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Utilizing Sensing Technology to Predict and Analyze the Activities of Employees on Shuttle Boat for Improving Human Resource Management

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Abstract

Under the global economic activities, the scale of competition in various industries is larger than in the past, and the staff affects whether the company's industry can continue to operate and whether they are more competitive and irreplaceable with other related industries. How can they attract or comfort them in various ways to stay and continue for a long time? Service is an important topic? Sea crews are different from general companies or institutional industries. They may experience various winds and waves and changeable conditions at sea. They have to overcome not only to be familiar with the difference between the living environments of ships and onshore, but also to overcome the most painful ones. "Seasickness" is also due to the lower willingness of people to stay which will increase the burden of the current job. With the development of the times, information technology and sensing technology continue to develop, the Internet of Things architecture sensor detection function, can provide more personalized and diversified services, through RFID and other portable devices to facilitate the use of personal information users and system device management, and then understand the physical and psychological state of the crew, can effectively achieve real-time management of human resources management (personnel health monitoring). In addition, the use of advanced sensing instruments, equipment for the operation of equipment regular or irregular measurement, analysis and identification, in order to facilitate the current status of the operation of each equipment, and the results of testing and diagnosis can be used as the basis for maintenance, the repair period of the mastery and material preparation also have predictable functions, and thus reduce maintenance costs and improve economic efficiency. Therefore, this research hopes to use sensing technology and IoT to record various data records of personnel working on deck or bilge, such as: travel distance, sleep time, Cardiopulmonary function or other relevant data of the working environment, and then construct the crew's measurement indicators of work

load, vocational skills, salary and benefits, and turnover intention.

Keywords: sensing technology, Internet of Things (IoT), human resource management.

1. Introduction

Like the enterprise, the crews need high-quality talents to operate together, the life at sea is same with the corporate enterprises in the general society, but there are very big differences in the life style and work content between onshore and offshore, which will affect its willingness to join the service and continue to stay, so the life safety will be based in high-tech on sea. Therefore, the application of sensing technology and the Internet of Things on the ship is very important. We can use sensing technology and the Internet of Things to know the physical state, psychological quality, or environment of the crew in the first time.

The IoT generation will be full of many small sensors, which may be hidden on tall buildings, bridge piers, reservoirs, steam and locomotives or human organs, forming various smart life styles such as smart disaster prevention, smart transportation, and smart home care. These sensing devices are mainly used to monitor various external environmental information for a long time. They have a single function, do not require complex calculation processes, consume less power, and can last for several years,⁽¹⁾ in order to support the innovation of the IoT, advanced countries have already launched Internet of Things research projects to accelerate the digital transformation of the industry, making the Internet of Things one of the most important forces driving the development of the technology industry, and the EU research and development plan data to collect popular Develop technology, implement practices, testing and verification models, industrialization mechanisms, etc., to assist industry, government, academia, and research to understand the EU's scientific research governance model and innovative thinking.⁽²⁾

For this reason, I hope to understand the influence relationship through the influence of various attributes of this research. The purpose of this study is as follows:

- I. Exploring crews of the workload, work competency, salary and welfare to scale-index construction of sensing.
- II. Exploring the relationship between the main variables and control variables of the crews for workload, job competency and salary and welfare.

2. Theoretical Background

2.1 Sensing and Internet of Things (IoT)

In recent years, global enterprises have promoted the Industrial Internet of Things (IIoT) to change the way of factory operation. The maintenance strategy of factory equipment has changed from manual inspection to preventive maintenance. By building an auxiliary management platform for the entire factory equipment, it can instantly grasp the health of main production equipment. In order to reduce the occurrence of unexpected car trips during the production process, the detection system architecture integrates a vibration sensing system with network communication, and a big data access and analysis framework to collect and analyze important equipment and process data in the factory. Analyze and apply multivariate statistics (MSPC) and full-band monitoring and analysis methods to establish

the health index of the equipment. In the example, the equipment abnormality warning was successfully carried out to reduce the risk of enterprise cost loss caused by production stalls.⁽³⁾ In addition to the factors of researchers, the most important thing for top research results is to have top-notch equipment. However, if the equipment does not have proper laboratory environment control, it will not be able to give full play to the functions of the equipment. It must integrate temperature, humidity, and vibration. Environmental sensors such as noise, noise, power consumption, oxygen concentration, etc., can effectively observe the system status and sensing data of the wireless sensor network deployed in the smart green energy laboratory for a long period of time, as well as through mobile devices, Such as mobile phones or tablet computers, remote monitoring of laboratory environmental parameters. In the event of abnormal conditions of environmental parameters, it can be dealt with immediately to avoid damage to laboratory personnel or equipment; real-time environmental information parameters can also help researchers determine whether the experimental results are acceptable, such as vibration or temperature and humidity parameters exceeding the allowable value, the experimental results Need to be verified again.⁽⁴⁾ It is independently developed by the Taiwan Industrial Technology Research Institute team, which connects various environmental sensors through the controller, and can be connected through the most popular Bluetooth, Wi-Fi, Lora or NB-IoT, and transmits the current monitoring data to the cloud in real time , And can use cross-platform technology to implement web pages, computers or smart mobile device apps to display current environmental quality data and trends, including air pressure, temperature and humidity, PM1.0 and PM 2.5 suspended particles, formaldehyde, volatile organic compounds etc. In the future, the smart housekeeper function will be combined to connect electric fans, heating and cooling, dehumidifiers, air purifiers... and other electrical products. In addition to the original environment detection, it can also actively remove harmful substances and maintain a comfortable working and living environment. To maintain air safety in the home or office environment, thereby improving employee work efficiency, etc.⁽⁵⁾

This research will explore the research of job competence, workload, salary and benefits on turnover tendency, and apply sensing technology and Internet of Things technology to achieve real-time monitoring of the crew's physical and mental conditions, and provide timely counseling support to reduce human resource problems The occurrence of, can also real-time understand the safety status of the working environment in the cabin through sensing technology and the Internet of Things.

2.2 Workload concept and theory

The workload is not only the technical expertise of the work. If the interaction theory is used to discuss the career planning of the crews from the two aspects of "organization" and "individual", through the identification of the parties, Being able to devote all of your heart to actual action and achieve self-fulfillment goals. If a person can't see the future, he can't hold it now. The comprehensive development of the path of development of crews will be provided as a holistic consideration, so that the development strategy will be more comprehensive.

The discussion of the workload of this section refers to the discussion of the workload of the officers and rating crews on boat. It has always been hard-working and working hard, but it is not known to work hard. It often lacks sleep and attendance. It continues to deteriorate and people are reluctant to stay in office. Even if the job is good, they still can't escape. The fate of leaving the job due to excessive workload. The following is a discussion of the literature on the workload of various scholars.

Yang et al.⁽⁶⁾ also indicated that team workload is applied from individual workload concepts, principles, and related to a team environment. They developed a subjective performance measures including communication, coordination, cooperation, and control to optimize team workload.

The workload indicator in this study is measured in sensing technology by working hours; sailing hours; physical state: pulse, blood pressure, blood sugar; working environment; temperature, humidity, illumination; mental state: physical and mental questionnaire scale, Or weather factors, etc.

2.3 Work competency concept and theory

To understand the meaning of job competence, one must first understand what is "competent". Graff and Street⁽⁷⁾ believes that competence is a required quality of work performance, and requires a certain quality that can achieve work performance, so competence is quality. Boyatzi⁽⁸⁾ indicated that a job competency represents ability, he defines competency as "an underlying characteristic of a person which results in effective and/or superior performance in a job". Competent management is a way to manage others and seek resources. Do the most effective use and achieve the goals of the organization. Hall⁽⁹⁾ proposes that in the management work, the focus of the worker's best performance in different aspects of presentation: (I) Positive expectations of work: Work must be based on the expectation that people can and will do their job well;

(II) Meaningful work: Considering the motivation of employees, the potential for growth, and a constructive response to positive work stimulus; (III) Interpersonal relationship ability: Ability management in face-to-face relationship in any cooperative activity.

Bandura⁽¹⁰⁾ puts forward the concept of self-efficacy in social learning theory, focusing on personal factors and combining cognitive psychology. Bandura defines self-efficacy as the individual's belief in whether or not he is capable of accomplishing a particular task. When an individual believes that the task can be successfully completed, people will be willing to work harder and more consistently to achieve the goal.

Job competency refers to the individual ability of a worker to meet or exceed the difficulty and professional experience of the work performed, and to show the employee's ability, skills, knowledge, and the needs and expectations of the organization. Once a worker is able to correctly understand his or her abilities and realize the characteristics of the work environment, the more he can produce the job.

Bandura⁽¹⁰⁾ stated that self-efficacy is the individual's ability to organize and express specific actions for himself to determine the likelihood of completing a certain job. Bandura proposed that reciprocal determinism considers individuals, the environment and behaviors

to interact with each other. Behavior is not only the result of interaction between the individual and the environment, but behavior also affects the environment and individuals. Bandura points out four factors that influence self-efficacy: Performance Accomplishments, Vicarious Experience, Verbal Persuasion, and Emotional Arousal. It is known from the above literature that the work of this research is competent to measure the facet (I) positive expectations of work; (II) meaningful work; (III) interpersonal relationship ability, which is the main measure of facet.

The work competency index in this study is measured in sensing technology based on the crew's daily work completion progress, completion rate, error rate, technical license, attendance status, and supervisor's score, etc., as the numerical basis for analysis.

2.4 Salary and welfare

In the era of "knowledge economy", attracting talents is the most important work for the development of enterprises and the country. It directly affects the competitiveness of enterprises and the state. Because talent selection sites will consider salary incentives, welfare packages, personal and industrial development, Various factors such as talent restrictions and legal support, social atmosphere, salary and welfare and development possibilities, and the achievement motivation of transnational talents positively affect the intention of transnational talent migration; social atmosphere and legal system guarantee will improve salary and welfare and development possibilities for transnational The influence of talent migration intentions.⁽¹¹⁾

In the case of a general enterprise, the compensation strategy is closely related to the business philosophy of the company, affecting the performance of the organization and shaping the organizational culture of the enterprise. The compensation strategy does play the role of talent retention and incentives, and affects the value judgment of its employees. Interaction, achievement needs.⁽¹²⁾ Lin and Cheung⁽¹³⁾ proposed different service units in the "Working Values" and "Work Satisfaction" (I) background changes, the job status and job security and "work" in "Working Values" Satisfaction, salary and welfare, and other three facets are significantly different,(II) The crew divers' "work values" and "job satisfaction" are all positively and positively correlated with each other, and significant; (III) two values of work values (work status, job security) are satisfactory to the job. The degree has a high positive explanatory power.

The salary and welfare index data in this study are measured in sensing technology by real-time analysis of salary, bonus and vacation.

2.5 Turnover intention

Liu and Zhou⁽¹⁴⁾ pointed out that when public sector personnel recognize the emotional extortion of their subordinates or the public, whether they will have the tendency to resign, or the level of work stress will be regarded as interference and mediation variables, and the public sector's emotional extortion will be public. The work pressure of department staff has a significant positive relationship with the turnover tendency. Maintaining the organization's stable manpower and reducing the turnover rate is a very important part of the human resources management work. At present, the government departments do not pay attention

to the employee turnover intention and the improvement of employee job satisfaction measures are not comprehensive, and pointed out that the future relevant regulations are amended as reference.^{(15) (16)} It proposed 12 job-related organizational and personal factors that may affect the personnel's satisfaction with the job: person-organization fit, job stress, job autonomy, internal security duties, pay, promotion, retirement concerns, resettlement concerns, family satisfaction, family involvement, work-home conflict and recreational facilities. Thus, some technologies can be introduced into the preventing and predicting the turnover of the human resources.

2.6 Research hypothesis

This thesis will use various facet factors such as Workload, Work competency, Salary & welfare and Turnover intention to construct a method to use sensors to predict and analyze the physical and mental state of the crew on the shuttle boat, so as to improve human resource problems. Therefore, the data collected from the questionnaire will be used to explore whether job competence, workload, salary and benefits affect the crew's turnover intention.

H1: There is a significant relationship between job Workload, Work competency, Salary & welfare and Turnover intention.

3. Research design

Human resource management refers to a series of policies, measures and systems that are adopted by enterprises and affect their employees' behavior, attitudes and performance. Enterprises need to think about how to maximize the effectiveness of human resource management measures, and improve their operational performance. A high degree of fairness and a better employee relationship can achieve better work efficiency. Highly interactive and fair cognitive adaptation with better salary and benefits can achieve better work efficiency. The scale of the horizontal and vertical units is more numerous. It is a multi-diversified multinational enterprise business model. It is relatively important for human resources management. This study aims to analyze the work. The impact of Workload, Work competency and salary & welfare on the resignation tendency of crews. There is a huge shortage in the human resources management package.

This study will explore the Workload, Work competency, Salary & welfare and Turnover intention research on crew' resignation tendency. The researchers will use the relevant society at home and abroad. The scientific management literature analyzes and studies the research, and expects to analyze how to reduce the factors of turnover intention.

3.1 Research methodology

After the questionnaire was collected, the statistical analysis of the quantitative data can fully present the data results. Therefore, the "SPSS for windows 20.0" version of the software is used as a statistical analysis tool, narrative statistics, t-test, single-factor variation, correlation analysis and gradually returns. The statistical analysis methods of this study are as follows:

- I. Research tools: The design of this research questionnaire is divided into two parts. The first part is the basic data of the subjects. The second part measures the impact of workload, job qualifications and salary and benefits on the resignation tendency of the crews. The whole questionnaire is based on Likert 5. The scale is used as measures with "1" stands for "Strongly disagree", "2" stands for "disagree", "3" stands for "Natural", "4" stands for "Agree", and "5" stands for "Strongly agree".
- II. The scale development: There are four main facets in this study: workload, job competency, salary and benefits, and turnover intention. When the study is formally investigated, the respondent is asked to express the opinions of the individual according to the situation set by the item, and according to the degree. Different scores of 1 to 5 points, the higher the score, the higher the respondent's perception of the question. After the formal recovery of the scale, the empirical data will be used to analyze and verify the appropriateness of the model.
- III. Descriptive statistics (Descriptive Analysis): Narrative statistics is a set of systematic methods and statistical techniques for collating, describing, and interpreting data. There are two main descriptions and presentations of data: First, use the allocation of numbers to organize and describe the numerical segmentation situation, and use statistical charts to show the characteristics and distribution of the data. Second, through the statistical calculation of descriptive statistics, preliminary statistical indicators are established as the basis for subsequent statistical analysis. For the purpose of the current situation survey part of the allocation of the number of points and percentage analysis to understand the distribution of the population, the number of times, the percentage distribution, etc., can show the sample overview.
- IV. T-test: It is mainly used to test the difference between the average number of two independent parent groups. For the purpose of the second study of this study, whether the difference in demographic variables of the test subjects with t-test is significantly different from physical function, psychological factors, training environment and training performance.
- V. One-way ANOVA: It is mainly used to analyze the difference of the change of the criteria of different groups formed by different groups of category variables. The purpose of this study is to compare the differences of different backgrounds and to explore whether the differences in the demographic variables of the subjects will affect the workload and work. Differences in competency, salary and benefits and turnover intentions.
- VI. Schaffer post hoc test: Comparison of different background differences, after the analysis of single factor variance, there is a difference, and then Schaffer post hoc test, the results are more accurate and determined.
- VII. Pearson correlation analysis (Correlation Analysis): The purpose of this study was to use Pearson correlation analysis to explore whether the differences in demographic variables of the subjects would correlate with workload, job competency, salary and benefits, and turnover intention.
- VIII. Stepwise Regression Analysis: Regression analysis uses linear relationships for interpretation and prediction. Stepwise regression analysis uses stepwise analysis strategies to determine predictive variables with explanatory power. Exploring the

impact of workload, job competency, salary and benefits, and turnover intentions.

3.2 Sampling method

In this study, 100 questionnaires were sent by means of the intentional sampling method. Before the formal questionnaire was issued, because the number of questionnaires was 40 questions, the number of questionnaires before the implementation of the study was more than twice the number of questionnaires. 100 formal test questionnaires were implemented before the 100 valid samples were collected, and the sample recovery rate was 100%. The meaning of the questionnaire questions in this study are from the past literature. The main purpose of the pretest is to confirm whether the questionnaire effectively conveys the meaning of the test questions, corrected after the pre-test and a formal questionnaire.

3.3 Scale measurement

The title of the questionnaire in this study is measured by Likert's five-point scale. "1" stands for "Strongly disagree", "2" stands for "disagree", "3" stands for "Natural", and "4" stands for "Agree", "5" stands for "Strongly agree". After completing the preliminary design of the questionnaire, in order to establish the correctness and acceptability of the questionnaire design, first consult the experts, and then randomly sample 100 samples for the pre-test questionnaire; after the pre-test questionnaire is recycled, first conduct a project analysis of the facet (Identification validity). The validity of the identification was tested, and then the reliability analysis of each facet was deleted. The Cronbach's α was less than 0.7. After the formal questionnaire was determined, the statistical analysis of the study was performed.

3.4 Expert validity

After the questionnaire was drawn up, the three experts and scholars provided revised opinions on the importance and applicability of the scale questions, and then corrected them after full reconciliation to check whether the semantics of the questionnaire contents were readable and readable. Sexuality, and revised the content of the questionnaire, and after the content of the questionnaire was revised by three experts and scholars, the withdrawal was not deleted.

3.5 KMO value and Bartlett's sphere test

Before the factor analysis, KMO (Kaiser-Meyer-Olkin) verification is carried out, and each scale is tested for KMO value to understand whether the degree of correlation of each variable is suitable for factor analysis. The verification result shows the Workload, Work competency, Salary & welfare and Turnover intention competence of the crews. The KMO values of the four facets of the scales of salary and benefits and turnover intention are .928, .901, .917, and .817, indicating that the sampling of this study is appropriate. Secondly, the study performed Bartlett's sphere test, and the Bartlett's sphere test value reached a significant level (p value = .000) (as shown in Table1), showing that each factor of these scales Have common variability. Therefore, the workload of the crews, Workload, Work competency, Salary and welfare and Turnover intention can all be factored.

Table 1
KMO analysis summary table

Construct	KMO Value	Bartlett's verification value	Degree of freedom	P Value
Workload	.928	962.513	45	.000
Work competency	.901	691.245	36	.000
Salary and welfare	.917	947.279	45	.000
Turnover intention	.817	.817	.817	.817
Resignation tendency facet	.817	296.281	10	.000

The study scale used principal component analysis and direct skew method for factor analysis to extract factors. The characteristic value of each factor must be greater than 1 and the factor loadings after the orthogonal axis is greater than 0.3, as the criterion for the construction validity of the scale. According to the analysis results of the above methods, the eigenvalues were 7.311, 6.118, 7.180, and 3.435, respectively. The explanatory variability was 73.107%, 67.977%, 71.803%, and 68.692%, respectively. The cumulative variability was 73.107%, 67.977%, 71.803%, and 68.692%, as shown in Table 2.

Table 2
Analysis for Workload, Work competency, Salary & welfare and Turnover intention

Workload	
Eigenvalues	7.311
Explain the amount of variation (%)	73.107
Cumulative interpretation of variation (%)	73.107
Work competency	
Eigenvalues	6.118
Explain the amount of variation (%)	67.977
Cumulative interpretation of variation (%)	67.977
Salary & welfare	
Eigenvalues	7.180
Explain the amount of variation (%)	71.803
Cumulative interpretation of variation (%)	71.803
Turnover intention	
Eigenvalues	3.435
Explain the amount of variation (%)	68.692
Cumulative interpretation of variation (%)	68.692

Note: 1. Extraction method: principal component factor analysis

3.6 Reliability

After the project analysis to test its validity, the study conducted the reliability test of physical function, psychological factors, training environment, and training performance, measured internal consistency and stability, and analyzed the analysis results with Cronbach's α of 0.940 for workload, Cronbach's α for salary and benefits, turnover orientation with Cronbach's α of 0.883, and turnover intention is 0.980. Thus, the analysis results showed that the test of reliability analysis is credible (as shown in Table 3).

Table 3

Reliability analysis summary of Workload, Work competency, Salary & welfare and Turnover intention

Variable	Number	Average	Standard deviation	Cronbach's α
Workload	100	4.37	.774	.958
Work competency	100	3.76	.734	.940
Salary and benefits	100	4.19	.800	.956
Turnover intention	100	4.29	.784	.883

4. Results and Discussion

4.1 Structural analysis of samples

This section will use descriptive statistical analysis to understand the basic characteristics and current situation of the officers and rating crews interviewed. A total of 100 valid questionnaires were collected in this study (as shown in Table 4).

Table 4
Structural Analysis of Subject Samples.

Variable	Category	NUMBER	percentage	Cumulative percentage
Gender	Male	81	81%	81%
	Female	19	19%	19%
Type of entry	Under 20 years old	22	22%	22%
	21~30 old	44	44%	44%
	31~40 old	28	28%	28%
	41~50 old	6	6%	6%
	51~60 old	0	0	0
	61 years old or older	0	0	0
Marriage	Married	36	36%	36%
	Unmarried	64	64%	64%
Family Population	2~3 people	24	24%	24%
	3~4 people	41	41%	41%
	4~5 people	21	21%	21%
	More than 5 people	14	14%	14%
Rank	Officer	25	25%	25%
	Rating Crew	42	42%	42%
	Apprentice	33	33%	33%
Education Level	Below the national middle (including)	1	1%	1%
	High school (job)	48	48%	48%
	College	14	14%	14%
	University	37	37%	37%
	graduate School	0	0%	0%
Monthly salary income	~30000	1	1%	1%
	30001~50000	37	37%	37%
	50001~70000	45	45%	45%
	70001~	17	17%	17%

4.2 Correlation analysis of Workload, Work competency, Salary & welfare and Turnover intention

This section is to explore the correlation between Workload, Work competency, Salary & welfare and Turnover intention. This study uses Pearson correlation analysis, and the results are shown in Table 5. Workload has a significant relationship with Work competency, Salary & welfare and turnover intention; Work competency has a significant relationship with workload, Salary & welfare and turnover intention; Salary & welfare have a significant relationship with workload, Work competency and Turnover intention. There is a significant relationship between Workload, Work competency, Salary & welfare and Turnover intention.

Table 5 Pearson Correlation Analysis of each Construct (n = 100).

Construct	Work competency	Workload	Salary and welfare e	Turnover intention
Work competency	1	.743(**)	.727(**)	.823(**)
Workload	.743(**)	1	.766(**)	.785(**)
Salary and welfare	.727(**)	.766(**)	1	.711(**)
Turnover intention	.823(**)	.785(**)	.711(**)	1

*p<0.05 ; **p<.001

4.3 Regression analysis of the impact of crews Workload, Work competency, Salary & welfare and Turnover intention

According to the verification results of the above correlations, the factors related to workload, job qualification, salary and benefits and turnover intention are selected for multivariate stepwise regression analysis. The variables selected include Workload, Work competency, Salary & welfare and Turnover intention.

Before the stepwise regression analysis, the hypothesis of the normalization of turnover intention, independence between independent variables, self-correlation and linear mode suitability is tested. The assignment of histograms, Work competencies, Salary & welfare standardization residuals, histograms and normal probability distributions can be found to be nearly normal; the collinear diagnosis of independence between independent variables.

According to the principle of collinear when the coefficient of variation inflation (VIF) is greater than 10 or the condition index (CI) is greater than or equal to 30, Collinear of degrees. The maximum VIF value of the study subjects (N=100) was 2.945, and the maximum CI value was 25.063, indicating that there was no obvious Collinear between the variables in all subjects in this study; the self-correlation test of residual values (Durbin-Watson D) In the case of verification, if the D value obtained is around 2, it means that the residual value does not violate the assumption that there is no self-correlation. The D value of this study object was 2.272 (as shown in Table 6). The regression results can be used to

list the regression of the overall crews turnover tendency of all the research samples (Table 6). The equation is as follows:

$$\text{Crew Demission Trend} = .230 + .514 (\text{Workload})$$

$$\text{Crew Demission Trend} = .230 + .358 (\text{Working Competency}) + .230 + .070 (\text{salary benefits})$$

Table 6

Crews Workload, Work Competency and Salary & welfare Summary of Regression Coefficient Regression Coefficient.

Construct	Decide coefficient	F Value	Not standardized Regression coefficients	Standardization Regression coefficients	T Value	Collinear diagnosis		Durbin-Watson
						Tolerance	VIF	
Intercept			.245		.938			
Workload			.514	.511	6.200*	.389	2.574	
Work Competence	.747	94.242	.358	.351	3.982*	.340	2.945	2.272
Salary and welfare			.070	.071	.822	.357	2.799	

The above formula shows that the overall crews turnover tendency of respondents can be explained by workload, job competency and salary and benefits, and the total variance explained is 50.590%. Regarding the basic assumptions in the classical linear regression model, this present research took on some assessments for it. First, A P-P Plot was used for assessing the assumption of normality. The plot showed the quantile pairs fall close a straight line and we would conclude from this evidence that the data we used are approximately normal. Secondly, condition index (C.I.) is used to assess the multicollinearity. The value of 31.24 indicated there was no severe multicollinearity problem among the regressors. Finally, we used Durbin-Watson d statistic for detecting serial correlation. The value of 2.272 indicated the autocorrelation problem does not exist.

In summary, as shown in 4.2 and 4.3, there is a significant relationship among the three dimensions of Workload, Work competency and Salary & welfare. Therefore, it can be seen that job competence, workload, and salary and benefits have a significant positive relationship with turnover intention. Therefore, H1 is established. Although no significant analysis was presented in the regression analysis, it was found during the explanatory analysis the study participants, for each additional point of work load, the respondent's overall crews' turnover intention will increase by 514 points; for each additional point of work, the respondent's overall crews turnover will increase. For each additional point of salary and benefits, the respondent's overall crews turnover will increase by .070 points. Therefore, it can be seen that the three aspects of this research are still positive. It is estimated that the number of samples may be insufficient. In the future, it is recommended to find more different shipping companies for sampling research.

5. Conclusions and Recommendations

The analysis shows that Workload has a significant relationship with Workload, Work competency, Salary & welfare and Turnover intention; Work competency has a significant relationship with workload, Salary & welfare and turnover intention; Salary & welfare have a significant relationship with workload and Turnover intention; Turnover intention and work There is a significant relationship between Workload, Work competency, Salary & welfare and Turnover intention, and this research shows that seafarers' turnover tendency can be learned through data analysis of Workload, Work competency, Salary & welfare through the application of sensing technology and the Internet of Things, and it can effectively warn the occurrence of sudden human resources incidents.

This research comprehensively explains that it is feasible to apply sensing technology and the Internet of Things to manage the human resource issues of the crew. The captain can immediately find the crew's problems at work, and can effectively solve the loss of talents and improve the crew. The work efficiency of the shipping company can also solve the human resource problem of the shipping company. The combination of sensing technology and the Internet of Things is the future trend in the business model. For enterprises, the use of sensing technology and the Internet of Things to improve company performance or monitor employees the behavior during working hours lies between official business and privacy, so the company must also take good measures to ensure the privacy of the company and its employees⁽¹⁶⁾. More importantly, the combination of sensors and IoT can also help. The company conducts education and training. It is learned from the database that it is the first time that employees use sensing tools and equipment, and they will immediately receive guidance and learn to operate. In terms of RFID technology, the application of wireless technology has gained support from the general public and the management of human resources Trust.⁽¹⁷⁾ Therefore, companies that use more advanced sensing technologies and the Internet of Things can avoid repetitive waste of resources while improving production efficiency.

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