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**RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES**

# **REMACS 5.0**

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**CS240 - BACHELOR OF INFORMATION TECHNOLOGY [HONS.]**  
**CS248 - BACHELOR OF SCIENCES [HONS.]**  
**MANAGEMENT IN MATHEMATICS**  
**CS251 - BACHELOR OF COMPUTER SCIENCE [HONS]**  
**NETCENTRIC COMPUTING**  
**CS255 - BACHELOR OF COMPUTER SCIENCE [HONS]**  
**DATA COMMUNICATION & NETWORKING**

**2<sup>nd</sup> February 2023**  
**Stor Complex, UiTM Perlis**

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**Organized by:**  
**College of Computing, Informatics and Media**  
**Universiti Teknologi MARA Perlis Branch**

**Research Exhibition in Mathematics and Computer Sciences  
(REMACS 5.0)**

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

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# Preface

It is with great pleasure that we present this extended abstract book, titled "The 5<sup>th</sup> Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)". This book is a collection of research work in the fields of Computer Science and Mathematics, contributed by the final year students from Universiti Teknologi MARA, Perlis Branch. The aim of this book is to showcase the diversity and depth of research in these two interrelated fields.

Mathematics and Computer Science are two fields that have seen tremendous growth and advancement in recent years. With the rise of new technologies and the increasing demand for data-driven solutions, researchers in these fields have been working hard to develop new theories, algorithms, and models that can help solve some of the most pressing problems of our time. This book is a testament to their hard work and dedication.

The abstracts in this book cover a wide range of topics, including algebra, analysis, logic, computer architecture, algorithms, artificial intelligence, machine learning, computer network, netcentric computing and many more. The work presented here is both theoretical and practical, and has the potential to impact many areas of society, from finance and healthcare to education and security.

We hope that this book will serve as a valuable resource for future students in the fields of Mathematics and Computer Science. We also hope that it will inspire more students to pursue innovative and groundbreaking research in these two fields. Finally, we would like to express our gratitude to all the contributors for their hard work and dedication, without which this book would not have been possible.



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**REMACS 5.0**

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# EVENT SCHEDULE

8:00 – 8:30 am

- Registration

8:00 am – 12:00 pm

- FYP Project Presentation

12:00 - 2:00pm

- Lunch Break

2:15 – 2:35 pm

- National & Wawasan Setia Anthems
- Doa Recitation

2:35 – 2:45 pm

- Welcoming Address by Director of REMACS 5.0

2:45 – 2:55 pm

- Officiating & Closing Remarks from Rector of UiTM Perlis

2:55 – 3:00 pm

- REMACS 5.0 Montage

3:00 – 4:00 pm

- Awarding of Winners:
  - Best Poster
  - Best Project Award

- Photo Session

- End of Ceremony

*Dress Code: Formal / Corporate*

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# EXTENDED ABSTRACTS

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RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES  
**REMACS 5.0**

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# SMART SUPPLY CHAIN MANAGEMENT USING DATA VISUALIZATION

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## Abstract

Smart supply chain management has been digitalized by industry revolution 4.0 to improve and maintaining manufacturing and logistic operation at all levels. Rapid adoption of emerging technologies transforms global economy and smart supply management to build greater connectivity. However, massive data scales, limited research of supply chain interactions, pandemics, recession, and geopolitical event interrupted supply chain management operations. This research investigates data visualization approach using interactive operational dashboard. Data visualization contains supply chain management operations and information of risks factors that can impact the supply and demand integration, which include the amounts of supply, sales and profit, payment process, shipping method and supplier pattern buying. Research model is significant to establish data visualization with practical determination. It consists of five phases which are preliminary study, requirement analysis, development, testing and documentation phase.

*Keywords: Data visualization, Supply Chain, Operational Dashboard, Fraudulent*

## 1. Introduction

Supply chain is a crucial connection between an organization and its suppliers. The worldwide supply chain management market was worth \$15.85 billion in 2020, and by 2026, it is estimated to be worth about 31 billion (Placek, 2022). The research determines the risk factors correlation of change in demand and supply chain based on smart supply chain dataset. Second objective is to construct interactive operational dashboard data visualization in emphasizing the flow of smart supply chain. This research aims to evaluate the effectiveness of developed data visualization in real-time metric. Manager, operational team, customer service representatives and researchers are users of dashboard. The supply chain dataset is measured on commerce activities including provision, production, sales, and commercial distribution. The data then will be analysed in form of dashboard to allow users interpret information that impact the supply chain.

## 2. Methodology

Research methodology has five phases starting with preliminary study, requirement analysis, development, testing phase and documentation phase. Each phase is aimed to meet the requirement of research objectives. During preliminary study phase, obtained information are view from various aspects by conceptualize the title, problem statements, project's goal and objectives, scopes, and significant that indicate measurable organizational value. Requirement analysis ensure the dataset is leveraged in variety of techniques such as pre-processing and data exploration. In conjunction with data and analysis gathered for development phase, designs and DAX Language also applied more widely to produce diverse results on operational dashboard visualization.

## 3. Results and Discussion

Design of Entity Relationship Diagram and storyboard of dashboard interfaces are key players in determining dashboard usability. Sales forecasts by each agent are made for the next 5 years to

determine the sales situation that will be managed by the system's supply chain management in the future. Moreover, sales summary is presented to determine the amount of sales profit and appropriate time to conduct sales based on each week of each year. This research also reveal supplier buying pattern among fraudulent suppliers who have faked repeat orders up to 22 times to prevent their access from purchasing in the system. Usability and functionality testing also were conducted to obtain feedback through questionnaires from 30 actual users. The feedbacks afterwards are used as guidance for improvement in developing operational dashboard.

#### **4. Novelty of Research / Product**

The implementation of dashboard visualization and variety of colourful graphs allow manager and operational team to monitor the supply chain planning and constraints in real-time for organization. It is because of when users encounter with massive information, they tend to grasp vivid imagery instead of basic plain graphics (Ramly et al., 2012). By using Microsoft Power BI, rapid access towards organization data request and cost-effective are offered through human language interface and convenient graphical design tools. Hence, the system does not require any expert technical assistances (Shah, 2018). Therefore, organization can achieve data-driven decisions. Users can prolong their screen-focus to increase the supply visibility especially during potential occurrences such as delayed deliveries, changes in sales order priority, supply estimation date and shipping. Apart from that, this project is crucial for customer support representatives to assists suppliers for their inquiries. For instance, they provide accurate shipment information that will improves suppliers' engagement. The acquired data allow researchers to improve meta-analyses for comparative studies towards diverse customer pattern buying.

#### **5. Conclusion**

Smart Supply Chain Management using Data Visualization is a platform allowing users to enhance their visibility towards smart supply chain management business and determine the risk factors that impact the change in demand and supply chain. Developing operational dashboard on Microsoft Power BI encourage logistic industries achievement and prediction.

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