UNTAR Universitas Tarumanagara TICATE

UNTAR untuk INDONESIA

Tarumanagara International Conference on the Application of Technology and Engineering 2023

Continuous Research in Generating Innovation to Support the Welfare of Global Society

October 6, 2023 Via zoom

KEYNOTE SPEAKERS

Dr. Ayub Ahmed Janvekar
Vellore Institute of Technology, India

***Prof. Dr. Mahadzir Bin Ishak**
Universiti Malaysia Pahang Al-Sultan Abdullah, Malaysia
(*to be confirmed)

IMPORTANT DATES

SUBMISSION DEADLINE
September 23, 2023

ACCEPTANCE NOTIFICATION
September 26, 2023

CAMERA READY & REGISTRATION
October 2, 2023

CONFERENCE DATE
October 6, 2023

REGISTRATION FEES

Presenters	
International	USD 200
Indonesian	IDR 2,500,000
Student	IDR 2,000,000
Additional pages	IDR 2,000,000
Participants	
International	USD 75
Indonesian	IDR 600,000
Students	IDR 400,000

PAPER SUBMISSION

Submissions must be original and should not have been published previously or be under consideration for publication while being evaluted for TICATE 2023.
All submitted papers will be double blind reviewed by internationally reputable reviewers.

You can publish the manuscript and deliver your presentation on TICATE 2023.
Please submit full-length manuscript for review before the submission deadline to **ticate@untar.ac.id**

You can download the paper's template at: **ticate.untar.ac.id**

Publish at: International Journal of Application on Sciences, Technology and Engineering

Contact

Address : Jl. Let. Jend. S. Parman No.1 Jakarta DKI Jakarta 11440 Indonesia
Fax Number : (+62) 215 6958 738
Email : ticate@untar.ac.id
Website : http://ticate.untar.ac.id

Contact No:
(+62) 21 5695 8751
(+62) 815 8433 6003 (Wulan)
(+62) 816 1961 710 (Hilary)

Organized by:
UNTAR Universitas Tarumanagara

UNTAR Universitas Tarumanagara | 64 Global Impact through Quality Education

TICATE | Kampus Merdeka INDONESIA JAYA

Tarumanagara International Conference on the Application of Technology and Engineering

Certificate

No: 004 /TICATE-UNTAR/X/2023

OF ACHIEVEMENT

Joni Fat, ST. ME. MT.

FOR THE CONTRIBUTION AS:

PRESENTER

PAPER TITLE:

Triangle Hedging Trading Robot with Currency Pair Correlation for The Forex Market

Universitas Tarumanagara, Friday October 6th, 2023

Prof. Dr. Ir. Agustinus Purna Irawan, M.T., M.M., IPU., A.E.
Rector

Didi Widya Utama, S.T., M.T., Ph.D.
Chairman

Jakarta, 25th of September 2023
No. : 001-TIM/3440/UNTAR/IX/2023

ABSTRACT ACCEPTANCE NOTIFICATION
Reference Number **: TICATE-004**
Title : Triangle Hedging Trading Robot With Currency Pair Correlation For The Forex Market
Author : Joni Fat, Handian Satria Utama, Hendry Candra, Wati Asriningsih Pranoto, Axel Irving Yoshua, Tyven Christopher Gilbert

Dear Sir/Madam,

Thank you for your paper submission to the TICATE 2023. We are pleased to inform you that your fullpaper submission is accepted for presentation in TICATE 2023. Due to some outstanding reviews for other submissions, however, the review result is not yet available. Currently the review is still on progress. In the meantime, we recommend that you check your manuscript to minimize obvious errors, such as formatting and grammatical errors.

We invite you to present your paper at the conference. All the paper presented in TICATE 2023 will be published in International Journal of Application on on Sciences, Technology and Engineering.

Further updated information will be published in our website (http://ticate.untar.ac.id)

If you have any questions, please do not hesitate to contact us.

Sincerely,

Didi Widya Utama, ST., MT., Ph.D.
Chairman of Ticate 2023

Paper ID	:	Triangle Hedging Trading Robot With Currency Pair Correlation For The Forex Market
Title	:	004

1. Abstract

- Abstract summarizes the objective or scope of study [ ] Weak [X] Satisfactory [ ] Strong
- State the major conclusions drawn from the results [ ] Weak [X] Satisfactory [ ] Strong

Reviewer Notes :

2. Introduction

- Purpose/ goal/ importance of the study clearly stated [ ] Weak [X] Satisfactory [ ] Strong
- The approach to carrying out the study is briefly started [ ] Weak [X] Satisfactory [ ] Strong

Reviewer Notes :

3. Designs and method

- Quality of Study Methodology [ ] Weak [X] Satisfactory [ ] Strong
- Describes technical experiments and proposed methods of data analysis [ ] Weak [X] Satisfactory [ ] Strong

Reviewer Notes :

4. Discussion

- Overall context of the research is clearly stated [ ] Weak [X] Satisfactory [ ] Strong
- Explanation why original hypothesis is supported / not supported [ ] Weak [X] Satisfactory [ ] Strong
- Conclusions are drawn from the evidence of results [ ] Weak [X] Satisfactory [ ] Strong

Reviewer Notes :

5. References

- References appropriate and sufficient [ ] Weak [X] Satisfactory [ ] Strong
- Proper and consistent formatting and sequencing of references cited [ ] Weak [ ] Satisfactory [X] Strong

Reviewer Notes :
.

6. Recommendation:

[ ] Accept [X] Minor revision [ ] Major revision [ ] Reject

7. Comment

TRIANGLE HEDGING AND AVERAGING TRADING ROBOT WITH CURRENCY PAIR CORRELATION FOR THE FOREX MARKET

Joni Fat[1], Hadian Satria Utama[2],Henry Candra[3], Wati Asriningsih Pranoto[4], Axel Irving Yoshua[5], Tyven Christopher Gilbert[6]

[1]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email:jonif@ft.untar.ac.id
[2]Facultyof Electrical Engineering, University Tarumanagara Jakarta
Email: hadianu@ft.untar.ac.id
[3]Faculty of Electrical Engineering, University Trisakti Jakarta
Email: henry_candra@yahoo.com
[4]Faculty of Civil Engineering, University Tarumanagara Jakarta
Email: watip@ft.untar.ac.id
[5]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email: axel.525210004@stu.untar.ac.id
[6]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email: tyven.525220003@stu.untar.ac.id

Enter : dd-mm-yyyy, revision: dd-mm-yyyy, accepted for publication : dd-mm-yyyy

ABSTRACT

Research on trading robots that apply the Triangle Hedging strategy in the context of currency trading on the forex market aims to optimize profit opportunities while managing risk by exploiting the correlation between currency pairs. The initial steps involve an in-depth review of forex literature, hedging strategies, and currency correlation concepts. This research explores the selection of appropriate currency pairs to be implemented in the Triangle Hedging strategy. This process is carried out by careful analysis of currency pair correlations, focusing on stable positive or negative relationships between them. The results of this correlation analysis show that several currency pairs have a correlation that can be utilized together with the Triangle Hedging strategy. The currency pairs are EURUSD and USDCHF; AUDUSD and USDCAD; GBPUSD and USDJPY. The trial was carried out using the forward testing method. The trial was carried out on four demo accounts with the following results: demo account 1-gain 205.07% and drawdown 43.52%; demo account 2 – gain 91.57% and drawdown 61.42%; demo account 3 – gain 263.54% and drawdown 60.12%; as well as demo account 4 – 170% gain and drawdown 91.81%. This test shows that for gain, the robot has shown good performance, but for drawdown, it still requires optimization. The triangle hedging method and the selection of correlation between currency pairs have not shown optimization in risk control. This is proven by 4 demo accounts showing drawdown levels above 50%; there are even 2 accounts with drawdowns above 90%.

Keywords: *Currency, Forex, Trading Robot, Triangle Hedging.*

1. PREFACE

Introduction

In the global financial market, currency trading (foreign exchange trading) has become a form of investment that attracts the attention of many market participants. In an effort to maximize profits and minimize risks, traders often look for complex and automated trading strategies. An interesting strategy is the triangle hedging strategy, where three related currency pairs are used to create arbitrage opportunities (Johnson & Smith, 2019). This triangular arbitrage takes advantage of temporary exchange rate imbalances to generate risk-free profits. Manually implementing a triangular hedging strategy requires complex analysis and rapid response to market fluctuations

(Wang & Li 2021). Therefore, the use of trading robot technology or Expert Advisors (EAs) will be able to overcome this obstacle by automating trade execution according to predetermined parameters (Tan & Kim, 2018). This research focuses on designing a trading robot and identifying correlated currency pairs that are suitable for a triangle hedging strategy. Choosing the right currency pair is important because strong correlation can increase the likelihood of success of this strategy (Zhang & Chen, 2017). Trading robots have become popular in Forex trading due to their ability to consistently execute trading strategies without human intervention. In the literature, trading robots are said to help eliminate the emotional factor in trading decision making, which is often the cause of losses (Smith & Jouganatos, 2018).

Correlations between currency pairs can provide insight into how the price movements of one currency pair may affect other currency pairs in a triangle hedging strategy. According to research (Stevens, Johnson & Smith, 2016), a positive correlation between two currency pairs showed that their price movements were trending in the same direction, while a negative correlation showed that their price movements were in the opposite direction. Selecting negatively correlated currency pairs in a triangle hedging strategy can help minimize risks associated with market volatility. In this regard, it is important to analyze historical correlations between currency pairs before deciding which pair is suitable for a triangle hedging strategy (Johnson & Smith, 2017). This trading robot will be designed to automatically analyze market data based on the correlations between currency pairs and make instant trading decisions to maximize arbitrage opportunities.

Based on the background of the problem, the problem identification in this research is as follows:

1. The importance of accurately determining the correlation: how to identify accurate correlation between currency pairs involved in a triangle hedging strategy. Strong correlations can influence the success or failure of a strategy, and accuracy in measuring these correlations is critical to minimizing risk and maximizing potential profits.
2. Choose the appropriate algorithm: Trading robot design includes choosing the right algorithm for correlation analysis and trading decision making. The problem is how to choose the appropriate algorithm to ensure accuracy in analysis and execution efficiency.
3. Risk management: Although the triangle hedging strategy offers profit potential with limited risk, the risks are still primarily related to rapid market movements and trade execution errors. The problem that needs to be overcome is how to design a trading robot that can manage risks well and avoid errors.

Problem Formulation

Based on the above problem identification, the problem formulation in this study is as follows:

1. Design an algorithm capable of identifying and measuring the exact correlation between different currency pairs in the context of a triangular hedging strategy.
2. Algorithms suitable for analyzing correlations and identifying arbitrage opportunities in triangle hedging strategies.
3. Effective risk management mechanism in trading robots to minimize the risk of market fluctuations and trade execution errors.

2. RESEARCH METHOD

The operational objectives of this research are:

1. Collect currency pair data to identify currency pairs for correlation analysis to be used in the triangle hedging strategy.
2. Calculate the correlation between currency pairs using statistical methods. This correlation calculation aims to identify currency pairs with strong negative correlations.
3. Develop trading robot algorithms.
4. Testing with real-time data (forward testing).

The research method carried out is as follows:

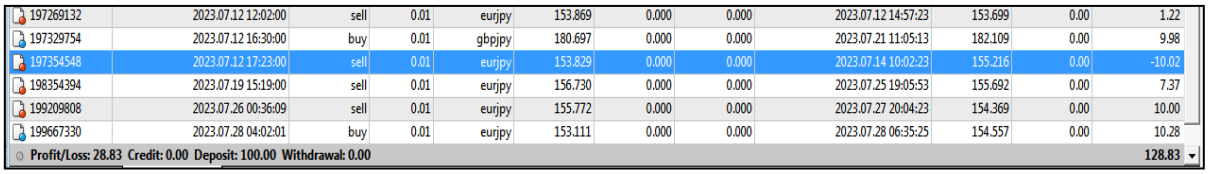
1. Determine the conceptual framework: the study will begin by formulating the basic concepts of trading robots, triangle hedging strategies, and the importance of correlations between currency pairs in the context of forex trading.
2. Identify sources of data and information: the requested data includes historical data on the price movements of the currency pairs that will be used in the correlation analysis. The source of information comes from the trading platform.
3. Analyze the correlation between currency pairs.
4. Select currency pairs.
5. Developing trading robots: at this stage, a trading robot will be developed based on an algorithm that allows to implement a triangular hedging strategy on the selected currency pair.
6. Test and optimize.
7. Check with real-time data: the trading robot will be tested with current market data (real-time data). The robot's performance will be monitored to see if the results are as expected.

3. RESULT AND DISCUSSION

The research was carried out according to the planned research steps. The first stage is a literature study. The results of the literature study are as follows:

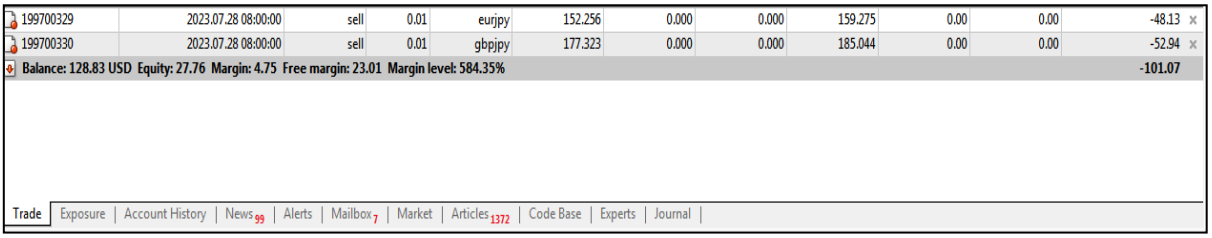
1. An explanation of the application of the Average Triangle Hedging strategy in the foreign exchange market and analyze its effectiveness in managing risks and potential returns (Stamoulis & Sogiakas, 2017).
2. Hedging strategies in the foreign exchange market and provide information related to the median triangle hedging concept (Wu & Shieh, 2019).
3. Aspects of hedging in forex and the possibility of using the Mean Triangle Hedging method as part of a risk prevention strategy (Molnar & Viski, 2019).
4. Arbitrage trading on forex trading strategies involving the combination of Middle Triangle Hedging method average to reduce arising transaction risks (Alev, 2020).
5. Risk analysis in the foreign exchange market and the concept of hedging strategies, provide perspective on risk and the need to protect against risk in an investment strategy (Song, & Qu, 2020).

The analysis of these literature studies are in the form of the strengths and weaknesses of the Triangle Hedging strategy in relation to potential profits in markets with high volatility. The method has good profit potential in its application, but is accompanied by risks regarding certain market conditions. Literature analysis also explains the factors that influence the performance of the Triangle Hedging method. Factors that influence the performance of the method include market conditions, profit taking and loss prevention in ongoing transactions. Figure 1 and Figure 2 show these influencing factors, where in trending market conditions, risks can arise if methods of taking profits and preventing losses are not designed well.



197269132	2023.07.12 12:02:00	sell	0.01	eurjpy	153.869	0.000	0.000	2023.07.12 14:57:23	153.699	0.00	1.22
197329754	2023.07.12 16:30:00	buy	0.01	gbpjpy	180.697	0.000	0.000	2023.07.21 11:05:13	182.109	0.00	9.98
197354548	2023.07.12 17:23:00	sell	0.01	eurjpy	153.829	0.000	0.000	2023.07.14 10:02:23	155.216	0.00	-10.02
198354394	2023.07.19 15:19:00	sell	0.01	eurjpy	156.730	0.000	0.000	2023.07.25 19:05:53	155.692	0.00	7.37
199209808	2023.07.26 00:36:09	sell	0.01	eurjpy	155.772	0.000	0.000	2023.07.27 20:04:23	154.369	0.00	10.00
199667330	2023.07.28 04:02:01	buy	0.01	eurjpy	153.111	0.000	0.000	2023.07.28 06:35:25	154.557	0.00	10.28
Profit/Loss: 28.83 Credit: 0.00 Deposit: 100.00 Withdrawal: 0.00											128.83

Figure 1. Limited Profit Taking



199700329	2023.07.28 08:00:00	sell	0.01	eurjpy	152.256	0.000	0.000	159.275	0.00	0.00	-48.13
199700330	2023.07.28 08:00:00	sell	0.01	gbpjpy	177.323	0.000	0.000	185.044	0.00	0.00	-52.94
Balance: 128.83 USD Equity: 27.76 Margin: 4.75 Free margin: 23.01 Margin level: 584.35%											-101.07

Trade | Exposure | Account History | News 99 | Alerts | Mailbox 7 | Market | Articles 1372 | Code Base | Experts | Journal

Figure 2. Uncontrolled Loss Prevention

The design begins with designing the open and close position sending module, algorithm design, date and account delimiter design and user interface (UI) design. The algorithm allows the robot to track position. Figure 3 shows the UI designed for the trading robot.

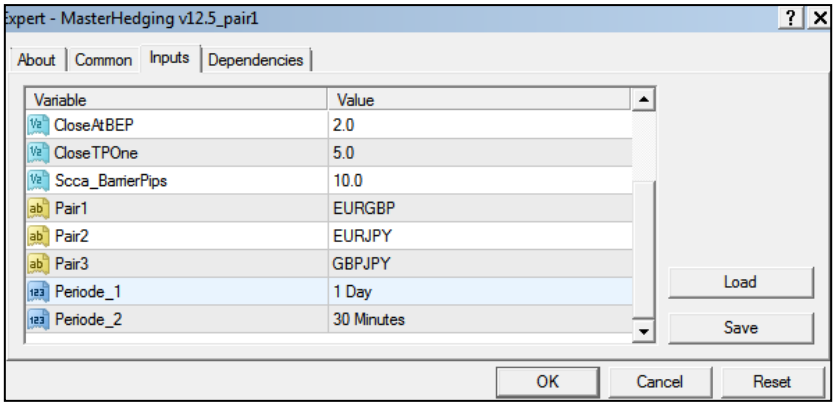


Figure 3. Robot UI

Testing of trading robot prototypes has also been carried out and is still being carried out in accordance with changes that occur. Test results statistics can be seen in Figure 4, Figure 5, Figure 6 and Figure 7. The accounts used in testing the trading robot are as follows:

1. 205680912,
2. 205680927,
3. 205681090,
4. 205681092.

The demo account statistical results in Figures 4 to Figure 7 show quite good results, i.e. demo account 1-gain 205.07% and drawdown 43.52%; demo account 2 – gain 91.57% and drawdown 61.42%; demo account 3 – gain 263.54% and drawdown 60.12%; as well as demo account 4 – 170% gain and drawdown 91.81%, but have a poor drawdown. Trading robots are able to open positions and close positions well. Likewise, robots are able to perform hedging to hedge open losing positions. The robot is also able to perform averaging to open positions so that it is hoped that it can cover the losses that arise.

Figure 4. Demo Account Statistics Results 1

Figure 5. Demo Account Statistics Results 2

Figure 6. Demo Account Statistics Results 3

Figure 7. Demo Account Statistics Results 4

4. CONCLUSIONS AND RECOMMENDATIONS

Some of the findings can be summarized as follows:

1. Exploiting currency pair correlation: the robot is able to identify and exploit correlated price movements, increasing profit opportunities. This can be seen from the forward test results

which provide significant gain values from the four demo accounts (205.07%; 91.57%; 263.54% and 160.07%)

2. Risk management is still less effective: this robot has a well-integrated risk management system, which is expected to be able to protect capital and minimize potential losses. However, in the forward tests carried out, this management has not shown optimal results with a drawdown level above 60%.
3. Consistent results: testing shows that the robot has the potential to generate consistent profits over the long term, with a level of risk that still requires tighter control.

Thus, this research shows that the application of trading robots with a triangular hedging approach and currency pair correlation analysis can be one of the promising solutions for Forex traders to optimize trading results. However, the use of trading robots in practice still requires a deep understanding of the Forex market and careful monitoring to maximize its potential.

Acknowlegdement

The author would like to thank the Directorate General of Vocational Education, Ministry of Education, Culture, Research and Technology (Kemdikbudristek) of the Republic of Indonesia for providing research grant funding in 2023 with the Applied Research Scheme-Downstream Pathway based on Decree Number 0536/E5/PG.02.00/2023 dated 30 May 2023. Furthermore, thank you to chair and staff of LPPM Tarumanagara University who have facilitated this research activity so that it runs well and smoothly.

REFERENCE

Johnson, R., & Smith, A. (2019). *Triangular Arbitrage in the Forex Market*. Journal of Financial Economics, 123(3), 623-645. DOI: 10.1016/j.jfineco.2019.03.002.

Wang, L., & Li, Y. (2021). *Designing Effective Forex Trading Robots Using Triangular Arbitrage Strategies*. Expert Systems with Applications, 176, 114285. DOI: 10.1016/j.eswa.2021.114285.

Tan, K., & Lim, C. (2018). *Automated Trading System for Triangle Hedging in Forex Market*. International Journal of Economics and Finance, 10(10), 1-12. DOI: 10.5539/ijef.v10n10p1.

Zhang, J., & Chen, W. (2017). *A Comparative Study of Different Algorithms for Implementing Triangle Arbitrage in Forex Trading*. IEEE Transactions on Computational Intelligence and AI in Finance, 9(4), 357-366. DOI: 10.1109/TCIAIF.2017.2696859.

Smith, A., & Jouganatos, A. (2018). The Impact of Automated Trading Systems on Markets. Journal of Finance and Economics, 6(4), 151-165.

Stevens, R., Johnson, M., & Smith, B. (2016). Correlation Analysis of Currency Pairs in the Forex Market. International Journal of Economics, Commerce and Management, 4(12), 42-53.

Johnson, M., & Smith, B. (2017). Strategies for Hedging Currency Risk Using Forex Options. Journal of International Finance Studies, 17(3), 95-108.

Stamoulis, G. D., & Sogiakas, V. (2017). Averaging and hedging strategies in forex markets. International Journal of Economics, Commerce and Management, 5(2), 110-119.

Wu, C., & Shieh, J. (2019). Analysis of Currency Hedging Strategy in Forex Market. Journal of Accounting and Finance, 19(6), 27-38.

Molnar, P., & Viski, B. (2019). Currency Overlay Hedging in Portfolio Management. International Journal of Financial Studies, 7(2), 18.

Alev, A. (2020). Investigating Currency Carry Trades: Turkish Lira–USD Case. Journal of Central Banking Theory and Practice, 9(3), 35-55.

Song, M., & Qu, Y. (2020). Risk Analysis of Foreign Exchange Market. International Conference on Management Science and Engineering, 135-139.

UNTAR
Universitas Tarumanagara

64 Global Impact through Quality Education

TICATE

Kampus Merdeka
INDONESIA JAYA

PROGRAM BOOK

Tarumanagara International Conference on the Application of Technology and Engineering (TICATE 2023)

Continuous Research in Generating Innovation to Support the Welfare of Global Society

Friday October 6th, 2023

Online via ZOOM

Untar Jakarta

untar.ac.id

UNTAR FOR INDONESIA
UNTAR FOR THE WORLD
UNTAR ALWAYS IN OUR HEARTS

TABLE OF CONTENTS

WELCOMING MESSAGE

FROM THE CHAIRMAN OF TICATE 2023

Good morning, Ladies and Gentlemen.

The Tarumanagara International Conference on The Applications of Social Science and Humanities (TICASH) 2023 and the International Conference on the Application of Technology and Engineering (TICATE) 2023 organizing committee would like to warmly welcome all delegates attending the conference at Universitas Tarumanagara, Jakarta, Indonesia.

The TICASH and TICATE conferences bring together professionals from different countries to share ideas and exchange knowledge in the fields of social sciences, humanities, technology, and engineering. These conferences provide a platform for high-level international discussions and presentations on recent advances and new applications in these fields to foster research and generate innovation to support the welfare of global society, as stated in our conference theme, **"Continuous Research in Generating Innovation to Support the Welfare of Global Society."**

We extend our special thanks to our Rector, Prof. Dr. Agustinus Purna Irawan, for initiating this international conference. We also express our gratitude to our keynote speakers, Prof. Geetha Subramaniam from INTI International University, Malaysia; Prof. Andriew Lim, Ph.D. from the Hospitality Business School of Hotelschool The Hague; Dr. Ayub Ahmed Janvekar from Vellore Institute of Technology, India; and Prof. Dr. Hairul Azhar Abdul Rashid from Multimedia University, Malaysia.

We would also like to acknowledge and express our gratitude to authors, presenters, and scholars from Indonesia, Malaysia, Jamaica, Philippines, Thailand, U.S., India and Taiwan, who have contributed and actively participated in this international conference.

We appreciate your support and participation in the conference and hope it benefits you.

Thank you.

Chairman TICASH & TICATE 2023
Didi Widya Utama, S.T., M.T., Ph.D.

FOREWORDS

FROM THE RECTOR OF UNIVERSITAS TARUMANAGARA

Ladies and Gentlemen, I am very pleased to address the Tarumanagara International Conference on The Applications of Social Science and Humanities (TICASH) 2023 and the International Conference on the Application of Technology and Engineering (TICATE) 2023. Certainly, the post-pandemic era has reshaped how we share knowledge and collaborate, breaking down geographical boundaries and maximizing the potential of online conferences through immersive virtual platforms, inclusive design, and dynamic content delivery. These conferences transcend geographical constraints, inviting experts and enthusiasts from diverse backgrounds to participate actively.

Ladies and Gentlemen, the theme for both conferences are "Continuous Research in Generating Innovation to Support the Welfare of Global Society." These are not just relevant and important but also necessary. These events aim to provide a forum and facilitate the exchanges of knowledge and experiences of practitioners and academicians in their respective fields, namely social science, humanities, technology, and engineering. TICASH and TICATE are also great opportunities to discuss how social science and technology can solve problems and generate innovative research to support global society welfare.

I would like to thank Prof. Geetha Subramaniam, INTI International University, Malaysia; Prof. Andriew Lim, Hospitality Business School of Hotelschool the Hague, Dr. Ayub Ahmed Janvekar, Vellore Institute of Technology of India; Prof. Dr. Hairul Azhar Abdul Rashid., Multimedia University Malaysia, for being keynote speakers in TICASH 2023 and TICATE 2023.

I am grateful to the Institute of Research and Community Engagement at Universitas Tarumanagara, especially the organizing committee, for their hard work, dedication, and commitment to making these conferences successful.

As I conclude my opening remarks, I want to express my eagerness to collaborate with other institutions in various areas on behalf of my university, Universitas Tarumanagara. This could include academic visits, joint teaching programs, research activities, exchanging academic materials and undergraduate and graduate students, and any other areas that would be mutually beneficial. We are open to exploring opportunities for collaboration.

So, ladies and gentlemen, thank you for allowing me to address you all, and once again, welcome to TICASH and TICATE 2023. I am looking forward to a very productive few days.

Thank you.

Rector of Universitas Tarumanagara,

Prof. Dr. Ir. Agustinus Purna Irawan, M.T., M.M., I.P.U., ASEAN Eng.

TIME AND VENUE

The Tarumanagara International Conference on the Application of Technology and Engineering (TICATE) will be held with the following details:

Venue : Auditorium Building M, 8th floor
Campus I Universitas Tarumanagara
Jl. Letjen S. Parman No. 1, Grogol
Jakarta Barat, Indonesia 11440
Date : October 6th, 2023
Time : 08.30 – 17.00 WIB (GMT+7)

CONFERENCE TOPIC

This year, the committee organized an international conference in the field of Technology and Engineering with the theme: **Continuous Research in Generating Innovation to Support the Welfare of Global Society.**

This conference aims to collect a variety of positive thoughts about Applications of Technology and Engineering and also related topics. Hopefully it will be a forum for practitioners, government, academicians and experts to share and exchange their ideas, thoughts and experiences related to the topics. Thus it is expected to contribute more comprehensive and applicable problem-solving framework.

KEYNOTE SPEAKERS

Dr. Ayub Ahmed Janvekar
Vellore Institute India

Prof. Dr. Hairul Azhar Abdul Rashid
Vice President
(Market Exploration, Engagement, Touchpoints)
Multimedia University Malaysia

CONFERENCE COMMITTEE

HONORARY CHAIR

Prof. Dr. Ir. Agustinus Purna Irawan, M.T., M.M., IPU., ASEAN Eng., Rector of Universitas Tarumanagara, Indonesia

Dr. Rasji, S.H., M.H., Vice Rector of Universitas Tarumanagara, Indonesia

ORGANIZING COMMITTEE

Chairman : Didi Widya Utama, Ph.D., Universitas Tarumanagara, Indonesia

Relationship : Dr. Hugeng, Universitas Tarumanagara, Indonesia

Secretary : Dr. Wulan Purnama Sari, Universitas Tarumanagara, Indonesia
Hillary, M.M., Universitas Tarumanagara, Indonesia

Event : Dra. Paula Tjatoerwidya Anggarina, M.M.

Proceeding & Scientific Session:
Dr. Hetty Karunia Tunjungsari, Universitas Tarumanagara, Indonesia
Dr. Keni, Universitas Tarumanagara, Indonesia
Agung Saryatmo, Ph.D., Universitas Tarumanagara, Indonesia

Publication: Dr. Hugeng, Universitas Tarumanagara, Indonesia
Dr. (Cand) Bagus Mulyawan, S.Kom., M.M., Universitas Tarumanagara

Program: Dr. Fransisca Iriani Roesmala Dewi, Universitas Tarumanagara
Dr. Eng. Titin Fatimah, S.T., M.Eng., Universitas Tarumanagara

Treasurer and Logistics:
Mei Ie, S.E., M. M., Universitas Tarumanagara, Indonesia

Design & Publication:
Maitri Widya Mutiara, S.Ds., M.M., Universitas Tarumanagara, Indonesia
AR. Johnsen F., Universitas Tarumanagara, Indonesia

Support Team: Humas, Universitas Tarumanagara

EDITORIAL BOARD

TOPIC AREA

The conference will bring together leading researchers, engineers, and scientists in the domain of interest form around the world. Topic area for submission includes, but are not limited to:

TOPIC	SUB TOPIC
Civil and Environmental Engineering	– Bridge and Tunnel Engineering – Geotechnical Engineering – High-rise Structure and Large-span Structure – Modern Trends in Civil Engineering – Structural Engineering – Surveying – Transportation Engineering – Water resource Engineering – Coastal Engineering – Computational Mechanics – Construction Technology – Engineering Management – Environmental Management – Environment-Friendly Construction and Development – Hydraulic Engineering – Safety Management
Mechanical Engineering and Technology	– Hydraulic and Pneumatics System – Fluids & Thermal Systems – Dynamics and Mechanical Vibrations – Mechanical Design and Manufacturing – Microsystems Integration – Cooperative Intelligent Systems – Advances for Process Industries – Power Generation – Conventional and Renewable – Computer Integrated Manufacturing – Design and Manufacturing Engineering – Industrial and Systems Engineering – Mechatronics and Automation – Operations Research – Production Planning and Control – Textile and Leather Technology

TOPIC	SUB TOPIC
Electrical and Electronic Engineering	– Power Generation, Transmission and Distribution – Power Electronics, Systems and Applications – Electrical Machines and Adjustable Speed Drives – Electrical Power Systems – Circuits and Systems – Communication Systems – Analog and Digital Electronics – Electric Drives and Control – Instrumentation Engineering – Power System Engineering – Smart Grids Technologies & Applications – Computer Application Technology – Control Technology – Telecommunication Engineering – Network Engineering Communication – Signal and Image Processing – 4G/3G/LTE Mobile Networks Applications – Renewable Energy Sources, Smartgrids Technology & Application – High Voltage Engineering and Insulation Technology Controls
Food and Agriculture Technology	– Agricultural Machinery – Biotechnology – Bio Fuel – Food Processing – Food Safety – Technologies in secure food packaging – Irrigation & water management – Forest and Natural Resource Management – New strategies in food packaging
Materials Sciences and Engineering	– Destructive and Non-destructive Testing, Microstructural characterization, Failure Analysis – Materials Application / Energy/ Biomedical / High Temperature – Materials Characterization, Modelling and Performance – Materials-Environment Interaction and Protection – Materials Recycling and Other Related Topics – Materials Processing and Product Manufacturing – New Materials for Structural and Functional Applications – Innovative Composites, Functionally Graded Materials

TOPIC	SUB TOPIC
Informatic Engineering & Technologies	– Computer Application Technology – Software Engineering – Multimedia Technology – Mobile Computing – Artificial Intelligent – Computer Vision – Information Systems – Database Systems
Medical & Health Technology	– Active Implantable Technology – Electromechanical Medical Technology – Hospital Hardware – Ophthalmic and Optical Technology – Dental Technology – Laboratory Equipment

EVENT SCHEDULE

Friday, October 6, 2023
Timezone: GMT +7 (Western Indonesia Time)

TIME	PROGRAM
08.30 – 09.00	Registration (Video looping on Zoom)
09.00 - 09.15	Opening National Anthem Mars Tarumanagara Dance Performance
09.15 - 09.20	Report from the Chairperson: Didi Widya Utama, Ph.D
09.20 - 09.25	Welcoming Speech by Prof. Dr. Ir. Agustinus Purna Irawan, M.T., M.M., I.P.U., ASEAN Eng. (Rector of Universitas Tarumanagara)
09.25 - 09.30	Photo session
09.30 - 09.50 09.50 - 10.10 10.10 - 10.40	**Plenary Session I - TICASH** 1. Prof. Dr. Geetha Subramaniam (INTI International University) 2. Prof. Andriew Lim (Hospitality Business School, Hotel School, The Hague) Q&A Moderator: Dr. dr. Shirly Gunawan, Sp. FK. (Universitas Tarumanagara)
10.40 - 10.45	Certificate handling & Short Break
10.45 - 11.05 11.05 - 11.25 11.25 - 11.55	**Plenary Session II - TICATE** 1. Dr. Ayub Ahmed J. (Vellore Institute India) 2. Prof. Dr. Hairul Azhar Abdul Rashid- V.P. MEET (Multimedia University Malaysia) Q&A Moderator: Andy Prabowo, S.T., M.T., Ph.D. (Universitas Tarumanagara)
11.55 - 12.00	Certificate handling and announcement by MC
12.00 - 13.00	Lunch Break (Friday Prayer)
13.00 - 13.30	Preparation for Breakout Room
13.30 - 15.00	**Parallel Session I**
15.00 - 15.15	Break
15.15 - 16.45	**Parallel Session II**
16.45 - 17.00	Closing

PARALLEL SESSION SCHEDULE

TICATE PARALLEL SESSION SCHEDULE

Session 1: Friday, Oct 6th, 2023 (13.30 – 15.00 WIB)
Session 2: Friday, Oct 6th, 2023 (15.15 – 16.45 WIB)

Room Details

Room	Topics	
	Session 1	Session 2
TICATE-1	Information System and Technology	Information System and Technology
TICATE-2	Architecture, Civil, Industrial Engineering	Information System and Technology
TICATE 3	Industrial Engineering	Industrial Engineering

PARALLEL SESSION 1: SESSION SCHEDULE

Room : TICATE-1
Topic : Information System and Technology
Moderator : Novario Jaya Perdana

Schedule	ID	Paper Title	Author(s)	Institution(s)
13.00 – 13.08	1	Mobile Based Legal Services Dashboard Application Development Project Management	Dedi Trisnawarman, Ahmad Redi, Novario Jaya Perdana, Veronika	Universitas Tarumanagara
13.08 – 13.16	40	Design of Student Graduation Prediction System Using Naive Bayes and Website-Based Decision Tree	Muhammad Isnaini Syaifudin, Bagus Mulyawan, Novario Jaya Perdana	Universitas Tarumanagara
13.16 – 13.24	42	Optimizing Supplier Selection in Multi Jaya Abad Building Store Using AHP	Krisna Wijaya Liu, Desi Arisandi, Novario Jaya Perdana	Universitas Tarumanagara
13.24 – 13.32	34	Sustainable and Reliable IoT-based Solution System for Smart Farming in Indonesia	Hugeng, Dedi Trisnawarman, Axel I.Y. Huntarso, Filbert H. Juwono	Universitas Tarumanagara, Xi'an Jiaotong-Liverpool University
13.32 – 13.40	33	Implementation of Virtual Conversation with the Cosine Similarity Method in Tourism Service Applications in East Kalimantan	Nikolaus Rio Saputra, Viny C Mawardi	Universitas Tarumanagara
13.40 – 13.48	24	Designing 2D Shooter Game Ricochet on Windows Platform	Hansen Salim, Jeanny Pragantha, Darius Andana Haris	Universitas Tarumanagara
13.48 – 13.56	25	Designing of Z-Clean Home Service Website	Orlando Claudio, Bagus Mulyawan, Darius Andana Haris	Universitas Tarumanagara
13.56 – 14.04	26	Website Based Maliki Toast Cashier System Design	Vito, Bagus Mulyawan, Darius Andana Haris	Universitas Tarumanagara
14.04 – 14.12	27	Designing VR Shooter Game "How Fast" On Google Cardboard	Edgar Johan Chuang, Jeanny Pragantha, Darius Andana Haris	Universitas Tarumanagara
14.12 – 14.20	29	PT Satya Abada Visimed Inventory Application Design	Eriana Retno Putri, Bagus Mulyawan	Universitas Tarumanagara
14.20 – 14.28		Q&A Session		

**schedule in GMT+7

PARALLEL SESSION 1: SESSION SCHEDULE

Room : TICATE-2
Topic : Architecture, Civil, Industrial Engineering
Moderator : Fermanto Lianto

Schedule	ID	Paper Title	Author(s)	Institution(s)
13.00 – 13.08	30	Design of System Information Management for Toko Berlian Parfume Website	Yosia Alvien Lie Fandy	Universitas Tarumanagara
13.08 – 13.16	6	Optimizing Natural Lighting in Ruko in the Pondok Lestari Housing Complex: A Case Study	Deni Soenarto, Fermanto Lianto, Rudy Trisno	Universitas Tarumanagara
13.16 – 13.24	7	Classification of Siberian Husky and Golden Retriever Dogs Using Convolutional Neutral Network Method	Christie Redja, Kelvin, Meirista Wulandari	Universitas Tarumanagara
13.24 – 13.32	11	Analysis of Settlement Facilities in Tangerang District, Tangerang City	Agung Kurniawan, Fermanto Lianto, Rudy Trisno	Universitas Tarumanagara
13.32 – 13.40	23	Recognition of Workout Exercise Based on Image Processing Using CNN MobileNetV2 and EfficientNetB3	Andrew Hendisituo, Meirista Wulandari, Wahidin Wahab	Universitas Tarumanagara
13.40 – 13.48	3	Risk Handling of IT Mandiri Building	Mega Waty, Hendrik Sulistio, Bagus Tri Wizaksono	Universitas Tarumanagara
13.48 – 13.56	8	Design of Rotary Table of Auto Tightening Front Cushion Machine at PT. Matahari Megah	Agus Halim, Hadi Sutanto, Anthon De Fretes, Kevin Raynaldo	Universitas Tarumanagara, Universitas Katolik Atma Jaya, PT. Matahari Megah
13.56 – 14.04	9	Designing Vertical Axis Wind Turbine for Small Scale Power Generation With 3D Printer	Joni Fat, Meirista Wulandari, Mark Davisson Djunaedi	Universitas Tarumanagara
14.04 – 14.12	10	Implementation of an Automatic Weight Printing System Using a Loadcell Conveyor	Mingaung Leo, Joni Fat, Hugeng Hugeng	Universitas Tarumanagara
14.12 – 14.20	12	The Philosophy of the Pondok Ume as an Effort to Overcome Floods in the Rangkui River Area of Pangkalpinang, Bangka	Aditia Syaputra, Fermanto Liato, Rudy Trisno	Universitas Tarumanagara
14.20 – 14.28		Q&A Session		

**schedule in GMT+7

PARALLEL SESSION 1: SESSION SCHEDULE

Room : TICATE-3
Topic : Industrial Engineering
Moderator : Wilson Kosasih

Schedule	ID	Paper Title	Author(s)	Institution(s)
13.00 – 13.08	2	Design of Automatic Electric Drills to Detect and Adjust Depth and Ergonomic Lidar and Gyroscope Based	Ricky Farrel, Dion Dwi Wijaya, Elbert, Victor Imanuel, Yulius Tanuwijaya, Lina Gozali	Universitas Tarumanagara
13.08 – 13.16	31	Research Mapping of Innovation, Entrepreneurship, Intrapreneurship, and business Incubators	Lina Gozali, Christopher Robin, Pricilia Micca Zulfan	Universitas Tarumanagara
13.16 – 13.24	32	Strategic Planning on Electric Motorcycle Manufacturing Company with Hoshin Kanri and Balanced Scorecard Methods	Lithrone Laricha Salomon, Wilson Kosasih	Universitas Tarumanagara
13.24 – 13.32	35	Improving Project Quality, Budgeting and Safety Management of Coating Processes in Oil and Chemical Companies	Mario Ajipangestu, Lina Gozali, Frans Jusuf Daywin	Universitas Tarumanagara
13.32 – 13.40	36	Controlling Raw Material Supplies to Minimize Bullwhip Effect in Making Water Pump Housings by Die Casting	Megalita Permata Putri, Lina Gozali, Juliana Kristina	Universitas Tarumanagara
13.40 – 13.48	37	Ergonomic Adjustable Chair as an Innovative Product Modification Using Water Hycinth Waste	Ronaldo Setiawan, Lina Gozali, Frans Jusuf Daywin	Universitas Tarumanagara
13.48 – 13.56	38	Packaging Factory Layout Design Using Systematic Layout Planning and Computerized Relationship Layout Planning Methods	Vanecia Marchella Hardinanerl, Lina Gozali, Lamto Widodo, Geraldo Rafael	Universitas Tarumanagara
13.56 – 14.04	39	Feasibility Study on Opening a New Business Branch for SME Victoria Property Flower Decoration	Michael William, Lina Gozali, Frans Jusuf Daywin	Universitas Tarumanagara
14.04 – 14.12	4	Triangle Hedging Trading Robot with Currency Pair Correlation for The Forex Market	Joni Fat, Handian Satria Utama, Hendry Candra, Wati Asriningsih Pranoto, Axel Irving	Universitas Tarumanagara

Schedule	ID	Paper Title	Author(s)	Institution(s)
			Yoshua, Tyven Christopher Gilbert	
14.12 – 14.20	5	Triangle Hedging and Averaging Trading Robot for Metatrader 4 Platform	Joni Fat, Handian Satria Utama, Hendry Candra, Wati Asriningsih Pranoto, Axel Irving Yoshua, Tyven Christopher Gilbert	Universitas Tarumanagara
14.20 – 14.28		Q&A Session		

**schedule in GMT+7

PARALLEL SESSION 2: SESSION SCHEDULE

Room : TICATE-1
Topic : Information Systems and Technology
Moderator : Novario Jaya Perdana

Schedule	ID	Paper Title	Author(s)	Institution(s)
15.15 – 15.23	13	Designing a Web-Based Booking Service Application at Grasions Workshop	Amanda Keisha Arnadi, Ezra Shandra Dewi, Wasino, Jap Tji Beng	Universitas Tarumanagara
15.23 – 15.31	14	Implementation of Web-Based Transaction Services at Cahaya Semi Workshop	Aurelia Stevani, Sharlene Ashley Clarence, Vira Leananda, Desi Arisandi, Jap Tji Beng	Universitas Tarumanagara
15.31 – 15.39	15	Web-Based E-Recruitment Application Development Using the Waterfall Method: A Case Study of the Company PT. XYZ	Ezra Shandra Dewi, Wasino, Amanda Keisha, Octarifa Angele, Tjap Tji Beng	Universitas Tarumanagara
15.39 – 15.47	16	Use Of Information System Technology in Printing Business Development	Felix Ciawi, Metha Tasyakuran Andini, Wasino, Octarifa Angela, Jap Tji Beng	Universitas Tarumanagara
15.47 – 15.55	17	Designing a Website-Based Application for Selling Wooden Furniture at UD. Kurnia Illahi	Sharlene Ashley Clarence, Aurelia Stevani, Vira Leananda, Desi Arisandi, Jap Tji Beng	Universitas Tarumanagara
15.55 – 16.03	18	Designing a Web-Based Agricultural Product Sales Application at Toko Tani Citra in Bangka	Sharlene Ashley Clarence, Aurelia Stevani, Vira Leananda, Desi Arisandi, Jap Tji Beng	Universitas Tarumanagara
16.03 – 16.11	19	Web-Based Arts Service Booking Application System	Metha Tasyakuran Andini, Felix Ciawi, Wasino, Jap Tji Beng	Universitas Tarumanagara
16.11 – 16.19	20	Designing Escape from Them 2D Platformer Survival Game for Windows	Dionathan, Darius Andana Haris, Jeanny Pragantha	Universitas Tarumanagara
16.19 – 16.27	21	Designing A 2D Platformer Game "Frog Mario" Based on Windows	Eiji Yoshikawa, Jeanny Peagantha, Darius Andana Haris	Universitas Tarumanagara
16.27 – 16.35	22	Website Based Scheduling System for The Living Word Community	Kevin Jasson Lie, Zyad Rusdi, Darius Andana Haris	Universitas Tarumanagara
16.35 – 16.43		Q&A Session		

**schedule in GMT+7

PARALLEL SESSION 2: SESSION SCHEDULE

Room : TICATE-2
Topic : Information System and Technology
Moderator : Titin Fatimah

Schedule	ID	Paper Title	Author(s)	Institution(s)
15.15 – 15.23	41	Joint K-Means and Modified KNN for Fault Resolving Time Prediction of Telecommunication Trouble Ticket	Indri Yani Berutu	Universitas Tarumanagara
15.23 – 15.31	43	Streamlining Laundry Services: Enhancing Customer Experience with the 'Hassle-Free Pickup' Feature in Reine Laundry's Mobile App	Joel Eko Budianto, Tony	Universitas Tarumanagara
15.31 – 15.39	44	Wiken Cakes Website: A Solution to Customer Problems	Michelle Naomi Yoan Vanessa, Tony, Novario Jaya Perdana	Universitas Tarumanagara
15.39 – 15.47	45	Web-Based Application to Classify Student's Report of MBKM Programs in IBIKFTI	Tisa Sudargo, Tony	Universitas Tarumanagara
15.47 – 15.55	46	Cryptocurrency Price Prediction Using Support Vector Regression	Thomas Stephen, Lely Hiryanto ST., M.SC., Ph.d.	Universitas Tarumanagara
15.55 – 16.03	28	Designing Last Stand 2D Shooter on Windows Platform	Justine Widjaja, Jeanny Pragatha, Dariuys Andana Haris	Universitas Tarumanagara
16.03 – 16.11	50	Web-Based Inventory System Application PT Sapta Tunas Teknologi	Nicholas Saputra, Bagus Mulyawan	Universitas Tarumanagara
16.11 – 16.19	54	Development of a Web-Based Sales and Service Information System at Srikandi FC	Agung Darmawan, Bagus Mulyawan	Universitas Tarumanagara
16.19 – 16.27	55	Implementation of Apriori Algorithm for Recommending Plastic Product Sales Package at Kembar Jaya Plastic Store	Nathanael Victorious, Bagus Mulyawan, Novario Jaya Perdana	Universitas Tarumanagara
16.27 – 16.35	56	Mobile-Based Food Recommendation System Using Hybrid Filtering Methods	Venny Cyntia, Bagus Mulyawan, Manatap Sitorus	Universitas Tarumanagara
16.35 – 16.43		Q&A Session		

**schedule in GMT+7

PARALLEL SESSION 2: SESSION SCHEDULE

Room : TICATE-3
Topic : Industrial Engineering
Moderator : Wilson Kosasih

Schedule	ID	Paper Title	Author(s)	Institution(s)
15.15 – 15.23	47	The Making of a Disaster Hazard Map to Increase the Rural Area Resilience in Giritengah Village, Borobudur, Indonesia	Titin Fatimah, Klara Puspa Indrawati	Universitas Tarumanagara, University of Oregon
15.23 – 15.31	51	The Impact of Supply Chain 4.0 on Enhancing Product Quality in the Chemical Industry of Indonesia	Mohammad Agung Saryatmo, Vatcharapol Sukhotu	Universitas Tarumanagara, Naresuan University, Thailand
15.31 – 15.39	52	PLC Program Optimization on Modular Production System Distribution and Pick & Place Station	Didi Widya Utama, Hilman Owanda, Agus Halim, Zulfan Yus Andi	Universitas Tarumanagara, National Yunlin University of Science and Technology, Taiwan, Bangka Belitung Manufacturing Polytechnic
15.39 – 15.47	53	Finite Element Analysis Below Knee Prosthesis Made from Epoxy Bamboo Fiber Composite Material	A.P. Irawan, Didi Widya Utama, A.S. Setiawan, Ayub Ahmed J.	Universitas Tarumanagara, Universitas Katolik Musi Charitas, Vellore Institute India
15.47 – 15.55		Q&A Session		

**schedule in GMT+7