behavior are positively related to employees' affective commitment to their organizations. The affective commitment refers to the degree to which members of an organization are willing to involve and participate in the organizational interactions. When individuals are involved in close and favorable relationships with coworkers and perceive that their leaders are supportive, they may get a more complete supportive feeling from their organization (Yang et al., 2020). Thirdly, the support from teammates and organization would enhance to employees' organizational citizenship behavior. There is a positive correlation between team support and employees' willingness to engage in organization citizenship behavior, and further, the organizational citizenship behavior is an example of indirect reciprocity (Gervasi et al, 2022).

Fourthly, organizational harmony would impact on its innovative culture. According to Cao et al.(2020), workplace friendship will be positively related to employees' innovative behavior. They argued that workplace friendship will help employees obtain innovative information and rich skills from colleagues, which helps individuals complete innovative work; high workplace friendship will promote mutual trust, reduce anxiety about uncertain and challenging tasks, and encourage innovative behavior; when workplace friendships are at a low level, the increase in perceived risks and innovation costs can hinder individuals from adopting innovative behaviors. de Geus et al. (2020) summarized a large amount of literature related to organizational citizenship behavior, and concluded that most of the current research indicates that the behavior is positively related to knowledge sharing and innovation.

And lastly, organizational identification mediates the impact of responsible leadership on employees' creative idea-sharing. Batool et al. (2024) suggested that organizational culture has a moderating role in the impact of responsible leadership and organizational identification, such that the impact of responsible leadership on organizational identification is higher when the organizational culture is positive. In addition, although the data of this study support the viewpoint that "innovative organizational culture is conducive to organizational harmony (they are positively correlated)", some other related studies have expressed the opposite view. For the ethical issues that AI may bring, Groumpos (2022) proposes that innovation is equivalent to destruction, nuisance, revolution, and in many cases, it only brings meaningless turbulence. And as an important part of organizational harmony, organizational citizenship is found to have no direct relationship with organizational culture (Widarko et al.2022).

As it is shown in table 6, the computed rho-values ranging from 0.237 to 0.310 indicate a weak direct relationship between self-confidence with AI and the sub variables of organizational harmony. It shows that there was a statistically significant relationship between self-confidence with AI and the sub variables of organizational harmony since the obtained p-values were less than 0.01. The computed rho-values ranging from 0.243 to 0.250 indicated a weak direct relationship between innovative awareness in AI and the sub variables of organizational harmony such as anticipate reciprocal relationship and employee rapport while the computed rho-value of 0.010 indicated a very weak direct relationship between innovative awareness in AI and organizational citizenship behavior. It shows that there was a statistically significant relationship between

innovative awareness in AI and the sub variables of organizational harmony such as anticipate reciprocal relationship and employee rapport since the obtained p-values were less than 0.01.

Table 6

Significant Relationship between Artificial Intelligence and Organizational Harmony

Variable	rho	p-value	Interpretation
Self-Confidence with AI			
Anticipate reciprocal relationships	0.237***	<0.001	Highly Significant
Organizational citizenship behavior	0.284***	<0.001	Highly Significant
Employee rapport	0.310***	<0.001	Highly Significant
Innovative Awareness in AI			
Anticipate reciprocal relationships	0.243***	<0.001	Highly Significant
Organizational citizenship behavior	0.010	0.848	Not Significant
Employee rapport	0.250***	<0.001	Highly Significant
Anticipated Future in AI Era			
Anticipate reciprocal relationships	0.572***	<0.001	Highly Significant
Organizational citizenship behavior	0.320***	<0.001	Highly Significant
Employee rapport	0.296***	<0.001	Highly Significant

*Note: ***. Correlation is significant at the 0.01 level*

The computed rho-value of 0.572 indicated a strong direct relationship between anticipated future and anticipate reciprocal relationship while the computed rho-values ranging from 0.296 to 0.320 indicate a weak direct relationship between anticipated future and the sub variables of organizational harmony such as organizational citizenship behavior and employee rapport. It shows that there was a statistically significant relationship between anticipated future and the sub variables of organizational harmony since the obtained p-values were less than 0.01.

Data analysis shows that most sub variables of the impact of AI were positively related to the sub variables of organizational harmony (although the correlation was not strong), indicating that AI applications have a positive impact on the harmony of the organization. The application of AI technology on the organizational harmony was specifically reflected in the following aspects. Firstly, AI can not only bear some tedious works, liberate organization members from repetitive tasks, but also help them to work more efficiently and thus reduce their energy consumption. In this way, the organization members would have more time and energy to build each other's rapports and trust, or practice some organizational citizenship behaviors (such as providing support for colleagues who are absent or overloaded, or provide guidance about skill for new employees). For an example, in meetings, employees can use "AI speech recognition technology" to convert speech into text, so as to quickly record the content of the meeting. Since they save time on taking notes in meetings, employees can spend more energy on perceiving other people's emotions, thus responding to other people's opinions more effectively and reducing the possibility of conflicts.

Secondly, the application of AI has created more opportunities for cooperation and interaction for employees. The enterprises adopting AI technology may occur more team support, supervisor support, and organizational support when employees dealt with technical challenges together. For example, when learning new AI tools and skills, employees may share knowledge with each other. Therefore, the organization members are more likely to form a solid reciprocal relationship.

Thirdly, the threat brought by new AI technology would strengthen the emotional connection and resonance among employees. Faced with the challenges of AI technology, organizational members will provide emotional support to each other (these supports are not related to technical guidance or knowledge sharing), such as when someone feels nervous and anxious because he/she cannot adapt to changes in AI era or cannot master new AI skills, colleagues will give comfort and encouragement. Employees overcome difficulties through mutual support and understanding of each other, and jointly adapt to the changes in the working environment brought by AI technology, and ultimately promote the deep friendship.

Fourthly, AI can become a "scapegoat" for organizational decision-making mistakes, thereby alleviating the conflict between the organization members. When decision-making mistakes occurs, organization members may pass blame to others, as a result, the organization become disharmonious. On the one hand, AI can improve the quality of decision makers through data monitoring and calculation, reduce the possibility of decision-making mistakes, and thus prevent the situation of passing blame. Hansen et al. (2020) described three use cases (false alarm, audible error, and unknown error occurs) of AI at industrial SMEs, and indicated that AI will enable SMEs to find and solve problems which are unable to solve with traditional means. On the other hand, when decision-making mistakes occur, the organization members may tend to believe that the defect in AI is the cause of the mistakes, and will not blame the decision maker. Therefore, because AI has become a "scapegoat", the organization maintains harmony.

Lastly, AI tools, such as chat robots and virtual conference software, could make communication among organization members more convenient. In addition, AI language translation software and hardware can promote the exchange of organization members of cross-state, cross-culture and cross-race. AI translation tools can translate text and voice in real time, helping people of different languages communicate with each other more easily. The Technology is especially useful for international business and multinational teams, eliminating language barriers and promoting global cooperation. AI technology has increased the permeability of national borders, but many organizations lack sufficient knowledge to effectively promote communication and integration among employees from different cultures.

It should be noted that some studies have put forward the opposite view that the application of AI technology is not conducive to organizational harmony. According to Nam (2019), the emergence of new technologies such as AI can create a sense of job insecurity which refers to "a phenomenon which affects a sizeable minority of employees" within organizations. Nam pointed out that though perceived job insecurity prevalence does not seem to disappear easily through organizational activities, one task of an organization should be to identify which members of the organization are more severely affected by the prevalent job insecurity, remain sensitive to technology-driven organizational changes, and addresses more "futuristic" forms of employment relationships and required work skills to cope with the impact of the Fourth Industrial Revolution. Braganza et al. (2021) believe that within the organization, there is a positive correlation between psychological contract, employees' job engagement, and job trust, and the adoption of AI will weaken this positive correlation. This is obviously not conducive to the harmony of the organization. And even worse, they also found that the adoption of AI technology would lead to a decrease in employee engagement. Gwagwa et al. (2022) argues that the application of AI will amplify or reinforce long-standing social biases, leading to a series of ethical issues related to harmony, consensus, collective action, and common interests.

Enhanced Employee Engagement Framework

Figure 1 shows "the enhanced employee engagement framework". innovative culture and AI technology on organizational harmony. According to the framework, enhanced employee engagement could be enhanced by improving the three variables in this study: innovative organization culture, adoption of AI technology and organizational harmony. There are 4 processes in the framework. First is interacting wherein innovative organization culture and adoption of AI technology interact on each other positively. Second is improving in which innovative organization culture and adoption of AI technology improve the organizational harmony. Third is feed-backing where the organizational harmony positively feedback on innovative organization culture and the adoption of AI technology. That means excellent organizational harmony could improve itself by a positive impact on the innovative organization culture and the adoption of AI technology. Fourth is enhancing that to achieve excellent organizational harmony employee engagement maybe enhanced in organizations, especially enterprises.
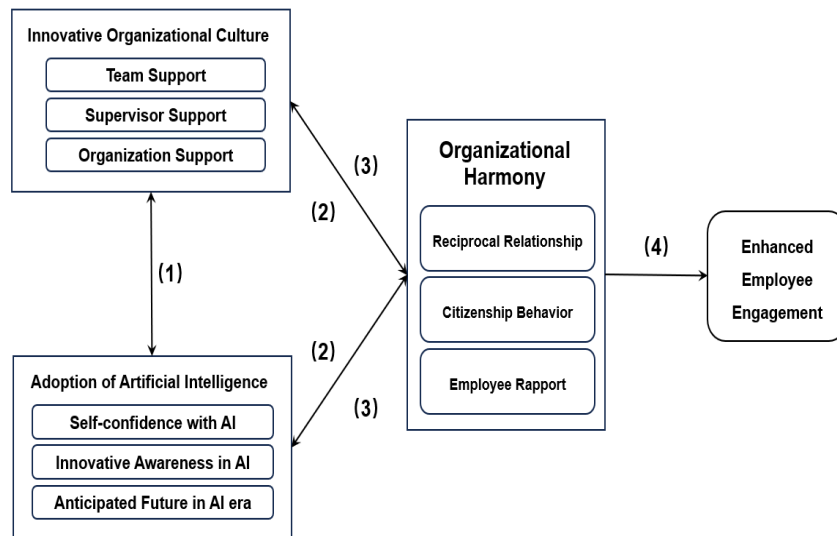
Figure 1. The Enhanced Employee Engagement Framework

The innovative organization culture and the adoption of AI technology could interact on each other positively. As a result, one could influence the impact of another on the organizational harmony. Firstly, innovative organization culture could promote the adoption of AI technology. (1) In an enterprise with good innovative organization culture, the employees usually have a strong willingness to explore and learn new technologies, carry out cross-department cooperation and exchanges, and bear risks for trying these new technologies; (2) Meanwhile, an innovative enterprise will invest more resources for the training and education of AI technology to help employees master these skills and knowledge.

Secondly, the adoption of AI could develop innovative organization culture. (1) The application of AI can cause a sense of crisis to employees. If they cannot improve their ability and undertake some tasks that AI cannot complete, they will be unemployed. Therefore, employees will have motivation to learn new knowledge, communicate with others and share their ideas; (2) AI tools can improve the internal team collaboration and communication efficiency in the enterprise, assist managers to make decisions with data analysis, promote the organization members to become more innovative. An example of the interaction is, on one hand, companies will take measures to ensure that their employees possess sufficient professional knowledge to meet the minimum requirements for using AI, such as hiring new employees, introducing external consultants (Colangelo et al., 2022); on the other hand, Kinkel et al. (2022) believes that for introducing AI technology successfully, therefore, companies would attract experts with appropriate skills in software and hardware development, data science, or AI. The introduction of new employees may lead to unemployment of some old staffs.

Both of the forming of innovative organization culture and adoption of AI technology in an organization could improve (impact positively) the organizational harmony. On one hand, innovative organization culture impacts the organizational harmony positively. The impact comes from: (1) the innovative organization culture which encourages employees to share ideas with each other openly, honestly and actively, can enhance the trust and understanding of organization members. (2) the innovative organization culture which advocates the mutual support and collaboration between employees, could reduce internal competition and differences. (3) innovative organization culture which requires enterprises to provide employees with various training and development opportunities to help them to learn knowledge and skills to adapt to the AI era, can enhance employees' sense of belonging and satisfaction to their enterprises. (4) Innovative organization culture has created a positive and optimistic atmosphere, which would encourage employees to overcome difficulties, and reduce the negative emotions of employees in their work. On the other hand, the adoption of AI technology also impacts the

organizational harmony positively. The impact is reflected in: (1) With AI technology which can replace humans to complete many simple and tedious tasks, employees would get higher work efficiency and more energy to establish workplace friendship; (2) When the organization members learn new technologies and skills of AI, they will spontaneously share knowledge with others, provide emotional encouragement for others, and form a reciprocal relationship with others; (3) The application of AI technology in various communication and collaboration tools (for example, chat robots and virtual conference software) can help employees to share information and exchange ideas with each other better; (4) AI technology can provide information support for decision-making, so as to avoid mutual accusations among organization members caused by decision errors.

4. Conclusion and recommendations

The respondents moderately agreed that there was innovative organizational culture in the enterprises they serve, and they could get triple support (team support, supervisor support and organization support) from their companies. The respondents revealed moderate agreement on the adoption of AI technology as to organization members' self-confidence, innovative awareness and anticipated future in AI era. The research revealed moderate agreement among respondents that their enterprises were in harmonious organizational atmosphere in terms of reciprocal relationship, organizational citizenship behavior, and employee rapport. There was a highly significant relationship among the innovative organizational culture, the adoption of AI technology, and the organizational harmony. An enhanced employee engagement framework was developed for the employees in financial service industry.

The Head of Human Resource Department may provide autonomy and resources for employees to explore new ideas and provide opportunities for to learn new skills and stay updated on emerging technologies. Department heads must ensure that AI is deployed ethically, taking into account bias, transparency, and data privacy. They can also equip employees with the necessary knowledge and skills to work effectively with AI tools. HR managers and department heads can regularly assess the impact of AI on business performance and employee well-being to ensure it contributes to a positive and satisfying work environment. The proponent can provide guidance to the company's HR managers to show them how the Continuous Engagement Framework can help them create a more positive and engaging work environment. Future researchers can develop or improve engagement frameworks tailored to specific industries by considering the unique challenges and needs of employees in different fields.

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