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# Validating Individual Work Performance Questionnaire (IWPQ): A Second Order Confirmatory Factor Analysis

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## Abstract

The main objective of this study was to validate the Individual Work Performance Questionnaire (IWPQ) developed by Koopmans et al. in 2011. The data were collected from 572 police officers attending the training courses administered by the Police Education Bureau, the Royal Thai Police, Thailand. The Second Order Confirmatory Factor Analysis was employed to validate the scale. The results showed that all sub-scales of the latent variable (work performance) had a high level of reliability. The measurement models of the three dimensions (task performance, contextual performance, and counterproductive work behavior) had a good fit with empirical data. There was a reasonable fit for the Second Order IWPQ Confirmatory Factor Analysis. We concluded that the IWPQ scale showed an unreasonable fit and could not be applied directly in the Thai context. Some items and dimensions should be revised prior to adopting this scale.

**Keywords:** work performance, IWPQ, confirmatory factor analysis

## 1. Introduction

Employee performance refers to behaviors or actions that align with an organization's goals (McCloy, Campbell, and Cudeck, 1994). It can be measured by the results of work, turnover, sales volume, and quality of service delivery. Being a successful organization and achieving the organization's goal requires the cooperation of employees. However, it's important for employees to perform well. Their skills, experience, and ability must be trained through the training, learning, and development process of the organization including human resource management practices of the organization. Shermerhorn et al. (2000) say that performance refers to the behavior that a person performs to accomplish an assigned task. Work performance, therefore, refers to the outcomes that result from working to achieve an employee's goals. The performance of a person's work depends on personal characteristics, individual efforts, and organizational support.

Employees' work performance (WP) could be influenced by various factors. Sawar and Aburge (2013) found that job satisfaction makes employees more active at work. Once they are satisfied with their jobs, they will work properly, provide good service to customers, come to work on time, innovate, and create a sense of belonging to the organization, which directly affects the performance of employees and helps the organization to be more profitable. A study in Thailand by Tengpongsthorn (2017), who focus on the factors relating to the work effectiveness of police officers in the Thai Metropolitan Police Bureau, found that enough equipment was a factor facilitating an increase in work performance, whereas the imbalance of manpower and scarcity of modern equipment were factors which were obstacles to work performance of the police in Bangkok. In addition, the study conducted by Kulachai,

Tedjakusuma, and Homyamyen (2022) mentioned job stress, job satisfaction, and organizational commitment have a positive impact on the job performance of the Thai police. Ahmad et al. (2018). Conducted research in Malaysia. They examined the predictive factors of the job performance of police in Selangor, Malaysia. The findings revealed that the job performance of the police was influenced by work stress, social support, and emotional intelligence. According to their study, emotional intelligence was the most influential factor. Zakarani and Noor (2021) examined the influence of the workplace environment that is physical environment, supervisor support, and performance feedback on the performance of employees at the Sepang Police District Headquarters, Malaysia. The results revealed that the physical environment, supervisor support, and performance feedback significantly influence the performance of police officers. In addition, supervisor support acts as the most significant predictor of the job performance of the police. Rifa'i et al. (2020) conducted a study entitled "Determinants factors affecting the performance of police officers in Tangerang City, Indonesia: Role of work experience and domicile as moderating variables." They explored the influence of organizational culture, employee engagement, and work-life balance with work experience and domicile distance as moderating variables on the work performance of police officers at the Tangerang City Police." They found that organizational culture and employee engagement had a positive impact on the work performance of police officers. However, there was no relationship between the work-life balance and the work performance of the police in Tangerang City.

Scholars and researchers employed various work performance measurements. Zakarani and Noor (2021) used the five-item employee performance scale created by Brennan, Chugh, and Kline (2002). Ahmad et al. (2018) employed the Formal Performance Appraisals initiated by Pearce and Porter (1986) as modified by Ngah et al. (2009) to measure the performance of the police. This measurement has eight items, such as "On the whole, my performance is good," and "I can set up a task within the stipulated time frame." The Cronbach's alpha of this scale was 0.95 according to their study. In addition, Rifa'i et al. (2020) adopted the work performance scale initiated by Aguinis (2009), which consists of two dimensions and eight statement indicators. In Thailand, Tengpongsthorn (2017) created a questionnaire to measure the work performance of the police based on the assessment of Thai Royal Police effectiveness rule B.E. 2547 (Royal Thai Police, 2004). This measure comprises 10 indicators which are responsibility, quality of work, knowledge and critical thinking, willingness, punctuality, compliance, ability to manage, initiative, cooperation, and resource use. Koopmans et al. (2014) validated the construct of the Individual Work Performance Questionnaire (IWPQ) and found that there are three constructs, namely task performance (TP), contextual performance (CP), and counterproductive work behavior (CWB). These three dimensions have five, eight, and five statements as shown in Table 1.

Table 1 The IWPQ Scale

Items	
Task performance (TP)	
In the past 3 months...	
TP1	I managed to plan my work so that it was done on time.
TP2	My planning was optimal.
TP3	I kept in mind the results that I had to achieve in my work.
TP4	I was able to separate main issues from side issues at

TP5	work. I was able to perform my work with minimal time and effort.
<hr/>	
Contextual Performance (CP) In the past 3 months...	
CP1	I took on extra responsibilities.
CP2	I started new work myself when my old ones were finished.
CP3	I took on challenging work tasks, when available.
CP4	I worked at keeping my job knowledge up to date.
CP5	I worked at keeping my job skills up to date.
CP6	I came up with creative solutions to new problems.
CP7	I kept looking for new challenges in my job.
CP8	I actively participated in work meetings.
<hr/>	
Counterproductive behavior (CWB) In the past 3 months...	
CWB1	I complained about unimportant matters at work.
CWB2	I made problems greater than they were at work.
CWB3	I focused on the negative aspects of a work situation, instead of on the positive aspects.
CWB4	I spoke with colleagues about the negative aspects of my work.
CWB5	I spoke with people from outside the organization about the negative aspects of my work.
<hr/>	

Based on the results of their study, they concluded that the overall construct validity of IWPQ was acceptable. Its convergent validity proved to be sufficient, and its discriminative validity was very good. The IWPQ provides researchers with a reliable and valid instrument to measure IWP generically, among workers from different occupational sectors, and workers with and without health problems. This present, therefore, validated the IWPQ of Koopmans et al. (2014) whether it is suitable for the Thai context, especially the Royal Thai Police.

## **2. Research Methods**

### **2.1 Population and Samples**

The population used in the study were 1,060 police officers who were trained in high police administration courses, such as Superintendent and Inspector Course at the Police Education Bureau, the Royal Thai Police. The sample or respondent size was 572 police officers derived from the G\*Power3 program. This program is flexible, easy to use, and suitable for determining sample size in cases where the research uses a family of test statistics, such as F-test statistics, and chi-square test statistics (Faul et al., 2007). In the present study, we used the difference between the average before and after interventions that this research can accept or the effect size of 0.3, which is a moderate influence size, and the power of test value is .80. Then, simple random sampling was employed to collect data from prospect participants.

### **2.2 Measures**

The Individual Work Performance Questionnaire (IWPQ) was employed in the present study. It consists of three dimensions and eighteen items as mentioned in Table 1. Prior to collecting the empirical data, the validity and reliability of the questionnaire were tested. Validity was

examined whether the questionnaire contains the full substance of the measured subject. In this present study, we used the Item-Objective Congruence Index (IOC) to indicate the validity of the questionnaire. This approach requires the discretion of at least five experts in the relevant fields to avoid the problem of ideas divided into two poles (Tirakanan, 2006). The index showing such conformity values is called the Item-Objective Congruence Index (IOC). The IOC values range from -1 to 1. Any good question should have an IOC value of close to 1, while any question with an IOC value below 0.50 should be revised (Prasitrattasindh, 2003). The results showed that all questions had an IOC value above 0.50, so none of them were eliminated and the authors updated some of the text of the questionnaires based on expert recommendations and used the updated questionnaires to test their reliability. The authors conducted a reliability test by means of a coefficient of reliability, or internal consistency, called Cronbach's Alpha. If the alpha value is below .50, it is considered less reliable (Prasitrattasindh, 2003). The authors collected data from samples similar to the actual sample of 30 people in order to analyze the data for the coefficient of reliability. The analysis result revealed Cronbach's alpha coefficient of 0.74. However, three items of task performance (TP), and four items of contextual performance (CP) were eliminated according to the advice of the statistical program. Hence, the total scale was 11 items (see table 2 below).

Table 2 The revised IWPQ Scale

Items	
Task performance (TP)	
In the past 3 months...	
TP4	I was able to separate main issues from side issues at work.
TP5	I was able to perform my work with minimal time and effort.
Contextual Performance (CP)	
In the past 3 months...	
CP3	I took on challenging work tasks, when available.
CP4	I worked at keeping my job knowledge up to date.
CP5	I worked at keeping my job skills up to date.
CP6	I came up with creative solutions to new problems.
Counterproductive behavior (CWB)	
In the past 3 months...	
CWB1	I complained about unimportant matters at work.
CWB2	I made problems greater than they were at work.
CWB3	I focused on the negative aspects of a work situation, instead of on the positive aspects.
CWB4	I spoke with colleagues about the negative aspects of my work.
CWB5	I spoke with people from outside the organization about the negative aspects of my work.

### 2.3 Data Collection

The simple random sampling technique was used to administer the questionnaire to police officers attending the training program at the Police Education Bureau. Each participant also gave consent before completing the questionnaire. After three months of the data collection process (October and December 2019), 572 people participated in the survey questionnaire.

The demographic characteristics of the sample are summarized in Table 3.

Table 3 The demographic characteristics of the sample (n = 572)

Characteristics		Percentage	Frequency
Gender	Male	497	86.89
	Female	75	13.11
Marital status	Single	145	25.35
	Married	390	68.18
	Widowed	5	0.87
	Divorced	30	5.24
	Others	2	0.35
Education	Secondary school or lower	1	0.17
	High school or equivalent	17	2.97
	High vocational or equivalent	7	1.22
	Bachelor's degree	310	54.20
	Master's degree or higher	237	41.43
Position	Sub-inspector	342	59.79
	Inspector	6	1.05
	Deputy superintendent	171	29.90
	Deputy commander	53	9.27
Type of work	Traffic	30	5.24
	Investigation	215	37.59
	Criminal suppression	172	30.07
	General affairs	155	27.10
Other characteristics		Mean	S.D.
Age		43.582	7.6910
Tenure		20.264	8.4076
Income*		37,219.86	17,818.83

\*1 THB = 0.030429636 USD

#### 2.4 Data Analysis

According to the data analysis, descriptive statistics for analyzing various statistical values, including percentage, frequency, mean, and standard deviation were employed. To validate the IWPQ constructs, the Second Order Confirmatory Factor Analysis was employed. The Second Order CFA is a statistical method employed by the researcher to confirm that the theorized construct in a study loads into the certain number of underlying sub-constructs or components. There are six steps to conducting the Second Order CFA as follows (Suksawang, 2013):

1. Model specification: The specification of the model refers to defining the structural relationships in each element of the subject in the model.
2. Model identification: The identification of the model refers to specifying whether a subject can estimate a parameter as a single value.
3. Model estimation: The estimation of the model is the estimation of the various parameters of the model as indicated by the single probability value of the model. Different methods of approximation can be chosen including instrumental variables (IV), two-stage least squares (TS), unweighted least squares (UL), generalized least squares (GL), weighted least squares

(WL), and maximum likelihood (ML) (Jöreskog & Sörbom, 2012). The present study employed ML to estimate the parameters since it is an ideal method for data with interval, ratio, and ordinal scale, where there is a normal distribution or slightly irregular distribution of the data (Schumacker & Lomax, 2010).

4. Model testing: It is a step in that researchers must carefully consider the model consistency index, with three principles to consider: 1) consider the consistency of the structural equation model developed with empirical data, 2) determine whether each parameter is different from zero, and 3) consider the reasonableness of the size and direction of each parameter.

5. Model modifications: Model modification is a procedure that is performed only if there are certain parameter values that do not differ from zero ( $|t| \leq 1.96$ ) or the direction of the parameter values does not match the theory.

The fit index used to determine the conformity of a hypothetical model to the empirical data consists of the various indices as illustrated in Table 4.

Table 4 The fit indexes

Fit indexes	Possible values	Criteria for consideration
Chi-square	0 (perfect fit) to positive value (poor fit)	The p-value must be greater than 0.05.
Relative Chi-square	0 (perfect fit) to positive value (poor fit)	Less than 2.0
Goodness of fit Index	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Adjusted Goodness of Fit Index (AGFI)	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Comparative Fit Index (CFI)	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Tucker - Lewis Index (TLI)	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Non Norm Fit Index (NNFI)	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Norm Fit Index (NFI)	0 (no fit) to 1 (perfect fit)	Greater than 0.95
Root Mean square Residual (RMR)	0 (perfect fit) to a positive value (poor fit)	It has a value approaching zero (depending on the degree determined by the researchers)
Standardized RMR (SRMR)	0 (perfect fit) to a positive value (poor fit)	Less than 0.05
Root Mean Square Error of Approximation (RMSEA)	0 (perfect fit) to a positive value (poor fit)	Less than 0.05 or 0.08
Parsimony Normed Fit Index (PNFI)	0 (perfect fit) to a positive value (poor fit)	Compare alternative models, which models have a higher PNFI value are better
Akaike Information Criterion (AIC)	0 (perfect fit) to a positive value (poor fit)	Compare alternative models, which models have less AIC value are better

Source: Suksawang (2013)

The present study employed an index of statistical values that are used to examine and show

whether the model is fitted with the empirical data. It consists of  $p$ -value  $> .05$ ,  $\chi^2/df < 2$ , GFI  $> 0.95$ , NFI  $> 0.95$ , CFI  $> 0.95$ , RMSEA  $< 0.05$  (Hair, Back, Babin, & Anderson, 2010; Suksawang, 2013). However, prior to the analysis, the assumptions of a CFA including multivariate normality, a sufficient sample size ( $n > 200$ ), the correct a priori model specification, and data that must come from a random sample were considered.

### 3. Results and Discussion

#### 3.1 Multivariate Normality Testing

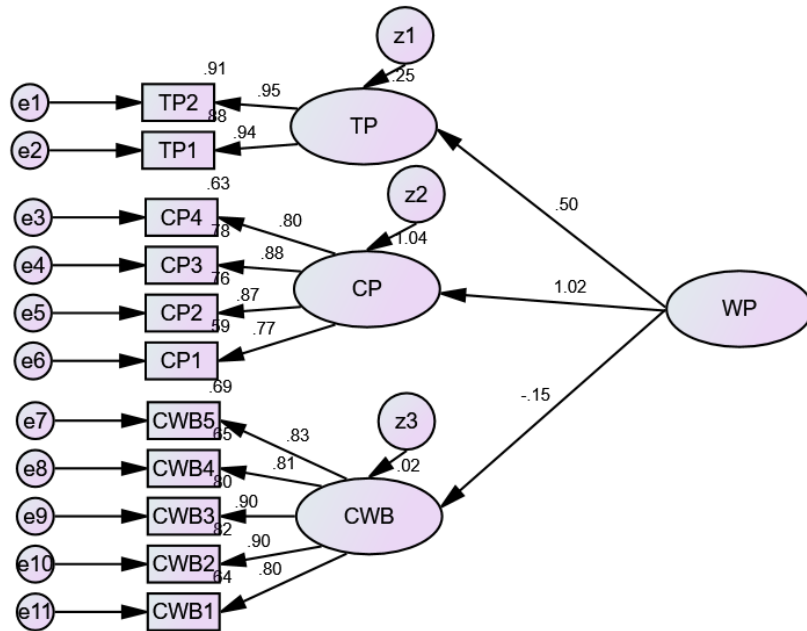
To test the multivariate normality, the authors employed kurtosis ( $< 10.0$ ) and skewness ( $< 3.0$ ) as criteria indicating normal distribution. The analysis results indicate that there is multivariate normal distribution as shown in Table 5. According to table 5, the skewness value is between .199-1.427, while the kurtosis value is between .083 - 1.616 indicating normal distribution criteria is accepted.

Table 5 Skewness and Kurtosis

Observed variable	Mean	S.D.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TP1	4.040	.6320	-.199	.102	.083	.204
TP2	3.990	.6721	-.439	.102	.754	.204
CP1	4.075	.7221	-.758	.102	1.616	.204
CP2	4.089	.6831	-.478	.102	.602	.204
CP3	4.180	.6435	-.502	.102	.939	.204
CP4	3.965	.6893	-.437	.102	.611	.204
CWB1	2.086	1.1126	.757	.102	-.289	.204
CWB2	1.682	.9635	1.427	.102	1.339	.204
CWB3	1.799	1.0198	1.226	.102	.811	.204
CWB4	2.135	1.0902	.764	.102	-.235	.204
CWB5	1.874	1.0677	1.154	.102	.536	.204

#### 3.2 Second-Order CFA Results

The results revealed the model chi-square of 790.430 with 52 degrees of freedom. The  $p$ -value was significant. According to Hair et al. (2010), if the number of samples is greater than 250, and the observed variables are less than 12, an insignificant  $p$ -value should be expected. Hence, the chi-square goodness-of-fit statistic did not indicate that the observed covariance matrix matches the estimated covariance matrix within the sampling variance. The value of GFI and RMSEA, the absolute fit index, were .845 and .158 in that order. These values indicate that the model was not fit. The normed chi-square was 15.201 which falls above 2.00 indicating an unacceptable fit for the CFA model. According to the incremental fit indices, the CFI, an incremental fit index, had a value of .806, which does not exceed the suggested cut-off values. In addition, the AGFI, a parsimony fit index, had the value of .803, which reflects a poor model fit as illustrated in Figure 1.

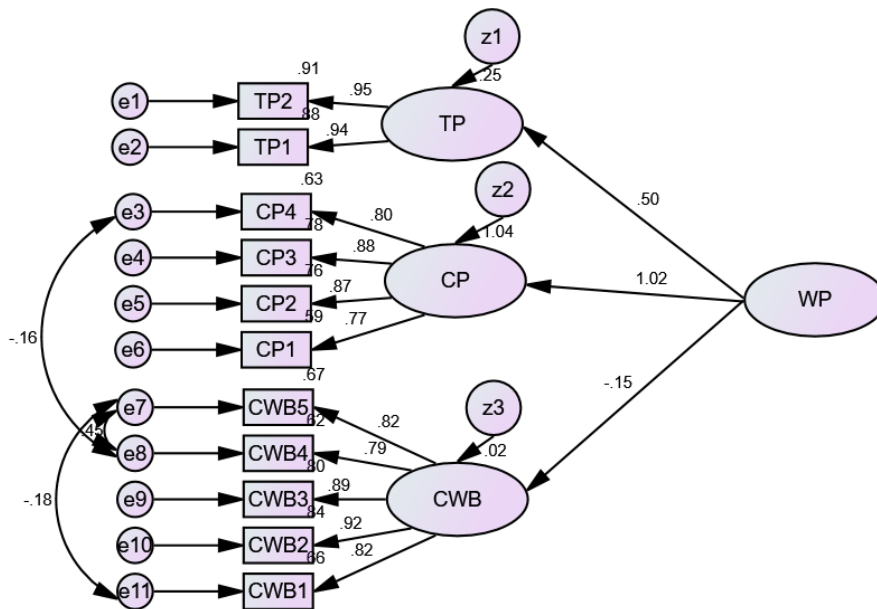


Chi-square = 790.430, df = 52, Chi-square/df = 15.201, p = .000, GFI = .845, AGFI = .803, CFI = .806, TLI = .794, RMSEA = .158, RMR = .282, NFI = .795

Figure 1 Hypothesized CFA model

Figure 2 illustrates the modification of the model according to the modification indices. The results of the revised model revealed the model chi-square of 642.642 with 49 degrees of freedom. The p-value was significant. According to Hair et al. (2010), if the number of samples is greater than 250, and the observed variables are less than 12, an insignificant p-value should be expected. Hence, the chi-square goodness-of-fit statistic did not indicate that the observed covariance matrix matches the estimated covariance matrix within the sampling variance. The value of GFI and RMSEA, the absolute fit index, were .891 and .146 in that order. These values indicate that the model was not fit. The normed chi-square was 13.115 which falls above 2.00 indicating an unacceptable fit for the CFA model. According to the incremental fit indices, the CFI, an incremental fit index, had a value of .844, which does not exceed the suggested cut-off values. In addition, the AGFI, a parsimony fit index, had a value of .854, which reflects a moderate model fit. All information on goodness-of-fit statistics is illustrated in Figure 2.





Chi-square = 642.642, df = 49, Chi-square/df = 13.115, p = .000, GFI = .891, AGFI = .854, CFI = .844, TLI = .825, RMSEA = .146, RMR = .286, NFI = .833

Figure 2 Revised CFA model

Table 6 illustrates the overall results of the Second Order Confirmatory Factor Analysis. The results of hypothesized CFA model and the revised CFA model were compared. Even though the authors modified the model suggested by modification indices, the model still no longer fits with the empirical data.

Table 6 The results of Second Order Confirmatory Factor Analysis

Fit indexes	Criteria	Hypothesized CFA model		Revised CFA model	
		Value	Description	Value	Description
p-value	> .05		Not pass	.000	Not pass
$\chi^2/df$	<2		Not pass	13.115	Not pass
GFI	> 0.95		Not pass	.891	Not pass
NFI	> 0.95		Not pass	.833	Not pass
CFI	> 0.95		Not pass	.844	Not pass
RMSEA	< 0.05		Not pass	.146	Not pass
TLI	> 0.95		Not pass	.825	Not pass

Figure 2 reveals that the three dimensions of work performance had a factor loading of .50 for task performance, .1.02 for contextual performance, and -.15 for counterproductive work behavior. These indicate that the counterproductive work behavior dimension contributed poorly to the work performance construct while the other two dimensions provided moderate and good contributions. The results revealed the standardized factor loadings, an average variance extracted, and the construct reliability as illustrated in Table 7.

Table 7 Standardized factor loadings, average variance extracted, and construct reliability.

Dimension/Item	Standardized factor loadings
Task performance (TP)	

TP1	.94		
TP2	.95		
Contextual performance (CP)			
CP1		.77	
CP2		.87	
CP3		.88	
CP4		.80	
Counterproductive work behavior (CWB)			
CWB1			.82
CWB2			.92
CWB3			.89
CWB4			.79
CWB5			.82
Average variance extracted (AVE)	.8931	.6911	.7215
Construct reliability (CR)	.9206	.9960	.9916

According to Table 7, the lowest loading obtained is .77 contextual performance (CP) to item 3 “CP1.” All factor loadings were greater than the .70 standard. The average variance extracted estimates (AVE) and the construct reliabilities (CR) are shown at the bottom of the table. The AVE estimates range from 69.11% for contextual performance (CP) to 89.31% for task performance (TP). All exceed 50% rule of thumb. The CR ranges from .9206 for the TP construct to .9960 for the CP construct. These exceed the .70 standard which indicates adequate reliability.

#### 4. Discussion

According to the analysis results, we concluded that the IWPQ scale showed an unreasonable fit and could not be applied directly in the Thai context. Some items and dimensions should be revised prior to adopting this scale. These findings show that the IWPQ provides sufficient convergent validity which is consistent with a previous study conducted by Koopmans et al. (2014). Some studies also found that IWPQ shows a good face of structural validity (Borman & Motowidlo, 1993; Koopmans et al., 2013). Ramdani et al. (2019) conducted research on the topic “The individual work performance scale: A psychometric study and its application for employee performance.” They also found that the IWPQ shows a good convergent validity with presenteeism and correlates with job burnout. However, the factor loadings of each dimension are questionable and need to be examined.

#### 5. Conclusion

This study addressed the work performance of police officers in Thailand. The study was designed to answer the fundamental question of whether the IWPQ is suitable to be adopted in the Thai context. The findings revealed that the IWPQ CFA model does not fit with the empirical data. Hence, researchers should validate the IWPQ scale prior to adopting it. Interestingly, counterproductive work behavior yielded low factor loadings (<0.30). This dimension could be eliminated from the analysis. Also, competing, or alternative models could be established for future research. However, this study helped us to understand the relationship direction between each dimension and work performance construct.

#### 6. Conflict of Interest

The authors of this article declare no conflict of interest.

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## Applied and Advanced Science Exchange (AASE):

The *Applied and Advanced Science Exchange* (AASE) is an active professional community and registered as a non-profit organization (NGO) in Japan. AASE has devoted itself to disseminate a variety of knowledge and worked with a vision to share the innovations in fields of academia by building up an international platform. Nowadays, interdisciplinary research is increasing and playing a key role. In our interdisciplinary joint conferences, participants are able to share their viewpoints from different perspectives and seek new collaborative opportunities across fields.

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AASE conferences footprints of the world



## **EDITORIAL MESSAGE**

It is my proud privilege to welcome you all to the PSMP International Conference at Paris/France on 01<sup>th</sup>-05<sup>th</sup> March 2023. AASE International Conference serves as platform that aims to provide opportunity to the academicians and scholars from across various disciplines to discuss interdisciplinary innovations. We are happy to see the papers from all part of the world published in this proceedings. This proceeding brings out the various Research papers from diverse areas of science, engineering, nanotechnology, management, business and education. These articles that we received for these conferences are very promising and impactful. We believe these studies have the potential to address key challenges in various sub-domains of social sciences and applied sciences. I am really thankful to all the participants for being here with us to create an environment of knowledge sharing and learning. I am also thankful to our scientific and review committee for spending much of their time in reviewing the papers for these events. I am sure the contributions by the authors shall add value to the research community.

Editor-In-Chief  
**Dr. H. Miyamoto**

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