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PREFACE

For hundred thousands of years humans have coped with scarcity, strange long and very long climatic cycles and weather oscillations, natural disasters and other vagaries through incremental and revolutionary innovations. Each time a major change or cycle is overcome civilization moves one ladder up.

We are currently at the threshold of a mind-boggling punctuated equilibrium: the age of complex technology system. Science and technologies from all streams unify to advance together with the help of digitization, a “grand unification” of a kind. Human made things rise in intelligence, learning at a speed which is inconceivable to humans thanks partly to the lack of instincts that often time inhibit human creativity. Borders between industries are abolished as one observes in car making with the arrival of a completely alien participant like Tesla and Google. The speed of adoption and diffusion accelerates at a breath-taking pace. Users of technologies in good and service industries as well as in households feed new insights in real time back to producers, enabling thereby real time redesign. Learning institutions and users of knowledge collaborate to pool resources together in a multitude of networked platforms, or global information commons. We call this collaboration “learning by enterprising”.

We don't know what the future might bring. The fire that Prometheus stole from Zeus may grow farther and less controllable than human wishes it to do, arriving possibly even at “singularity”. We count on the wisdom of the “homo sapiens sapiens”, including its brightest minds, while confronting the new challenges as our ancestors had repeatedly done and we are always fond of imagining when watching a great story come to an end.

There is not much that we can do other than counting on the old and proven wisdom and continuing the human journey outward and the voyage inward in our attempts to improve our fitness in the ceaselessly changing landscape. The toiling is our fate, the harvest our luck. The better we learn the more probable it will be that our luck becomes reality.

On that closing notes I hope that the innovation ideas presented in this “INNOSCAPE 2018” will serve as impetus for us to walk tirelessly and creatively the difficult but rewarding path to human progress.

Prof. Dr. Djisman Simandjuntak

Conference Chairman

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12. Anastasia Ary Noviyanti, M.Sc
13. Haru m Fadhilatunnur, M.Sc

CONFERENCE PROGRAM

DAY 1: Thursday, October 25th, 2018		
08:00 - 08:30	FO YER	Registration
08:30 - 08:45	BALLROOM	<u>Welcoming Speech</u>
		Prof Djisman Simandjuntak (Innoscape 2018 chairman, Universitas Prasetiya Mulya)
<u>Keynote Speech</u>		
Dr. Ir. Ismail, MT (Directorate General of Post and Informatics Resources and Devices, Ministry of Communication and Information Technology)		
09:30 - 09:45		Token of appreciation & photo session
09:45 - 11:45		<u>Plenary talks</u>
		"Ecosystem to Foster Strong Networks and Linkages to Power an Innovation-Driven Economy: The Role of Universities" , Prof. Mahendhiran Nair (Monash University Malaysia)
		"Innovation: from Concept to Market - Bringing Innovation to Life" , Oka Putra (Motorola Singapore)
		"Technological Learning and Innovation of ASEAN's Manufacturing Firms" , Prof. Patarapong Intarakumnerd (National Graduate Research Institute for Policy Studies, Japan)
11:45 - 12:00		
12:00 - 13:00	OLAM RESTAURANT	Lunch Break
13:00 - 13:30	FO YER	Poster Session

13:00 - 13:30	BALLROOM A	<u>Invited Talks - Track 1 (Digital Innovation)</u> "How Digital Innovation Transformed Today's Business World" , Tony Seno Hartono (Microsoft)	BALLROOM B	<u>Invited Talks - Track 2 (Food & Health)</u> "Promoting Healthy Diet and Lifestyle: The Role of Food Industry" , Astri Kurniati (Nutrifood Indonesia)
		"Augmented Reality Technology in Business" , Daniel Surya (WIR Group)		"Innovation in Herbal Medicine: Moving up Firm's Capability towards Basic Research" , Prof. Dr. Erman Aminullah (LIP)
14:45 - 16:30	BALLROOM A	<u>Paper Presentation - Track 1 (Digital Innovation)</u> "SAP SLCM Implementation Critical Success Factors: A Case Study of Prasetiya Mulya University" , Eko Ariawan, Irawan Ekasurya (Univ. Prasetiya Mulya)	BALLROOM B	<u>Paper Presentation - Track 2 (Food & Health)</u> "A Green Alternative of Nitrogen Source to Chemical Fertilizer in Nata De Coco Processing" , Cut Aja Rahmawati, Muhammad Sami, Said Aiyub (Politeknik Negeri Lhokseumawe)
		"Inclusive Economic Development through SIC A (Sistem Informasi Cerdas Agribisnis - Smart Agribusiness Information System) Application" , Amni Susandi (Institut Teknologi Bandung)		"Tropical Fruits Quantitative Inspection" , Nurmalia, Ihsan Iswaldi (Univ. Prasetiya Mulya)
		"Autonomous Multimodal Transportation: How It Changes the Liability in the Carriage of Goods Industry" , Kartika Paramita, Ridha Aditya Nugraha (Univ. Prasetiya Mulya)		"Utilization of Le Asam Sunti As a Natural Coagulant Alternative in Tofu Production Process" , Salmyah, Fachrariah, Teuku Rihayat, Suryani Salim, Fajri (Politeknik Negeri Lhokseumawe)

14:45 - 16:30	BALLROOM A	<p>"Developing an Online Platform for Air Charter Services in Indonesia: A Feasibility Study", Giovanni H. Setyantoro, Ananta Wijaya (International University Liaison Indonesia), , Odi Akhyarsi (Surya University)</p>	BALLROOM B	<p>"Low Cost Spirulina Cultivation from Food Waste", Yalun Arifin (Univ. Prasetiya Mulya), Faisal Amri Tanjung (Universitas Hasyim Asy'ari), Ryanto Kurniadi (PT. Nugen Bioscience Indonesia)</p>
		<p>"Law as Technological Control to the Infringement of Intellectual Property Rights in the Digital Era", Tri Hamowo, Krishna Lubis (Univ. Prasetiya Mulya)</p>		<p>"Phytochemical Screening and Antioxidant Activity of Averrhoa bilimbi L. Flower as Raw Material for Herbal Beverages", Nurhayati, Ihsan Iswaldi (Univ. Prasetiya Mulya)</p>
		<p>"Development of Mobile Radiation Monitoring System utilizing LoRa as the Communication Means", I Putu Susila (BATAN), Agung Alfiansyah (Univ. Prasetiya Mulya), Istofa, Sukandar, Budi Santoso, Suratman (BATAN)</p>		
19:00 - 22:00	BALLROOM	Gala Dinner		
DAY 2: Friday, October 26th, 2018				
08:00 - 08:30	FOYER	Registration		

08:30 - 09:30	BALLROOM A	<u>Invited Talks - Track 3 (Innovation in Finance)</u>	BALLROOM B	<u>Invited Talks - Track 4 (Innovative Leisure)</u>
		"Re-imaging Financing Innovation in Thailand" , Theresa Mathawaphan (National Innovation Agency, Thailand)		"Innovative Tourism Experience" , Prof. Agus W. Soehadi (Universitas Prasetiya Mulya)
		"Innovation in Stock Market" , Edwin Sebayang (MNC Financial)		t.ba, Rizki Handayani (Ministry of Tourism)
09:45 - 11:15	BALLROOM A	<u>"The Role of Financial Technology in Banking Industry in Indonesia"</u> , Dendi Ramdani (PT Bank Mandiri Tbk)	BALLROOM B	<u>Paper Presentation - Track 4 (Innovative Leisure)</u>
		<u>Paper Presentation - Track 3 (Innovation in Finance)</u>		"Visitors Experience Effect on Memory and Its Implication to Destination Satisfaction and Loyalty" , Fransiska Ayu Friscillia*, Salsabila Athaya Zahra, Agus W. Soehadi, Yudo Hartono (Univ. Prasetiya Mulya)
		"A Bootstrap Simulation for Comparison of Group Risk Plan and Multi-Peril Crop Insurance Policy" , Valantino Agus Sutomo, Dian Kusumaningrum (Univ. Prasetiya Mulya), Rahma Anisa, Aryana Paramita (Institut Pertanian Bogor)		"The Impact of Creative Industries on a Nation's Socioeconomic Growth (Case Study: Game of Thrones on Northern Ireland)" , Aulia Ardista Wiradarmo (Univ. Prasetiya Mulya)
"A Literature Review on Commodification Personal Data and Their Valuation Methodologies in Data-Driven Economy" , Adrian Teja (Univ. Prasetiya Mulya)				

09:45 - 11:15	BALLROOM A	<p>"The Willingness to Pay Alternative Crop Insurance Policy", Dian Kusumaningrum, Valantino Agus Sutomo (Univ. Prasetiya Mulya), Rahma Anisa, Aryana Paramita (Institut Pertanian Bogor)</p>	BALLROOM B	<p>"Exploring the Transition to Eudaimonic Tourism", Djisman Simandjuntak, Alvin Desfiandi, Erica Lukas, Isti Setiawati, Reinardus Suryandaru, Eko Ariawan, Stanley Makalew, Nakita Sabrina (Univ. Prasetiya Mulya)</p>
		<p>"Structural Equation Model to Analyze the BOP Intention to Use Banking Products", Dewi Saraswati, Dian Kusumaningrum (Univ. Prasetiya Mulya)</p>		<p>"Acoustics Analysis of Open Air Stages for Music Performance", Anastasia Noviyanti (Univ. Prasetiya Mulya)</p>
		<p>"Sport Venue Operation: The Theatre of Dreams", Farazandy Fidinansyaha, Imman Jayawardhana (Univ. Prasetiya Mulya)</p>		
		<p>"Exploring the Roles of Social Technologies for Open Innovation in Tourism Sector: A Systematic Literature Review", Stevanus Wisnu Wijaya, Sesaria Kiki Tamara, Eko Ariawan, Peni Zulandari (Univ. Prasetiya Mulya)</p>		
11:15 - 11:45	FOYER	Poster session		
11:45 - 13:30	OLAM RESTAURANT	Lunch Break		

13:30 - 14:30	BALLROOM A	<u>Invited Talks - Track 5 (Social Innovation)</u>	BALLROOM B	<u>Invited Talks - Track 6 (Sustainability & Resources)</u>
13:30 - 14:30		"Experimenting for Social Innovation", Sarah Wilson (Kopernik)		"Foundations of Continuous Innovation in Japan's Manufacturing Firms: How to Cope with Industrial Transformation", Prof. Masatsugu Tsuji (Kobe International University)
		"Why Businesses Should Go Beyond Innovation", Pandu Aditya (Mekar - PT Sampoenma Wirausaha)		"Disruptive Innovation: Electricity 4.0", Dr. Muhammad Reza (Solvina International)
	"Agricultural Social Innovation and Global Branding: Formosan Farms of Agra Boutique Social Enterprise", Prof. Yvonne Han (Feng Chia University, Taiwan)	"Accelerating Sustainable Electricity Development", Joko Sulistyoyo Yekti, PhD (Medco Power Indonesia)		
14:30 - 16:15	BALLROOM A	<u>Paper Presentation - Track 5 (Social Innovation)</u>	BALLROOM B	<u>Paper Presentation - Track 6 (Sustainability & Resources)</u>
		"A Social and Community Based Approach to Accelerate Renewable Energy Development in Indonesia", Johannes Anton Witono (Terang Nusantara Hijau Foundation)		"Welding Products Defects Analysis with Fault Tree Analysis and Failure Modes and Effects Analysis", Pretty Princess Pontororing, Stanley Gilbert, Aditya Andika (Bina Nusantara University)
	"How An Entrepreneurial Intention Proceeds into Real Behaviour: A Perspective from Complexity Thinking Process of An Entrepreneur", Henry Pribadi (Univ. Prasetiya Mulya)	"Techno-economic Assessment on the Application of Waste to Energy Technologies in Indonesia", Bayu Prabowo, F. Simanjuntak, Zaki Saldi, Yudi Samyudia, Ida Juda Widjojo (Univ. Prasetiya Mulya)		

14:30 - 16:15	BALLROOM A	<p>"Driving Social Innovation through the effective use of Social Hubs", Prof. Rolf F. Meyer, Prof. Pieter Perrett (Univ. Applied Sciences Northwestern Switzerland)</p>	BALLROOM B	<p>"Tide Level Prediction Using Hybrid, Supervised and Unsupervised Neural Networks", Nerfita Nikentari, Hendra Kurniawan (Univ. Maritim Raja Ali Haji)</p>
		<p>"Innovation in Learning: Comparative, Repetitive Cross-Sectional Surveys in Higher Education", Eliot Simangunsong (Univ. Prasetiya Mulya)</p>		<p>"Preliminary Design and Sustainability Study of Rosella Jam Factory Utilizing Renewable Solar Energy", Ronald Horisona, Evi, Michelle Muliawidjaja, Vini Octaviani Puspita, Dave Mangindaan (Bina Nusantara University)</p>
		<p>"Indonesia's Demographic Future", Bhayu Purnomo (Ministry of Finance)</p>		<p>"Corporate Social Responsibility and Community Development on beyond Compliance of Environmental Protection and Management", Anwar Hamdani, Siti Fatolah, I Gusti Putu Diva Awatara (STIE AUB Surakarta)</p>
		<p>"Challenges of Social Entrepreneurs Collaboration to Alleviate Disparity at Periphery", Muhammad Setiawan Kusmulyono (Univ. Prasetiya Mulya)</p>		<p>"Rural Electrification Development to Enhance Human Development Index in Majalengka District", Tete Saepudin, Hadi Fredian (Universitas Pasundan)</p>
		<p>"Social Entrepreneurship, Innovation, and Equality: The Consequences of Innovation for the Craft Communities in Flores, Indonesia", Dhientia Andani (Kanazawa University)</p>		<p>"Innovation and Development of Polyetherimide-diaminobenzene Nanofiltration Membrane for Textile Wastewater Dye Removal towards Sustainable Environment of Indonesia", Dave Mangindaan (Bina Nusantara University)</p>

16:30 - 17:00	BALLROOM	<u>Closing Remarks</u>
		Prof Djisman Simandjuntak (Universit as Prasetiya Mulya)
17:00 - 17:15		Closing

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INNOSCAPE 2018

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Full paper

Developing an Online Platform for Air Charter Services in Indonesia: A Feasibility Study

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This study assessed the feasibility of developing an online platform for connecting air charter providers operating in Indonesia with their potential customers. The size of air charter market size in Indonesia and its growth were investigated through literature studies. Subsequently, a series of interviews were carried out to collect specific information and insights from potential users. The interviewees from air charter provider side were full service, low cost carrier, and medium service airlines while the interviewees from customer side were travel agents, independent travellers, and corporations. Website developers were also interviewed to investigate technical and financial challenges of developing the online platform. The literature studies found that the market size of air charter in Indonesia is promising and expected to grow rapidly. The interview results indicated that the needs are high and the potential users are interested in using the online platform once it is available. This paper also suggested some important requirements to be accommodated in the online platform.

Keywords: air charter; feasibility; market; online platform; requirement.

1 Introduction

The airline industry model could be formed into different shapes, from low-cost to full service airlines business model, cargo airlines that focused on goods shipping, up until chartered fleet airlines to fill in the payload and direct chartered demand. There are promising portion of chartered industry in the total of market size of airline industry. According to Wells and Chadbourne [4], the primary advantage of charter operations is flexibility, the use of charter service is attractive to firms that do not have consistently high levels of demand for point-to-point services. Charter services are also cost-effective solutions when supplemental lift is required to support existing flight operations [2]. This opportunity can be profitable not only for the airlines perspective but also for the customers, and intermediaries sector. The vast options to fulfil the demands for particular destination will be very possible.

Digitalization represents an exciting opportunity for the aviation, travel and tourism ecosystem, with the potential to unlock approximately \$1 trillion of value for the industry and wider society over the next decade. Digital transformation is impacting every element of the aviation, travel and tourism value chain. Platforms such as Airbnb and Uber have radically altered demand-side dynamics, enabling small entrepreneurs to compete with bigger players. At the same time, online travel agencies (OTAs) are using up-to-date information to change the way travellers explore travel offerings. The travel ecosystem is evolving, with blurring boundaries and changing roles across the industry landscape. According to world economic forum report, digital transformation over the next decade will transform on: Living travel experience, Enabling the travel ecosystem, Digital enterprise, Safety and security [6].

This study is intended to investigate how vast the charter business sector specifically in the airlines business and the opportunity to accommodate all the needs using a single platform. It is very rare to have a platform to access directly the chartered airlines. The consumers or intermediaries usually have to go directly to a particular chartered company. By the advance of the digital technology, online

platform is always bringing ease to both consumer and industry. This fact encourages the idea of having online platform that can provide the full access to the chartered industry in Indonesia. The feature of booking, choosing the airlines until specific aircraft, and online transaction can be provided by this platform. With the complete overview of airlines charter business and digital transformation, this study will provide the digital business enterprise idea to accommodate charter business importance. To fill in the void of chartered-airlines platform start-up in Indonesia is the main idea. This study is limited in scope of Indonesian air charter and airliners, from low cost carrier up until full service. Finally, the goal of this study is determining the feasibility of an online business platform for chartered airlines as well as proposing the platform idea overview by reviewing requirements that need to be accommodated by the platform.

2 About the Research

2.1 Methodology

This report is the results of a six-month research effort. Our work described on several sources of information such as:

- Literature review of airlines' business model, air-chartered business model and forecast, market size of airline industry in Indonesia, digital business and transformation, and how digital business transformation affects airline and tourism businesses.
- Expert interviews and survey from private and public sector figures. The interviewees are including infamous scheduled and unscheduled airlines in Indonesia as the provider, travel agents as intermediary sector, prospective customers as the user, and web developers.

The main questions covered in the interview can be seen in the table:

Table 1. Interviewee List and Main Questions

Category		Questions
Provider	Full Service airline	1. What is your opinion about the prospect of charter industry?
	Medium Service airline	2. What are the problems faced by the company in the charter industry?
	Low Cost Carrier airline	3. What is your expectation about the charter industry in the future?
Intermediary Sector	Travel Agent	4. What is your opinion about the online platform concept?
Customer	Travel Vlogger	5. What is your expectation about the concept?
	Travel Blogger	
Web Developer	Individual	1. What is the technical challenge to develop a platform for online ticketing and booking, such as traveloka?
	Corporation	2. What is the cost of develop such kind of platform and how long does it take to develop?
		3. Given the requirements, do you able to develop the platform as requested?

We analysed the data from literature review to estimate the market of the charter flight in Indonesia as well as its trend in the future, later on it will be explained in the market share analysis section.

The interview results are discussed using qualitative method, where the information gathered from the stakeholders are processed in form of problem analysis. The platform overview contains what the stakeholders are expecting from the platform itself, as well as the technical and financial challenges described by respective web developer.

Finally, we also collected about how the stakeholders' consent with the idea of the platform in the approval by stakeholder section as the validation of the platform existence interest in the future. All the data gathered will complete the missing puzzle of the platform itself.

3 Results and Discussion

3.1 Market Share Analysis

After reviewing many sources in regard with the market share of the airline in Indonesia, we can conclude a figure below that shows the market share of airlines in Indonesia in term of domestic passenger and its percentage.

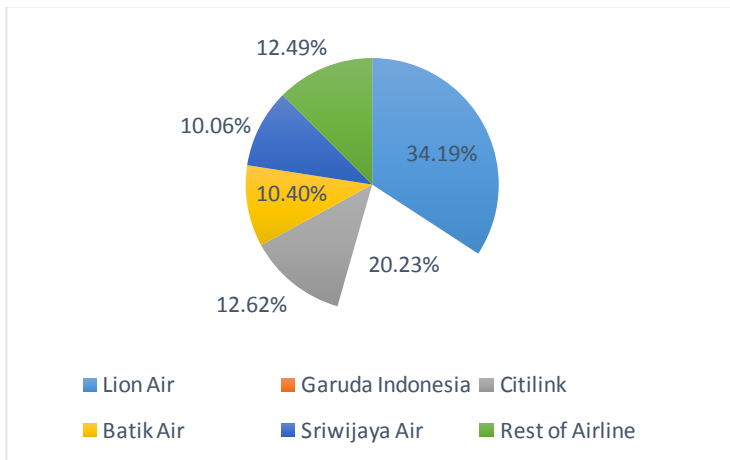


Fig 1. Airline domestic market share in Indonesia 2017 (source: DGCA)

This graph is showing the total passenger in a mixture between both scheduled and unscheduled airline. The total amount of passenger in year 2017 was 96,890,664 passengers it is increasing with the percentage of 8.4% from 2016 with the number of 89,385,365 passengers in total. What makes this market share graph interesting is because of the total passenger of each scheduled airline is also a combination between scheduled and unscheduled flight. In other word

the big portion of each big airline in the graph contains a promising number of charter/unscheduled flight from the scheduled airline sector.

The unscheduled airlines themselves are ranked inside the percentage of the rest of airline portion in the graph. If all the number of passengers for unscheduled airline are combined together, the percentage in total is around 1.2% or 1,161,641 passengers in 2017. Although it looks small compared to the scheduled flight, but the number is expected to always growing and it is not yet combined with the number of unscheduled flight of the scheduled airline percentage.

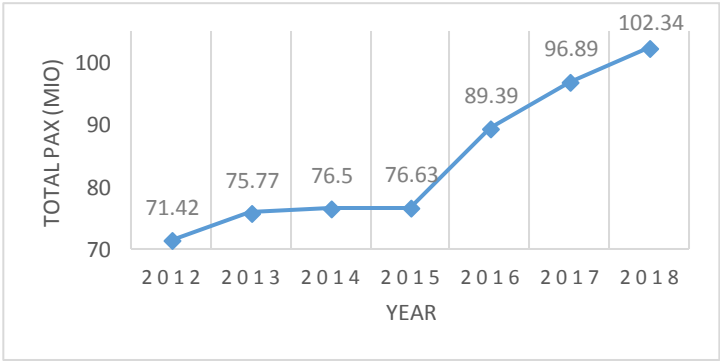


Fig 2. Domestic passenger traffic growth (source: DGCA)

The year 2018 is an estimation obtained from Directorate General of Civil Aviation (DGCA), up until the first quarter of the 2018, the growth of domestic passenger already in the level of around 3% as reported from the busiest airport in Indonesia, Soekarno-Hatta International airport. The number of Compound Annual Growth Rate (CAGR) from 2016 to expected 2018 is 14.5% and CAGR of 2012 to the last quarter of 2017 is 7.6%. This positive growth of domestic passenger is expected to continuously growing in the future, following the positive trend since 2012 and the development of the infrastructure of the aviation industry in Indonesia.

Table 2. Garuda Indonesia operating revenue in Q1/2018 (source: company presentation)

Category	Total Revenue (mio)	Percentage
Scheduled	\$ 828.5	84.28 %
Unscheduled	\$ 19.8	2.01 %
Others	\$ 134.7	13.71 %
Total	\$ 983	100 %

From this table, what we can conclude is the proportion of the unscheduled/charter flight of scheduled airline specifically from Garuda Indonesia in term of revenue. Overall for the first quarter of 2018, the revenue from unscheduled flight take 2.01% of the total company revenue or about \$ 19.8 million in just the first quarter a year.

From the interview of another scheduled airline as well, there is also unscheduled revenue from another scheduled airline who touch the percentage of 10% from its total revenue in a year. This revenue is coming from ad-hoc charter as well as seasonal tourism charter from international charter flight.

Combined the revenue from the scheduled airline in general as well as the unscheduled airline leads to a promising opportunity from the unscheduled flight market itself. Although that maybe the percentage is quite small compared with the regular or scheduled flight, but still the number is pretty consistent and expected to grow further. Another consideration is because this whole number is not yet utilized by any online charter platform in Indonesia, a bright prospect for the start-up platform who can accommodate the portion of the charter itself.

3.2 Problem Analysis

We have conducted interviews directly to the stakeholders in order to know what are their difficulties in term of charter flight, there exist several problems in practice.

First, the airline's aircraft availability is so limited. Although chartered flight brings fix and forecast-able income for airline, for the regular airline perspective, they can only spend a few of aircraft flight hour for charter flight since it is not their main focus and the regular flight schedule is already tight.

Domestic demand of charter flight is difficult to be forecasted. The demand of the charter mostly come from occasional importance, and also seasonal. Because of this fact, the airline is quite difficult to forecast the demand for the charter, so then allocating the aircraft flight hour to compensate the aircraft availability specifically for charter becomes too risky.

Second is about the negotiation and permission of the charter flight itself. Negotiation including the agreement about the cost, contract of the chartered aircraft, etc. While permission including the slot of the destination airport, flight permission, etc. A lot of permission is too complicated and sometimes prevent the airline to make a charter flight (the route already flown by regular airline for example) and the process of the negotiation as well as permission mostly takes a lot of time to be accomplished.

In term of travel agent, their concern is mostly about, again, availability of the aircraft. Also the type of the aircraft takes a big role of the process of the dealing. Sometimes the number of prospective customers is not as many as the number of seats available in one aircraft or the occupancy issue. This fact brings into another concerning problem, which is the cost. The customer and the travel agent will try to have the optimum configuration between the number of prospective passenger, cost, and aircraft availability.

For the prospective customer point of view, the cost of the flight still become the major concern. Another consideration is about the flight time. It is not too flexible if just following the regular flight time, since the cost and the time already has been determined by the airline.

Last but not least is mostly the unique destinations make the passenger have to go for a transit flight, it takes a lot of time not as efficient as direct/chartered flight.

These problems later on will determine how the online platform will be, and ease the problems of the stakeholders in the future.

3.3 Platform Overview

By reviewing the problems that the stakeholders have been faced from the charter industry and the stakeholder's expectation from the interview, we can sort some of the requirements to be accommodated by the platform itself. Those requirements are from the combination of the provider, intermediary party, as well as the user as shown:

- Negotiation feature. This feature is required in the platform to ease the complex process to make a deal between the provider and the user and/or from the intermediary sector. The ability to make a deal for a charter contract and customization directly in the platform will cut the long duration and bureaucracy process that is done manually before.
- Demand interest forecast information. It can be done by enabling the booking feature or any other approach where the prospective user can show their interest inside the platform. This data is essential since the provider can forecast the demand of the charter and allocating their fleet for the charter assuredly.
- Integration of airline needs into the platform. A recommendation from the airline where they can also integrate charter flight with: for example, marketing, cargo booking, parcel, and so on. So the focus of the charter itself is not always about human passenger but over and above cargo delivery.
- Basic online ticketing and booking platform. Using the existed online ticketing platform as the benchmark for the user interface and user experience for all the stakeholders will bring easiness to assess the feature and options accommodated by the platform itself.
- Permission arrangement. Although that we do not have complete data and information about charter permission mechanism between provider and government, but the online solution for the permission

agreement is quite expected by the provider and intermediary sector for the effectiveness of negotiation process period.

3.4 Technical and Financial Challenge of the Platform

All the basic requirements are already acknowledged for the platform to be accommodated. These basic requirements then must be examined more further about the challenges in term of the technical and financial area by the web developer. We have concluded some survey with respective web developers to see the responds and capability of Indonesian's developer to undertake the platform project.

From the technical point of view, the platform architecture itself is not too complicated to be done by the web developer. The difficulty level is not too high and the challenge is mostly about the number of the web developers needed to develop the platform from the beginning until the kick-off launch. Quoted from the interview results, at least a group consist of 20 developers is needed to develop the platform with the requirements stated in the project overview. The technical problem itself however, more likely to be the business requirements form the client or the stakeholders of the platform itself. "We have to make it clear all the needs of the stakeholders, because it is directly affect the platform architecture in the future" said one of the respective web developer. The recommendation is to declare clearly about the business requirements in details and communicate all the requirements with both the stakeholders and developer. Nevertheless, all the web developer interviewees were declaring their capability to develop the platform.

On the other hand, financial challenge probably becomes another major concern. Taking one of the most popular online ticketing platform such as traveloka as the benchmark, will cost the development of the platform become quite high. Referred to the web developer information, the cost needed is at least hundred million rupiahs, and that is just from the scratch until the launch of the platform. It is excluded the cost of maintenance and operational of the platform after the launch. This challenge can be overcome with prioritizing the features to reduce the cost, as well as looking for support from funding and collaboration.

According to the web developer, the time needed to develop the platform can go from three to six months and even more, depending on the complexity of the platform itself. The development period however, can be accelerated by increasing the number of the developers, but obviously increasing the cost of the project.

3.5 Approval by Stakeholder

The response of the stakeholders in term of the online platform project approval quite vary each another. But all the stakeholders agree that the platform is certainly needed. The highlighted comment from the airline sector is: “If the platform's benefit to the company is crystal clear, absolutely interested. But first thing first, we need the detail explanation about the benefit for our company, such as more revenue opportunity, etc.” and one of the airline director showed his great interest in the project by saying that the platform and charter flight is very prospective and a good opportunity to fill in, especially for Indonesia's market.

Coming to the travel agent and prospective customer, all of them showing their interest to the platform itself. The highlighted comment is: “Absolutely interested, the prospect is very promising, especially for travel agent” by one of the travel agent owner, and “I do agree with the idea. It opens the opportunity for us to get competitive price and freedom to choose destination and flight time based on our needs” by a respective travel vlogger and blogger.

4. Conclusions

This paper has documented the market share of the airline industry in Indonesia, showing the opportunity of the industry to grow year by year. This is also valid for the charter industry, the growth is certain and shows positive trend following the growth of the industry in general. Although that the percentage looks quite small but the portion itself shows its promising prospect. On the other hand, currently this portion is not yet being utilized by any online platform who can accommodate the needs of the charter industry. The opportunity is vast and waiting to be utilized even more.

This paper also has highlighted the problem occurs in the charter industry from many stakeholders' point of view. The availability of the aircrafts which is limited directly connected with the demand of the passenger that is difficult to forecast, negotiation and permission process is complicated, up until the high cost of the flight itself become the major concerning problem found on the field. This fact leads to the basic requirements that need to be accommodated by the platform later on.

The basic requirement is the basic feature for the platform so that the platform can be said as the solution of the problems faced by the stakeholders. These basic requirements are: Negotiation feature, demand interest forecast information, integration of airline needs in the platform, basic online ticketing and booking platform, permission arrangement. All these basic requirements however, need to be developed even more with the platform architecture and development in the future.

In term of the technical challenge there is no significant obstacles since most of the respective web developers in Indonesia have declared their capability to develop the platform. Nonetheless, the challenge found in the financial factor. The cost needed to develop the platform that include all the basic requirements and the need of the stakeholder cost quite high, can go up to hundred million rupiahs. The recommendation to overcome the challenges however can be in term of prioritizing the features of the platform to reduce the cost, as well as seeking for the support from sponsorship in form of funding and collaborations.

Despite all the challenge and difficulties to develop the platform, all the stakeholders agree that the platform is undoubtedly needed. This paper also shows the approval by the stakeholder for the platform by highlighting the response of the stakeholders about the platform. All responses are positive, and it is concluded that this platform is promising to be developed even further. The future study may include the development of a prototype, to conduct testing and analyze the feedback from potentials users.

Acknowledgements

We would like to show our gratitude for all the interviewees and the institutions who provided insight and expertise that greatly assisted the research. We also want to thank Teddy Matthew S, Oki Zulheimi, Fifi Alfatha for helping us in the interview process.

Conflicts of Interest

The authors declare that there is no conflict of interest

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Utilization of *Ie Asam Sunti* as a Natural Coagulant Alternative in Tofu Production Process

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Asam Sunti is one type of spices that only exist in the province of Aceh, made from star fruit wuluh by drying and fermentation repeated for 5 days. The resulting waste is called *Ie Asam Sunti*, which is only used as food stirrer or as a spice of grilled fish especially in Pidie district. The injectable acids used in this study were from starfruit fermentation results collected until day 4. This study aims to utilize waste *Ie Asam Sunti* as an alternative to natural agglomeration and preservative tofu. The process optimization using Surface Response Method of Central Composite Design with Minitab 14 software shows that the regression model is significant to the model and interaction between factors with P_{value} is less than 0.005. The optimum conditions were obtained at volumes of *Ie Asam Sunti* 150 mL, 5 hours soybean soaking time and 25 minutes of clotting time obtained 121-135% knowl, protein content (12.57-14.15)% and texture (395,71-.459,65) gr with a very good taste. Protein content was tested by Kjeldahl method, texture tested using LFRA Texture Analyzer and taste organoleptic tested with untrained panelists of 25 people.

Keywords: *Ie Asam Sunti*; *Asam Sunti*; minitab 14, and tofu.

1 Introduction

The Acehnese people are known for their distinctive flavor of Aceh, which is the product of star fruit *Asam Sunti*. *Asam Sunti* is a flavor of cuisine with a distinctive flavor and aroma. The preparation of *Asam Sunti* is done in a very simple way that star fruit ready to harvest soaked overnight, then do salting, fermentation and drying for 4-5 days. Every morning star fruit dried in the sun and leaving waste in the liquid just thrown away, but there are some people of Aceh, especially in Pidie area the waste is sterilized by boiling for 0.5-1 days used as a preservative fish or as a baked fish sauce or as a substitute Lime juice while cooking typical *Asam Keueng* cuisine of Aceh. either.

According to [1], star fruit contains formic acid, citric acid, ascorbic acid (vitamin C), saponins, tannins, glucoside, flavonoids, and some minerals, especially calcium and calcium in the form of potassium citrate and calcium oxalate. Star fruit contains a very high level of vitamin C. The vitamin C contained in it is about 25.8 mg/100 grams. Citric acid can be used in preserving food, as an antioxidant that prevents rancidity and retains color and aroma. Citric acid can also act as sequester of metal binder chemical compounds in the form of complex bonds.

The ethanol extract from star fruit showed positive test on flavonoid and terpenoid test where both of these compounds were suspected as antimicrobial. The crude extract of star fruit is still effective as antibacterial to *S. Aureus* and *E. Coli* bacteria, but for ethanol it gives the inhibition zone. Smaller than when it is compared with antibiotic inhibition zones such as penicillin, [2].

In vitro test on the bacteria *E. Coli*, *S. Aureus*, *M. Luteus* and *P. fluorescens* showed the potential of active as antibacterial. The antibacterial potency contained in the fruit of star fruit makes the opportunity to be developed as a natural preservative of formalin replacement [3].

Tofu is a processed soybean products which very popular in Indonesia and most widely produced. As much as 40% of Indonesian soybean consumption is processed into tofu. Tofu has the original color of white, compact texture but still soft and soft. The principle of

making tofu is generally the extraction of soybean protein with water and then coagulated with some clotting materials such as tofu (CaSO_4), acids (vinegar), and certain salts. Tofu is often called the boneless meat because of its high nutritional content, Protein quality equivalent to animal flesh. Even protein of tofu higher than soy protein and tofu has the best quality of vegetable protein because it has the most complete amino acid composition and has high digestibility or 85% - 98% [4].

The addition of tofu stone as a coagulant has no effect on the preservation of the product, so it is necessary to add other ingredients such as salt or even the addition of formalin, which is very dangerous for health. Similarly, with the addition of vinegar that sometimes produces products with an acidic taste.

The use of *Ie Kuloh sira* coagulant produces solid tofu and good taste because there is still salt (NaCl) because *Ie Kuloh Sira* is the salt industry's remaining water that does not crystallize [5]. The combination of nutrients content of star fruit like citric acid and the addition of salt in the process of making *Asam Sunti* gives the opportunity to make sunti acid as a healthy agglomeration and have a longer save time as research done by [6] that based on the concentration of citric acid of 15% can produce tofu which protein content 17,98% and rendement is 168,19%. In addition, coagulation has never been used as a clumping tofu. So it is very rationable to be published as coagulant which is eco friendly.

The principle of making tofu is generally the extraction of soybean protein with water and then coagulated with agglomeration materials in the form of acids (vinegar) and certain salts. The clumping of proteins by vinegar will take place rapidly and simultaneously throughout the soybean juice, so much of the water that was originally mixed in the soybean essence will be trapped inside. Discharge of trapped water can be done by applying pressure. The greater the pressure, the more water can be excreted from the lumps of protein. That protein blob is then known as tofu.

2 Materials and Methods

2.1 Tools and Materials

The research was conducted at the Laboratory of Biotechnology and Food Department of Chemical Engineering State Polytechnic of Lhokseumawe. Tools used: Stove, juicer, pan, cooker, Tofu mold scales, tissu, Blacu cloth, Measuring cup, Mixer, Thermometer. The materials used were: Soybean, gallon water, *Ie Asam Sunti*.

Protein is amphoteric because it has carboxyl groups and amine groups in amino acids so that proteins can be acidic or alkaline depending on the pH value they have. The charge on the protein is also determined by the chain of the chain, the condition where the positive and negative charges of the protein are equal, so the protein is said to reach the isoelectric point [7].

2.1 Research Methodology

The research method used is Surface Response Method of Central Composite Design using Minitab 14 software with 3 factors that is soaking time of soybean (3 hours, 4 hours, 5 hours, 6 hours and 7 hours); Volume *Ie Asam Sunti* (50; 100; 150; 200; and 250 mL) and protein clotting time: 15 min, 20 min, 25 min, 30 min, and 35 min.

2.2 Research Procedure

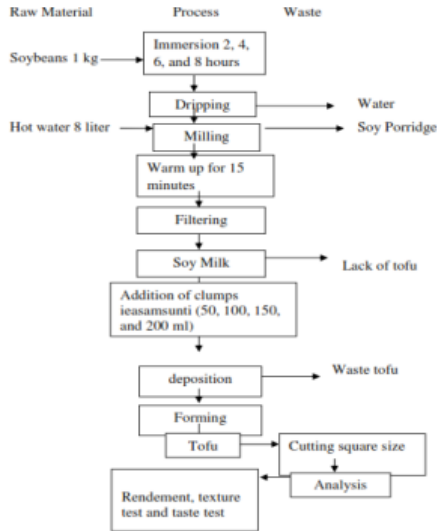


Fig. 1. The Process of Tofu from the *Asam Sunti* Ignition Clot.

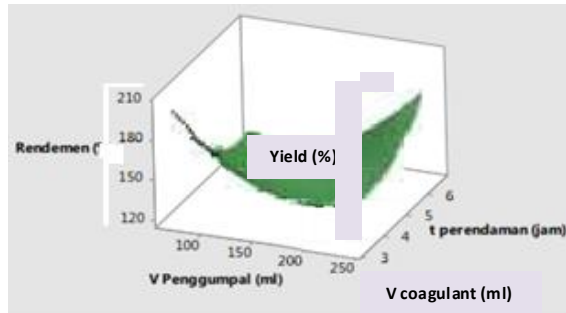
3 Results and Discussion

The results of statistical analysis can be seen that the volume of coagulation (X1), soaking time (X2) and agglomeration time (X3) have a significant effect on the yield with 72.5% contribution, 61.3% protein content and 69.1%.

3.1 Rendemen

Treatment of X1 X2 has significant effect on yield with $P_{\text{value}} 0,050$ and $X2X3 0,012$ with $R^2 = 72,5\%$. Variant analysis showed that the regression model was significant with P_{value} of 0.05 and Lack of feet 0.002 so that the regression equation obtained was :

$$Y = -7,28459E_{-04}X1^2 - 5,09152X2^2 - 0,127293X3^2 + 0,2625X1X2 - 0,0675X1X3 + 4,625X2X3 - 0,78425X1 - 114,524X2 - 4,98189X3 + 409,675.$$



t Soaking (hr)

Fig. 2. Surface Plot of yield (%) vs t soaking (hr); V Coagulant (mL).

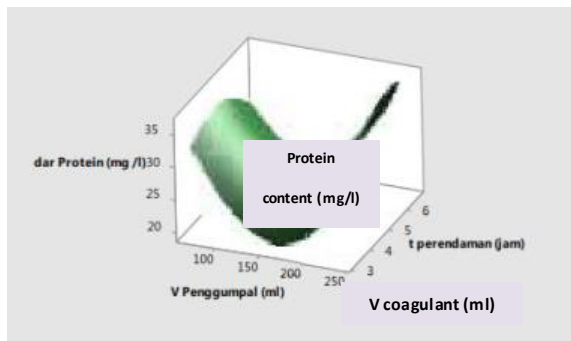
At the time of aggregation 25 minutes the increase of rendement occur with the increase in volume *Ie Asam Sunti*, but the yield will decrease significantly at the time of increase in volume *Ie Asam Sunti* due to the decrease of pH due to the formed protein will dissolve and difficult to precipitate. This happens because it has passed the isoelectric pH of soybeans.

3.2 Protein Levels

Treatment of X1 X2 has less significant effect on protein levels with $P_{value} 0,064$ with $R^2 = 61,3\%$. Variant analysis showed that the regression model was less significant with Lack of feet 0.079 it was due to the usage of protein test tool was irrelevant actually by using Kjeldahl apparatus. The regression equation obtained was :

$$Y = 0,000800747 X_1 - 120,303301 X_2 + 0,0824788 X_3 + 0,0114500X_1X_2 - 0,0127700X_1X_3 - 0,518500X_2X_3 + 0,0132489X_1 + 15,2739X_2 + 0,672106X_3 - 30,0650.$$

The longer the immersion will occur changes in the structure and changes in protein levels due to the release of the protein structure [8].



t Soaking (hr)

Fig. 3. Surface plot of Protein content (mg/L) vs t soaking (hour); V coagulant (mL).

Protein levels were in the range 20-22.5 mg/L with T bundle 25 minutes. Coagulation volume is in the range of 100-220 mL. At a volume below 100 mL protein will be difficult to dissolve because the pH of the solution is still high so it has not been able to precipitate protein in soy milk. While in the range of 220 mL volume, protein content is higher but there is a decrease in yield.

3.3 Texture

Treatment X1 X2 has significant effect on texture with $P_{\text{value}} 0.028$ and treatment X2X3 with $P_{\text{value}} 0,009$ with $R^2 = 69,1\%$. The analysis of variance shows that there is interaction between the three variables with $P_{\text{value}} 0.011$ so that the regression equation obtained is

$$Y = 0,00560869X1^2 + 4,98843X2^2 - 0,957926X3^2 + 0,946600X1X2 - 0,332320X1X3 + 20,7840X2X3 + 2,40736X1 - 734,805X2 - 5,87766X3 + 2145,63.$$

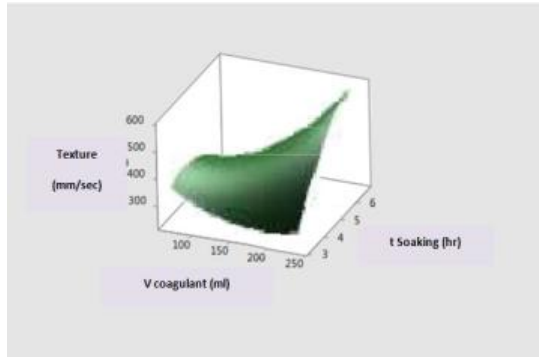


Fig. 4. Surface plot of Texture (mm/det) vs t soaking (hour); V coagulant (mL) .

The texture value obtained is almost close to the texture of the branded tofu of 556 mm/sec. The texture of tofu is getting softer on the low volume of *Ie Asam Sunti*.

4 Conclusion

Ie Asam Sunti can be used as one of the alternative of aggregate tofu clumping which is eco friendly. Based on statistical analysis with Minitab14 volume software *Ie Asam Sunti* , soaking time and coagulation time have real effect and interaction between factors to yield, protein content and tofu texture. Volume of *Ie Asam Sunti* 150 mL, 5 hours immersion and 25-minute agglomeration yielded a tofu product with a rendement range of (121-135) %, protein content (20-22.5) mg/L and texture (300-350) mm/s.

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Indonesia's Demographic Future

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Some empirical evidence advocates that large population size, especially with a high proportion of working age population, played a significant part in creating economic growth. The typical long-run demographic scenario for an emerging economy like Indonesia is that an increase in the number of working-age persons will lead to an increase in the labor force, thereby boosting potential economic growth. The central objective of this paper is to better understand the challenges of Indonesian future's population profiles. This paper serves to highlight the fact that policy decisions in Indonesia need to be made with an eye to the longer term. Two questions to be discussed in this paper are what will be Indonesian future demographic profile look like in the future and what types of policies can Indonesia undertake to fully achieve its demographic potential. Several scenarios will be presented later on before the last section that summarizes and provide some policy commentaries. The different scenario results suggest that the Indonesian dependency ratio will reverse in the next 20 years, suggesting a time-limited window for Indonesia to reap the positive condition of the demographic dividend.

Keywords: demographic dividend; Indonesia; population; projection.

1 Introduction

A typical scenario in growth economics shows that there is a strong association between population and economic growth. Looking at the East Asian region, Bloom & Williamson (1998) empirically show that young demographic condition was an important feature in explaining the East Asian economic miracle in the 70s to late 90s. They advocate that the East Asian economic miracle happened because the working-age population at that time was growing at a much faster rate than the dependent population which, in turn, help the region to expand the per capita productive capacity. The relation between population and economic growth relation was also proven bi-direction. Barro and Becker (1989) suggest that higher economic growth is often balanced with a decline in fertility through altruism factor and utility maximizing efforts of parents. Becker et. al. (1999) further adds that an improvement in economic condition leads to a higher return on investments for a child. Accordingly, the rates of population growth would eventually decrease with the improvement of economic condition. The relation between demographic and economic growth lead Bloom & Williamson (1998) to suggest that demographic profile not only postulates the current condition of the population but also provides clues as to the likely direction for future economic development. This opens a wide range for further discussion on the role of demographic development in shaping economic growth.

The choice of Indonesia as a case in this paper is because, not only, Indonesia is currently the world's fourth most populous nation but also because Indonesia's economic profile is also important in the South-East Asia (SEA) region. With an average of 5.5 percent economic growth per year, Indonesia is one of the fast-growing economies in the world. This has led Indonesia's economy to accounts for a third of SEA's GDP. The latest population census of Indonesia in 2010 reported that the Indonesian population reached more than 230 million people. This number has been estimated to reach 265 Million in 2017. Accordingly, understanding on the trajectory of Indonesia's economic and demographic profile will be beneficial for policymaker and futurologist not only in the region but also in the world.

Figure 1 shows the historical population of Indonesia as published by the Indonesian Bureau of Statistic (BPS). As pictured in the graph, Indonesia’s population roughly grew by more than 50 million between 1990 and 2010. Moreover, Indonesia’s large population also conveyed a large number of working-age populations. The number of Indonesians aged 15 to 64 years, generally considered the traditional working age group, has significantly increased over the last ten years. This profile is obvious through the larger bulge in the lower part of the population pyramid. Theoretically, this productive population is the ones expected to encourage economic growth through economic activity creation, create a source for consumption, provide the capital in the financial market, and act as a strong supporter for tax revenue. With the right approach, Indonesian productive population can be the key factor for Indonesia to be one of the world's biggest economic power. Therefore, Indonesian policymakers need to develop policies that could, not only, provide decent employment opportunities but also trigger productivity improvement. Failing to do, however, so could push Indonesia’s demographic bonus into what so-called demographic burden.

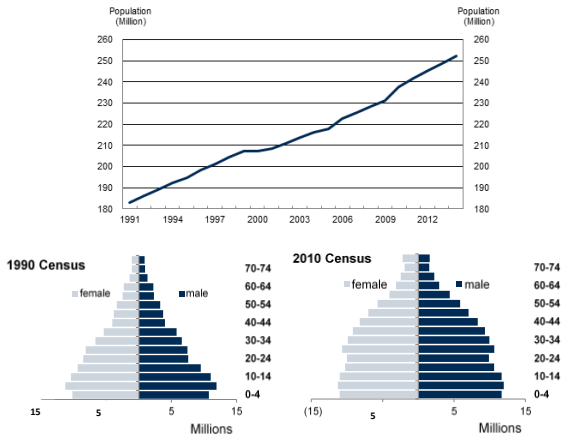


Fig. 1. Indonesian Population Historical Estimation & Population Pyramids.

2 Methodology

This paper uses the cohort-component method in the projection of population with 2050 as the end or projection period. The demographic components, (births, deaths, and migration) are estimated from available historical data while migration rate followed a constant value of zero. Due to more widespread availability, this paper focuses on Indonesia's national data rather than regional. This paper employs three scenarios which incorporate possible demographic trends of fertility and life expectancy (mortality) in Indonesia. Table 1 shows the summary of these scenarios. The objective of the scenario analysis is to understand the effect of different challenges and opportunities which may emerge in Indonesian demographic development. The choice of a deterministic assumption rather than probabilistic was driven mostly by the fact that there are some limitations in the historical data for Indonesia to support a robust probabilistic model.

Table 1. Scenario Summary.

	Total Fertility Rate Improvement	Life Expectancy Improvement
Series A	Lower	Moderate
Series B	Base	Moderate
Series C	Higher	Elevated

The fertility scenarios (Base, Lower and Higher) are developed under the movement of Indonesia's "Replacement Level", which is The Total Fertility Rate (TFR) at which a population exactly replaces itself from one generation to the next without migration component. The Indonesian National Population and Family Planning suggest that Indonesia replacement level is reached when the TFR equal to 2.1. Series B (Base) will utilize this 2.1 TFR to be reached in 2025. Series A uses estimation that the replacement level is reached earlier (2020) while series C assumes that the replacement level is reached farther (2035). Indonesia's increasing focus on industrial improvement could play a potential factor of an accelerated decline in the fertility rate. As

more jobs are created, the labor participation rate of women is likely to increase. This could generate tendencies of women marrying and bearing children later in life. In addition, an increase in incomes could also lead to a higher opportunity cost of having children. These last two factors were seen in South Korea's Industrial revolution in the early 1990s. The third scenario, Series C, assesses a longer reduction of fertility. A rationale for this scenario is based on internal conditions within Indonesia where several regions still have a high fertility rate. Data from the Indonesian Bureau of Statistics (BPS) shows that in 2012 there were ten provinces that have a TFR of three or above.

The development of the life expectancy scenario starts with the assumption that without any short-term shocks (i.e. war, natural disasters, and epidemics), life expectancy should improve. The rate of improvement in life expectancy, however, could vary depending on several influencing factors. The basic premise in developing the life expectancy scenarios in this paper leans more on infant mortality rates as an age-independent component. Series A and B will use a moderate infant mortality improvement while Series C will use a higher (elevated) improvement estimation. The premises in assuming a moderate improvement in infant mortality level is that health service exposures, especially in the remote area of Indonesia, are still limited. The UN reports that Indonesia's Infant Mortality in 2016 reached 22 per 1000 live birth, well above its peers. In the moderate life expectancy scenario (Series A & B), Infant Mortality for Indonesia in 2050 are projected to improve to reach 10 per 1000 live birth. Using mortality table, this condition results to a life expectancy calculation of roughly 68 years (Male) and 72 years (Female). On the other hand, higher level of education of mothers, easier health access and overall progress in health technology are some factors that motivate faster improvement of infant mortality development thus lead to higher life expectancy scenario used in Series C. For Series C, Infant mortality projection of 8 per 1000 live birth in 2050 will be used, suggesting a life expectancy of roughly 70 years (Male) and 72.5 years (Female). A large reduction of child and infant mortality has happened before in China in the early years of its industrialization era.

The assumption of zero net overseas migration in Indonesia used in all scenarios. With the current low quality of data on international migration and the uncertainty of the pattern and direction of international migration in Indonesia, it is difficult to know and estimate the real number of international migration. Therefore, this paper will use zero as the net overseas migration assumption.

3 Model Result

The model suggests that a 300 million population mark for Indonesia will be reached between 2036 and 2039. Figure 2 shows the population projection of Indonesia to 2050 under the different scenarios. The average annual rate of growth in population projection is projected to be 0.89 percent in the next 20 years. The UN population projection medium-variant scenario under the World Population Prospect is used as a key comparison.

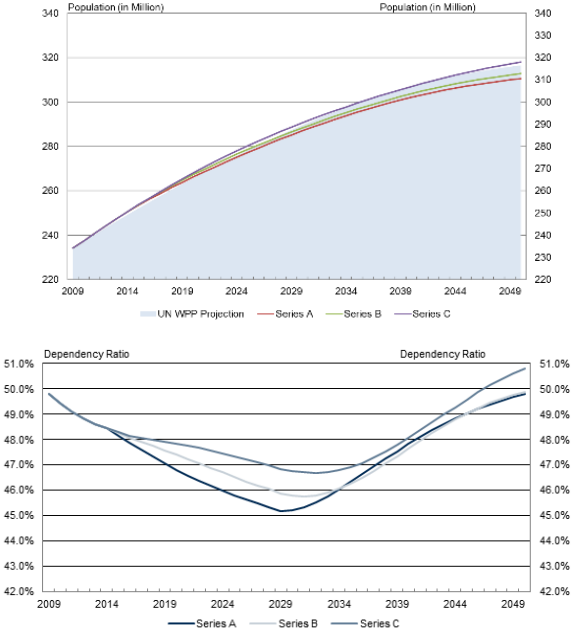


Fig. 2. Indonesian Population and Dependency Ratio Estimation.

All scenarios show a similar trend of declining dependency ratio profile. As expected, this declining profile then reverts to an increasing trend. In all scenarios, a low fertility rate and/or a high life expectancy will lead to older citizen gaining more share of the population. Series B, which uses 2025 as the year where replacement level is reached, provides 2031 as the turning point for the dependency ratio. A lower fertility scenario indicates that the turning point happens earlier (2030) while the higher fertility scenario suggests an extended turning point (2033). This condition is self-explanatory since a low fertility rate means that there are fewer children, creating an accelerated reversal of the dependency ratio. Nevertheless, Figure 2 shows a convergence of the dependency ratio for series A and B which use similar life expectancy assumption. The convergence suggests that the fertility rate will be influential in the medium term for the population while life expectancy will have a longer-term influence.

All scenarios suggest population in the productive age (15 – 64) in 2030 are high, demonstrating the potential of a large consumer base and a huge source of labor for Indonesia. Nevertheless, the model result also shows the risks for Indonesia in term of a consistent increase in the number of older population. The proportion of population above 64, which is estimated to be around 5 percent of the total population in 2014 will rise to around 9 percent in 2035. In Series B, with a population estimation of 296 Million in 2035, the 9 percent portion of the population above 64 constitutes of more than 23 million people. From a policymaker perspective, this condition could create some risks. A poorly manage fiscal management, such as social and health spending, could lead to a non-sustainable budget spending, as well as, uncovered health risks.

Using the population projection, we can also construct an estimation of labor force for Indonesia. One key element in the labor force estimation is that, without extending the pension age policy, as the population ages, a declining profile in labor force participation follows. Using the population projection number, a stable age-specific participation rate estimation, and the Non-Accelerating Inflation rate of Unemployment (NAIRU) projection from OECD we calculate Indonesia employment number projection. Using scenario B as the

selected scenario, the estimation suggests that there will be more than 153 million workers in Indonesia in 2050. These results should help answer the question of how big the labor force potential for Indonesia in the future. This, of course, assuming the NAIRU and other assumptions prevail.

4 Analysis

The UN describes the declining profile of the dependency ratio as the “window of opportunity” when a “demographic dividend” may be reaped. The potential within this demographic dividend includes an increase in labor supply, increase in personal saving, higher potential from tax revenue, a low health and social cost and high domestic demand. The model suggests that Indonesia’s dependency ratio trend is still declining and is predicted to reach its lowest level in 2030-2035. The different scenarios show that fertility is a central component for Indonesian demographic profile. However, a reduction of fertility rate without supportive policies, such as migration, could create a distortion that results in a significantly reduced share of young people in the population. Following the idea of Bloom & Williamson (1998), a low portion of young productive population could lead Indonesia to miss the golden opportunity of growth. This loss of potential could lead to some serious economic consequences in a longer term. The improvement in life expectancy, on the other hand, provide a moderate influence on the dependency ratio profile. Nevertheless, there are still risks coming from an increasing life expectancy, particularly from a fiscal perspective. As happened in many high-income countries, the health and social cost of an increasing older people’s proportion is not negligible. Additionally, a rising dependency ratio shows an increased risk to the economy as more of the population become more reliant on others, be it family or the government.

Capitalizing on the demographic dividend opportunity has challenges. Unfortunately, the efforts of managing these demographic challenges, including preparing the necessary budget plan, are more prevalent in advanced economies compared to the emerging economies, including Indonesia. As mentioned earlier in the paper, a policy question to be answered in the paper is what strategy Indonesia should adopt in maximizing the potential from a large number of population. It is easy to understand that Indonesia's large population could lead to a large productive labor force potential. However, one should also understand that this relation is not strongly written. A supportive and aligned education policy also needed to make sure that the population is ready and prepared to be in the labor force thus creates economic growth.

Indonesia's economy is said to be in the process of transitioning to industrial-based. Therefore, it is more likely that the future engines of output growth will be the industrial and value-added sectors. The Indonesian government has been moving in this direction by building mass infrastructures such as roads, airports and other forms of connectivity. Coupled with the high allocation for education, this infrastructure spending will surely help creates more opportunities for Indonesians to improve their productivity and accelerate the economic transformation. Nevertheless, the economic transition will also mean that Indonesia could no longer rely on traditional, resource-based, industries for labor absorption. This type of Industries is traditionally acted as the main labor absorber. In the effort of economic transformation, Indonesia's industrial and value-added sector need to be developed as an important part of labor absorber. Additionally, preparing workers to move into and participate in the modern sectors of the economy should also be a priority. Human capital development to create high-quality labor is a critical factor.

For Indonesia, the needs of maximizing the labor force potential to participate and create added value for the economy is gaining importance. This includes a greater focus of policymakers in creating a match between the skills required in the job market and the skills of

the working age population. The 20 percent budget allocation for education signals a positive commitment of the government to improve the quality of the country's workforce. Nevertheless, in the long run, this percentage will need to be reviewed as the profile of the Indonesian economy and population evolves. Additionally, maximizing the population potential also related to addressing the challenges associated with a rising share of the dependent population. These challenges include slowing economic development as there are potentially fewer labor force participants and potentially higher budget expenditures. The current low exposure of the Indonesian population to private health insurance could increased government expenditures on health services. As Indonesia's demographic profile moves to an aging population the proportions of the young population in the population, available for employment, will gradually decrease. Accordingly, with the current retirement age of 58 years, the aging process will lead to an increase of people outside the labor force. Smaller portion of the labor force will reduce potential economic output and tax revenue. Therefore, the importance of addressing the barriers in labor force participation will increase.

5 Summary

This paper hopes that understanding Indonesia's current and projected demographic profile can help policymakers better prepare for the future. The Indonesian population projections model has several key findings (1) the Indonesian demographic dividend will end within the next 20 years (2030 – 2035), suggesting a limited window of opportunity for strong productive age population (2) the Indonesian high population growth rate is projected to continue, creating a large potential market and labor force (3) higher life expectancy and lower fertility rate and are key factors in Indonesia's expanding demographic profile, with the latter provides higher influence. Specifically, the model shows that fertility rate is influential in the medium term for the population projection while life expectancy will have a longer-term influence. The model shows that Indonesia is currently walking on a positive demographic momentum. Moreover, as more working-age

population is provided by the population, support for human capital improvement is needed. It would be beyond the scope of this paper to prescribe specific policies in each of these areas. However, this paper tries to highlight the fact that policy decisions related to demography (health, education) need to be made with an eye to the longer term this policy also need to be followed by a sustainable financing source. Providing health service, investing to promote skills, and preparing workers to move into and participate in the modern sectors of the economy should be a priority that be kept sustainable.

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Welding Products Defects Analysis with Fault Tree Analysis and Failure Modes and Effects Analysis

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In manufacturing companies, high number of defects translates to high costs. Some types of products that have defects can be reworked to minimize wastes. However, not all types of products can be reworked, especially welding products. Companies need to find ways to reduce defects before they occur. Reduced defects mean better sustainability, both in economical terms and in ecological terms. This paper discusses the results of a field study conducted in an automotive company that uses Resistance Spot Welding (RSW) in its processes. Fault Tree Analysis (FTA) and Failure Modes and Effects Analysis (FMEA) method is used in identifying causes of defects and in developing action plan to reduce Risk Priority Numbers (RPN) as a way to reduce defects and defects-related costs.

Keywords: FTA; FMEA; Resistance Spot Welding

1 Introduction

Motor vehicle production process in the automotive industry is not only about producing more quantity, but also about maintaining and improving the quality of the product so that consumers feel satisfied with the product. According to the Indonesian National Standard / SNI 19-8402-1991, quality is the totality of features and characteristics of products and services that can satisfy both stated and implied customer needs [1].

Quality product results depend on production process. The process of making a product has its own quality control depending on the process. Car production has several processes, and one of the processes of making a car is the welding process using Resistance Spot Welding (RSW). RSW is a process of combining two or more materials in the structure of a car or commonly known as Body-in-White (BIW). There are around 4000-6000 spot welding on the car [2]. The results of RSW will not always be in accordance with the provisions of quality that already exists or can be called defect. One of the results of a defect from resistance spot welding is crack.

This research was carried out in an automotive company in Indonesia. Based on experiments conducted in the company laboratory using RSW on a galvanized steel, the percentage of welding product defects in the forms of nugget diameter cracks is more than 15 percent. Spot welding defects can reduce the quality of the car, so the results of the defect will be analyzed using the Fault Tree Analysis (FTA) method and the Failure Mode and Effect Analysis (FMEA) method. FTA is a deductive technique [3] that is graphical and logical which can evaluate the probability of an event or accident as a result of failures of a system's components [4] by using symbols that is easy to understand [5]. FMEA is a simple and economical methodology [6] that enables the documentation of failure modes and their causes, effect, control, and ranking; therefore, it is important for the automotive industry to implement FMEA because it can provide point of action before errors occurs and avoid rework and corrective action [7]. The combination of FMEA and FTA provides more detailed information than separate applications of the two methods [8][9].

2 Materials and Methods

In this Resistance Spot Welding (RSW) research, the equipment and materials used are KDC30-1056N Welding Gun, pendant, force gauge, and galvanized steel. This research uses SCGA 270D galvanized steel material with two different thicknesses, 1.2 mm and 2.0 mm and have different material dimensions that follows the JIS G 3136 standard. Material that has a thickness of 1.2 mm, follows a dimension of width 30 mm, length 100 mm. As for material with a thickness of 2.0 mm, following dimensions of width 40 mm and length 125 mm, as can be seen in Fig. 1.

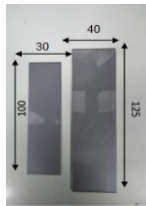


Fig. 2. Material Dimensions
Fig. 2. RSW Result

Fig. 3. Weld Nugget Crack.

In this research, 72 spot welding experiments was carried out. An example of RSW Result can be seen in Fig. 2. After the spot welding process, the next step is to evaluate the weld nugget to see the results of the process. From 72 spot welding experiments, there are 12 results that have cracks in weld nugget. Illustration of the weld nugget crack can be seen in Fig. 3. The results of these defects are analyzed using

the Fault Tree Analysis (FTA) method and Failure Mode and Effect Analysis (FMEA). In developing the FTA and FMEA analysis, interviews are conducted with 4 welding experts who have worked with the company for more than 6 years.

Fault Tree Analysis (FTA) is a top down analysis that provides a visual representation of how equipment failures, human errors and other factors lead to an accident or event [10]. The beginning of the FTA step is to identify a system failure mode from the top event problem. The top event is developed by several branches that bring to several sub-events which shows the possible causes of an event [11]. FTA maximally shortens the time required to find faults and failures; upon the occurrence of a fault, we only need to observe the FTA diagram to detect, localize, and remove it in the shortest period of time [3].

Failure Mode and Effect Analysis (FMEA) is a method that focuses on defects prevention [12]. FMEA uses the Risk Priority Numbers (RPN) of defects that gives prioritization on which defects that needs to be focused in order to have production process with minimal defects based on value of the RPN; defects or failure modes with higher RPN needs higher attention [13]. RPN has 3 risk factors, namely Severity (S), Occurance (O), Detection (D) that is rated on a scale of 1-10 for each failure mode using the ranking guidelines [14]. The formula of the RPN [15] can be seen in Equation (1).

$$\text{RPN} = \text{Severity (S)} \times \text{Occurance (O)} \times \text{Detection (D)}$$

FTA and FMEA are methods that can be used in attempts to assess risks or failures. FTA and FMEA is already used in numerous studies. Several of them is described in the following. Medvesek et. al. [3] used FTA to analyze heavy fuel oil supply. Povolotskaya & Mach [8] used FTA and FMEA to analyze adhesive joining process. Aravinth et. al. [13], Tripathi et. al. [15] used FMEA to analyze welding. These studies have shown that FTA and FMEA is very beneficial in assessing risks and developing actions to lower process failure.

3 Results

3.1. Fault Tree Analysis (FTA)

The FTA method is used to analyze to cause of Resistance Spot Welding nugget cracks. The potential factors causing the cracks are Condition, Equipment, and Material. These potential factors, intermediate events and basic events are determined through field study and discussion with company welding experts. The results can be seen in Fig. 4.

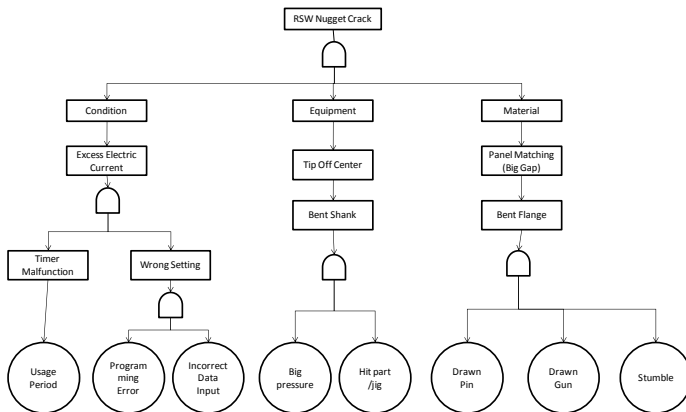


Fig. 4. Fault Tree Analysis on Spot Welding Crack Results.

3.2 Failure Mode and Effect Analysis (FMEA)

After finding the causes from FTA analysis results, the FMEA method was conducted and the results can be seen in Table 1. The recommended actions and the RPNr, which is the RPN value after the recommended actions are implemented, can be seen in Table 2.

Table 1. Failure Mode and Effect Analysis for the Weld Nugget Crack.

Failure Mode	Effect	S	Cause	O	Control	D	RPN
			EQUIPMENT				
Tip Off Center	Bent shank	8	E1. Big pressure	6,5	Welding conditions inspection	8	416
		8	E2. Hit part/jig	7	Equipment condition inspection	8.5	476
			CONDITION				
Excess Electric Current	Timer Malfunction	9	C1. Usage period	7	Electric current inspection	8.5	535.5
	Wrong setting	9	C2. Incorrect data input	5.5	welding conditions inspection	8.5	420.75
		9	C3. Programming error	5	welding conditions inspection	8.5	382.5
			MATERIAL				
Panel Matching (Big Gap)	Bent flange	7	M1. Drawn gun	6.5	Material position check	9	409.5
		7	M2. Stumble	7	Material inspection	9	441
		7	M3. Drawn pin	6.5	Datum pin check	9	409.5

Table 2. Failure Mode and Effect Analysis based Recommended Actions.

Failure Mode	Effect	Recommended Action Plans	S	O	D	RPNr
EQUIPMENT						
Tip Off Center	Bent shank	E1. Check and adjust pressure	5.5	2.5	8	110
		E2. Check equipment and replace damaged equipment	6	2.5	8	120
CONDITION						
Excess Electric Current	Timer malfunction	C1. Measure the electric current before using	6.5	2	8	104
	Wrong Setting	C2. Check the setting of the spot welding process and reset it	6	2.5	9	135
		C3. Check the setting of the spot welding process and reset it	6	3	9	162
MATERIAL						
Panel Matching (Big Gap)	Bent flange	M1. Learn correct material position during the process of spot welding and re-arrange material position	5	2	8.5	85
		M2. Check material and replace material with new ones if damage occurs	5	2.5	9	112.5
		M3. Check the datum pin and replace the datum pin with a new one if there is damage	5	2.5	9	112.5

4 Discussion

4.1 Fault Tree Analysis

The first result that has the potential to cause spot welding crack results is equipment. The description of the factors that have the potential to cause defects by equipment is due to the tip off center (the electrode is not right at the spot welding). Failure caused by tip off is not center is bent shank which can be caused by large pressure, hit part / jig.

The potential cause of defects in the condition section is the excess of the electric current caused by three factors, namely timer malfunction and wrong settings. The cause of the defect on the timer factor is corrupt due to the usage period which results in a functional decrease of the timer. Whereas in the wrong setting factor, the cause is the incorrect data input and incorrect the program used for setting the electric current parameter.

The last part of the cause of the defect due to crack is the material part. The potential cause is matching panel which can be caused by bent flange. The bent flange caused by drawn gun, stumble, and drawn pin. This FTA analysis uncovered events that lead to welding nugget crack. This is the data that will be used in the following FMEA Analysis.

4.2 Failure Mode and Effect Analysis (FMEA)

The FMEA Analysis in Table 1 is based on the FTA Analysis. The basic events in the FTA Analysis which can be seen as the bottom events in Fig. 4 is inserted as the Cause in the FMEA Analysis. The cause with the highest RPN is the Usage Period which is the cause of Timer Malfunction. Action plans are developed for each of the causes in order to decrease the RPN. Action plans that are developed are basically simple actions that only require checking and measuring. However, the implementation of these simple action plans give meaningful results. The results of comparison between RPN and RPNr is shown in Fig. 5. RPNr is the value of RPN after recommended actions are implemented. It can be seen that after the recommended

actions are implemented, the RPNr is quite low, very different from the original RPN.

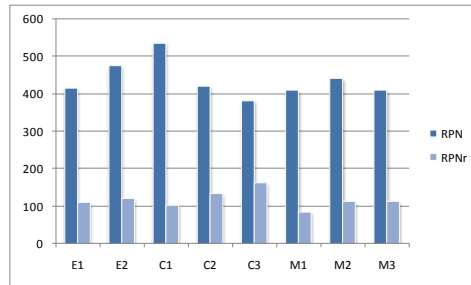


Fig. 5. Comparison of RPN and RPNr

5 Conclusions, Limitations, and Future Research

From this research, it is concluded that the combination of the FTA and the FMEA method can find the failure modes in a systematical way. The results of the FTA is the failure modes. The failure modes is then analyzed with FMEA. This research has developed action plans that result in lowering the Risk Priority Numbers (RPN) of the Failure Modes. However, the research results is not without limitations. Further welding experiments have not been conducted to prove that lower RPN numbers do result in lower number of weld nugget defects. It is recommended that future researches include empirical researches that can prove lower RPN numbers mean lower number of defects. It is also recommended that future researches use economic engineering approach, such as cost-benefit analysis, in the research.

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Abstracts

Foundations of Continuous Innovation in Japan's Manufacturing Firms: How to Cope with Industrial Transformation

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This paper focuses how "Japanese technology" was formed in the Japanese machine tool industry, and presents how Japanese machine tool builders competed in R&D and innovation process in the domestic as well as international markets. During the competition for innovation of CNC, drastic changes occurred in the ranking of individual firms. Prior to the transformation, the traditional "Big 5" companies occupied the largest market share. After the innovation, however, the "Big 3" firms which had not been big in size at their origins increased their market share. This paper examines how this change stemmed from different attitudes towards technology management related to R&D and innovation. Recently most of Japanese manufacturing industries such as electric appliances, semiconductors lost global market shares. The Japanese machine tool industry, however, still maintains the dominant position more than 40 years in terms of not only quality but also quantity. This is due to the result of continuous innovation, and this paper attempts to find this basis.

Keywords: computerized numerically-controlled (CNC) machine tools; electronics; mechatronics; strategic alliance; technology management

Technological Learning and Innovation of ASEAN's Manufacturing Firms

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This paper summarizes situation regarding innovation and technological upgrading in selected Southeast Asian countries based on surveys and case studies of selected industries, sponsored by the Economic Research Institute of ASEAN and East Asia (ERIA) since 2008. Firms in Southeast Asia innovated more and upgraded their technological capabilities. They conducted more R&D, though most were done informally. They leveraged more with external actors like transnational corporations and more recently universities. They performed better in key industrial sectors, namely, electronics, automotive and resource based industries. However, in machinery industry, technological upgrading is still limited.

Keywords: innovation, technological upgrading, global value chain, R&D, Southeast Asian countries



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Inclusive Economic Development through SICA (Sistem Informasi Cerdas Agribisnis - Smart Agribusiness Information System) Application

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Indonesia is a developing country that is prone to be shaken by the domestic and foreign economic sectors. The government develops inclusive economic growth that is oriented towards the goal of maximizing resource use, leaning towards the community as a good economic implementer, and expanding employment. In line with the inclusive economic development of the government, the agricultural sector that has been conventionally developed has become more communicative and predictive in particular by incorporating weather and climate information that helps agriculture in an Agribusiness Intelligent Information System (SICA). SICA assists Indonesian agriculture with weather prediction and planting calendar so that it can reduce the number of farmers' crop failure and increase productivity. SICA is an agricultural information system that has features such as 3 hours weather prediction for the next 3 days, climate prediction, planting calendar, flood and drought hazard and market information. SICA was developed to answer farmers' needs for weather and climate information in determining the time of planting. SICA was developed in website and Android platforms so that it makes it easier for farmers to use and view information. With information support from SICA, farmers can determine the right planting time and are ready to be alert to the threat of flooding and drought. The use of SICA has been proven to increase farmers' productivity. By increasing the productivity of these farmers, inclusive economic growth in Indonesia, especially in the agricultural sector, can be overcome.

Keywords: agriculture; inclusive economic development; SICA

Development of a Highly Compact and Versatile Digital Reverb/ Delay Effect Processor for Music Performances

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In music production, advances in digital technology made it possible for audio engineers to create a wide variety of sound effects for various applications such as music performance/recording, product commercials, and movie production. The software-based nature of digital audio gives engineers more versatility in creating imaginative sounds that are difficult to create using purely analogue signal processing technology. DSP chips are specialized hardware devices that performs digital signal processing under the control of software algorithms. Audio engineers use these algorithms to create time-based sound effects, such as reverb and delay, which epitomizes the degree of time manipulation possible in the digital domain. The real-time audio processing capability of DSPs also make them suitable for professional musicians to use DSP-based audio effects during live performances where signal latency becomes a major concern. At GFI System, we develop, engineer, and manufacture various audio processors in pedal format designed for the electric guitar. In 2017 we released an effect processor called Specular Tempus. Compared to other similar products in the market, Specular Tempus' value proposition lies in its specialized software which allows for extensive manipulation of the reverb and delay audio effects while maintaining a compact, user-friendly physical footprint.

Keywords: audio signal processing; reverb algorithm; effect processor

Autonomous Multimodal Transportation: How It Changes the Liability in the Carriage of Goods Industry

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The era of digitalization has changed the face of many businesses including the industry of carriage of goods. The autonomous multimodal transportation such as an unmanned ship, car, and aircraft has emerged and soon being operated to support the door-to-door carriage activities. In the near future, human role is no longer controlling but the artificial intelligence system that takes charge. This article is primarily aimed to identify how such autonomous technology changes the concept of liability to the actors of the industry. The present available international conventions were not designed to cover such development and thus resulted in a gap between the technology and existing regulations. In the light of that, suggestions are put forward to alleviate the identified problems.

Keywords : autonomous; multimodal; transportation; liability

Developing an Online Platform for Air Charter Services in Indonesia: A Feasibility Study

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This study assessed the feasibility of developing an online platform for connecting air charter providers operating in Indonesia with their potential customers. The size of air charter market size in Indonesia and its growth were investigated through literature studies. Subsequently, a series of interviews were carried out to collect specific information and insights from potential users. The interviewees from air charter provider side were full service, low cost carrier, and medium service airlines while the interviewees from customer side were travel agents, independent travellers, and corporations. Website developers were also interviewed to investigate technical and financial challenges of developing the online platform. The literature studies found that the market size of air charter in Indonesia is promising and expected to grow rapidly. The interview results indicated that the needs are high and the potential users are interested in using the online platform once it is available. This paper also suggested some important requirements to be accommodated in the online platform.

Keywords: air charter; feasibility; market; online platform; requirement

Evaluating User' Engagement of E-Commerce Platform: A UX Perspective

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This paper discusses a UX measurement model of e-commerce based on Hassenzahls's framework of UX. This framework covers a holistic aspect of user experience including: be goals, do goals, and motoric goals. Be-goals relate to the meaning of an action, do-goals concern with functionality whereas motoric goals divulge the ability generated by actual interactive product and context. Although the framework is suitable implemented both at initial phase and evaluation phase of e-commerce, yet we focus to present the measurement model to be implemented at the evaluation phase. This measurement model hopefully contributes to improve the usability of Indonesian e-commerce site due to its problem on ineffective usage. What we defined here were basically industrial approach to evaluate their e-commerce platform, which definitely enhance the user experience so that it could leverage the user engagement.

Keywords : user experience; UX; e-commerce

SAP SLCM Implementation Critical Success Factors: A Case Study of Universitas Prasetiya Mulya

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Enterprise Resource Planning (ERP) systems has been trusted by many organization as the standardized integrated information systems that automate the business process. ERP implementation affects entire organizations aspect such like people, culture, and process. There are many challenges that organization may encounter during the implementation of ERP systems. Recently the systems are also implemented in universities around the world to replace their bespoke or current legacy systems to improve management and administration or specifically referred as student life cycle management. This research will emphasize the ERP implementation in Universitas Prasetiya Mulya by using the Critical Success Factors (CSFs) Framework and Miles and Huberman Framework (antecedents, implementation and post implementation). The findings from the case studies will contribute to contextual understanding of distinctive challenge of ERP implementation in university environment.

Keywords: Enterprise Resource Planning; student life cycle management; Critical Success Factors (CSFs) Framework; Miles Huberman Framework

Innovate New Segment with API Telco

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API (Application Programming Interface) is a software intermediary that allows two applications to talk to each other. We familiar with API gateway for payment transaction as nowadays e-commerce, market place as well as online shop has already integrated with payment gateway for the easiness connection to bank and give more alternatives payment method for the end customer. Refer to Menkominfo (2017), online transaction in Indonesia is only 7% compare with the internet users, this is caused by 2 factor which are: 1) Low penetration of bank and credit card; 2) Distrust of the owner of account bank and credit card to share information through internet. Meanwhile data for cellular phone owner reach 85% of Indonesia population. Therefore, following the evolution of transaction, telecommunication operator also open API connection which is not only for trade of information but also for commercial transaction as the end user can use DCB (Direct Carrier Billing) for digital content (intangible) purchase and telco e-money for goods (tangible) purchase. Through API telco services, can help SME to boosting the sales performance as follow: a) improve brand and product awareness by API communication; b) give alternatives of payment method by API DCB and telco e-money

Keywords: API; API telco; payment

Law as Technological Control to The Infringement of Intellectual Property Rights in the Digital Era

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According to technological determinists, particular technological developments are the prime antecedent causes of change in society, and technology is seen as the fundamental condition underlying the pattern of social system, including the law. The development of technology in digital era has influenced the pattern of intellectual property rights infringement and enforcement. One of the functions of patent and copyright systems is the dissemination of knowledge and works well needed by the society. On the other hand, technological development in information system also facilitate the dissemination of knowledge and works but has unwittingly infringed the intellectual property rights. To overcome this dilemma, therefore, the legal function must be redefined so that the law can be used as a means of technological control.

Keywords: technological determination; technological development; intellectual property rights; legal development

Development of Mobile Radiation Monitoring System utilizing LoRa as The Communication Means

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Public protection is one of important issue when operating nuclear facility. In case of accident occurs, the facility owner and related organizations shall make decision whether to evacuate people or not, based on the level of the accident and radiation dose rate released to the environment. In this study, as part of the decision support system for nuclear emergency response, a prototype of mobile radiation measurement system has been developed. The device consists of Geiger-Muller (GM)-based radiation measurement board, Global Positioning System (GPS) module, microcontroller board and low power LoRa module for communication. Radiation dose rate along with its geoposition were recorded and being sent to base station equipped with LoRa gateway for connecting LoRa network to TCP/IP-based network. The measurement data is then published to storage server using Message Queuing Telemetry Transport (MQTT) protocol. Power consumption, measurement of counter/timer accuracy, communication ranges testing and radiation dose rate measurement was performed around Puspipstek area to demonstrate the functionality of the system.

Keywords: radiation monitoring; decision support system; LoRa; mobile



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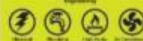
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Tropical Fruits Quantitative Inspection

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Indonesia is blessed with a tropical climate, which makes the country one of the best places on earth to grow many exotic and tasty fruits. According to some reports published by government institutions, papaya and mango are among the top four of fruits priority for both domestic consumption and export commodity. Post-harvesting fruits inspection is an indispensable step to do in order to ensure quality of the fruits before presenting them to the customers. However, conventional inspection by human perception is still the main method, despite its subjectivity and limitation. For a more reliable and objective inspection, a quantitative method based on science and technology is then required. In this research, the current harvesting and inspection method of papaya and mango in Indonesia and their contribution to economy will be reported. Following that, a preliminary study on the potential of replacing the manual inspection with quantitative inspection will be examined. Two parameters will be particularly explored, namely firmness and soluble solids content (SSC). Firmness of the fruits is measured as compressive strength, while SSC as oBrix.

Keywords : papaya; mango; quantitative inspection; firmness; soluble solids content

A green Alternatives of Nitrogen Source to Chemical Fertilizer in Nata De Coco Processing

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Nata de Coco is a type of snacks that rich with fiber and minerals. The basic raw material of Nata de Coco processing is pure coconut water obtained from the coconut fruit sellers in the markets. Nata seeds are bacteria *Acetobacter xylinum* which will be able to form fibers nata if grown in coconut water that has been enriched with carbon and nitrogen through a controlled process. In such conditions, these bacterias produce enzymes that can be compiled into a thousand chain sugars or cellulose fibers. Sources of nitrogen needed by the bacteria *Acetobacter xylinum* are usually taken from ZA fertilizer, Urea fertilizer, or Di-Ammonium Phosphate. Due to the strict regulation and harmful effect of chemical fertilizer as nitrogen source, an alternative source is highly sought. In the present research, an environmentally friendly solution was introduced by using bean sprouts as nitrogen source in the process of producing nata de coco. From the reserach, it was found that chemical fertilizer can be replaced with bean sprouts.

Keywords: nata de coco; ZA fertilizer; urea fertilizer; di-ammonium phosphate; nitrogen source; bean sprout

Utilization of *Ie Asam Sunti* as a Natural Coagulant Alternative in Tofu Production Process

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Asam Sunti is one type of spices that only exist in the province of Aceh, made from star fruit wuluh by drying and fermentation repeated for 5 days. The resulting waste is called *Ie Asam Sunti*, which is only used as food stirrer or as a spice of grilled fish especially in Pidie district. The injectable acids used in this study were from starfruit fermentation results collected until day 4. This study aims to utilize waste *Ie Asam Sunti* as an alternative to natural agglomeration and preservative tofu. The process optimization using Surface Response Method of Central Composite Design with Minitab 14 software shows that the regression model is significant to the model and interaction between factors with P_{value} is less than 0.005. The optimum conditions were obtained at volumes of *Ie Asam Sunti* 150 ml, 5 hours soybean soaking time and 25 minutes of clotting time obtained 121-135% knowl, protein content (12.57-14.15)% and texture (395,71-.459,65) gr with a very good taste. Protein content was tested by Kjeldahl method, texture tested using LFRA Texture Analyzer and taste organoleptic tested with untrained panelists of 25 people.

Keywords: *Ie Asam Sunti*; *Asam Sunti*; minitab 14; tofu

Low Cost Spirulina Cultivation from Food Waste

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Spirulina (Arthrospira platensis) is one of the algae with market that is developing rapidly. The application includes for food supplement, animal feed, cosmetics and production of specialty chemicals obtained during the extraction of the algae biomass. The current market, however, is limited by the cost of production, particularly when synthetic chemicals are used as the growth medium. The use of industrial waste and agricultural by-product may reduce the production cost. Our research is using liquid waste obtained from tofu manufacturing process for production of *Spirulina* biomass. In this media, the cell performed mixotrophic metabolism that allowed higher cell productivity. The growth in 16- and 25-fold dilution of the liquid waste produced highest biomass productivity and cell concentration at 14 mg/l-day and 0.1 g/l, nearly three times higher than the values obtained from the cultivation in a control medium using synthetic chemicals. Higher concentration of liquid waste inhibited the cell growth. The biomass composition and the cellular phycocyanin level of the cell growing in the tofu waste is similar to the composition produced from growing in the control medium. This utilization of the liquid tofu waste reduced the cost for medium until 40 % lower. These results demonstrate the potential of using liquid waste from tofu manufacturing process as an alternative low cost and efficient growth medium for *Spirulina* biomass production.

Keywords: *Spirulina*; tofu waste; low cost medium; algae biomass

Phytochemical Screening and Antioxidant Activity of *Averrhoa bilimbi* L. Flower as Raw Material for Herbal Beverages

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The aqueous extract of *Averrhoa bilimbi* L. flower, which is purported to have good properties for cough and mouth sores, has been studied for its antioxidant activity and phytochemical screening tests. The antioxidant activity of this extract was determined using 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. The aqueous extract of fresh *A. bilimbi* L. flowers showed higher antioxidant activity than the flowers dried in an oven at 50 °C with IC₅₀ 13.24 µg/mL. Secondary metabolites in *A. bilimbi* L. flowers were studied by qualitative phytochemical tests and the results showed that the extract contains alkaloids, flavonoids, saponins and tannins. Further studies are needed to determine the optimal drying method so that the antioxidant activity of *A. bilimbi* L. flower as raw material for herbal beverages is obtained in accordance with the characteristics of its fresh flower.

Keywords: *Averrhoa bilimbi* L.; antioxidant activity; DPPH; herbal beverage; phytochemical screening



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A Literature Review on Commodification Personal Data and Their Valuation Methodologies in Data-Driven Economy

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Commodification personal data gathered by technological progress in hardware, e.g. Internet of Things (IoT), software, e.g. social media, and network economy, e.g. sharing economy, is a necessity in the data-driven economy that being characterized with disrupted social structures and substantial and unpredictable consumer behavior. Commodification personal data range from quantified personal operational data to qualitative personal experience data. Commodification personal data have monetary value in the data-driven economy. In this article, several valuation methodologies to value commodification personal data are discussed and how different business model attached different value to commodification personal data eventhough they using the same personal data valuation methodologies.

Keywords: operational data; experience data; commodification personal data; personal data valuation methodologies; data-driven economy

A Bootstrap Simulation for Comparison of Group Risk Plan and Multi-Peril Crop Insurance Policy

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Agricultural insurance is one of solution for farmers to avoid the risks such as climate change, pest, disease, which increase the risk of crop failure. Indonesian Ministry of Agriculture (MoA) and Jasindo have been using subsidized Multi-Perils Crop Insurance, that faces some disadvantages mainly due to high risk moral hazard, adverse selection, high administrative costs. Therefore, our research provides an alternative policy area yield index insurance, known as Group Risk Plan (GRP), which minimizes the moral hazard and adverse selection, thereby reducing administrative costs and offering potential to market at lower costs. In order to find homogenous basis risk in GRP, the data is classified under two hectares and upper two hectares and bootstrapping approach is used to find MPCl and GRP indemnity amount for each term of harvesting period. Moreover, parametric estimation and goodness of fit test indicate appropriate distribution, used by MPCl and GRP in each term of harvesting period. In order to compare the aggregate loss distribution, the conditional value at risk $CVaR_{\delta}(X)$ measures the mean of excess loss exceeding $VaR_{\delta}(X)$. It indicates how risky and how much amount of money should be retain by insurance company. Simulation show that MPCl has greater $CVaR_{\delta}(X)$ than GRP, which implies the likelihood of loss is higher. The insurance company should have enough reserve for MPCl to cover that loss. On the other hand, GRP policy encourage farmers to do good farming practices, which result in lower likelihood of loss. Hence, GRP could be considered as an alternative crop insurance policy in Indonesia.

Keywords : Multi-Peril Crop Insurance (MPCl), GRP (Group Research Plan), Bootstrapping, $CVaR_{\delta}(X)$

The Willingness to Pay Alternative Crop Insurance Policy

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Most of the Indonesian poor households worked in the field of agriculture where farmers have been struggling with many challenges, e.g. climate changes and narrow farming land that increase the risks of crop failure. One of the most promising ways to solve this problem is through the establishment of crop insurance. However, the small number of farmers using crop insurance (9% of the respondents) indicates that the recent policy (Multi-Peril Crop Insurance (MPCI)) needs to be evaluated. Crop insurance in Indonesia is still novel and it is known that this policy carries some disadvantages, i.e. high risk of moral hazard and adverse selection, high administrative cost, fluctuation of price fall, and low quality of human resources. Therefore, this research focuses on driving better insight of farmers' perception on crop insurance, alternative policies based on conjoint analysis, and evaluate the willingness to pay for a more preferable policy. Results show that the most important factors are the causes of loss covered by insurance provider (risk pooled), value of money (risk and benefit comparison), and practicality of insurance product. Based on conjoint analysis, policies that focuses on these factors will be considered both attractive and favorable in the willingness to pay. Farmers are interested in unit link features as it offers a chance to invest fund and as for the willingness to pay, it is possibly increased due to the attractiveness of all-risk feature. The willingness to pay a crop insurance is affected by farmer's income, cultivated land, risks faced by farmers, and types of crop insurance chosen. Appealing policies include, modified MPCI and Group Risk Plan (GRP). GRP is not only simple but also induces good farming practices and potential for farmers having cultivated land above 2 Ha. Hence, it is expected to be a good contender for the currently-existing crop insurance policy in Indonesia.

Keywords: Multi-Peril Crop Insurance (MPCI); GRP (Group Research Plan); Conjoint Analysis; Willingness to Pay

Structural Equation Model (SEM) to Analyze the BOP Intention to Use Mobile Banking

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Indonesia is a country with a very low level of financial inclusion. Based on World Bank data in 2014, only 34% of the adults in Indonesia have accounts in formal financial institutions and has increased by 34%. Therefore in 2013, Bank Indonesia launched a pilot Branchless Banking program by cooperating with 6 Banks (Mandiri, BRI, BNI, BTN, BTPN, BCA) as a pioneer and in 2016, the President of the Republic of Indonesia launched a Strategy National Financial Inclusion. One of the initiatives in Branchless Banking is Mobile Banking. Mobile Banking is considered to have great potential in expanding services finance in Indonesia thus helping to increase inclusive finance in Indonesia targeted at 75% in 2019. This study aims to measure the effectiveness of Mobile Banking to increase the interest of the BOP in buying financial services at formal financial institutions in Indonesia. The effectiveness of Mobile Banking is a variable which can't be measured directly or known as a Latent variable. Therefore, Structural Equation Model (SEM) model is the most suitable model for used in this study. The SEM model was developed based on the models tested by Gocallo Baptista and Tiago Oliveira in 2016, which was based on meta-analysis and weight analyses. The study shows that the variables significant to the acceptance of mobile banking is the intention (intention) to use mobile banking. In addition we have also suggested the influence of technology fit, voluntary & involuntary barriers in inclusive finance, and product fit. The data used for our model was based on survey of 100 BOP households. The results of this study can be further used by researchers and mobile banking service providers to evaluate existing mobile banking services to improve its contribution in providing better and more appropriate financial services for BOP and ultimately increase the level of inclusive finance in Indonesia.

Keywords: Mobile Banking Effectiveness; Structural Equation Model (SEM); Financial Inclusion



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Exploring the Roles of Social Technologies for Open Innovation in Tourism Sector: A Systematic Literature Review

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This paper presents the state of academic research on open innovation. In particular, we examine the role of social media in open innovation of tourism industries. We employ analytical review to evaluate the contribution of literature. Data is collected from reputable journals and conferences. Once articles are selected, then we implement a descriptive analysis to provide a comprehensive and conceptual analysis.

Keywords: open innovation; social media; literature review; descriptive analysis

The Impact of Creative Industries on a Nation's Socioeconomic Growth (Case Study: Game of Thrones on Northern Ireland)

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Garnham (2005), Potts and Cunningham (2008), and Lee (2014) suggested that creative industries have a spill-over effect for a greater socioeconomic growth of a nation. This paper analysed how cultural policies may affect that growth. As television sector generates the highest creative industries revenue in Britain, this paper examined a case study of Game of Thrones television series impact on Northern Ireland, which is a post-conflict nation. This desk research utilised secondary data from the British government's policy documents. Finally, it found several policies including funding, skill-building, marketing, and city branding that created positive impacts on screen tourism, urban regeneration, and employment.

Keywords: creative industries; cultural policy; film and television; screen tourism; tourism business

Sport Venue Operation: The Theatre of Dreams

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In this report the authors have chosen to examine the operational strategic evaluation of Sport Venue. Theatre of Dreams, the Old Trafford Stadium usually been called, was chosen to be the case. The authors have used qualitative methods by tour observation in Old Trafford and secondary data from websites and academic books. In addition, through using these methods, the writers have discussed about operation management, service process, operation performance, operation strategy and competitive advantage in Old Trafford. To sum up, the findings proved that these five points are essential for Old Trafford, to gain more revenues. In contrast, commercialization is the only negative point, that have been found by the writers, that affected in customer satisfaction, caused by poor atmosphere in the stadium.

Keywords : sport venue; Old Trafford; operation

The Innovative Tourism E-Commerce Model for 'Wonderful Indonesia' Destination Branding Campaign

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The development of e-commerce in the tourism sector is expanding. The online unique features are able to navigate people to follow the current trend of destination and create the global competition among the countries. One of the essential matters to survive in this battle is to take advantage of this situation to the maximum effort. This paper will examine the e-commerce model from 'Wonderful Indonesia' destination branding campaign, in Indonesia. It will integrate the marketing characteristics and enhance the e-commerce model to recommend a brand new standard for the destination branding campaign.

Keywords : e-commerce model; destination branding campaign; Wonderful Indonesia

Visitors Experience Effect on Memory and Its Implication to Destination Satisfaction and Loyalty

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Travels initiated by local tourist in Indonesia have increased continuously throughout the years. One of the immense acts from the government is the encouragement to host cultural festivals in every corner of the nation, including in the city of Jakarta. This research aims to see how compatible consumer experience is by measuring how big the impacts are from the four realms that create the experiences, which are education, entertainment, esthetics, and escapism, to the establishment of memories of the event's visitors that will lead to their satisfaction and destination loyalty. The objects of this research are a couple of events in Jakarta which promoted the culture of Betawi, which were "Gelar Budaya Betawi" Festivals in Bintaro and Ragunan. This research is done quantitatively, distributing 297 questionnaires by intercepting the visitors domiciled outside of Jakarta who were found right inside of these two festivals. Most visitors who were also the sample of this research had the socio economy class of class C, with the majority of them labeled as "Gen Y" and "Gen Z", and had the professions of being a student. The collected data were tested using factor analysis and structural equation modelling (SEM) in AMOS. The result of this research shows that the four realms of experiences can indeed positively form consumer experience. Albeit in this context of research, out of four realms, there are only three—entertainment, escapism, and esthetics—which show a significant impact on the establishment of the visitors' memories that influences their satisfaction and loyalty for the city of Jakarta.

Keywords: consumer experience; cultural festival; memories; customer satisfaction; destination loyalty

Acoustics Analysis of Open Air Stages for Music Performance

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Nowadays, music performances are common held on outdoor venue. The limitation of proper indoor venue causes the event performs in near the beaches, mountains, or historical places. The positive effect of this condition is considered to attract domestic and international tourists. Unfortunately, they usually do not provide the audience and the performers the high level of comfort than indoor space. External noise, the behaviour of sound propagations, control of sound reflections, the reinforcement through sound reflections from the amphitheatre gradient and natural loudspeaker responses are indicated as some problem of outdoor spaces. This paper discusses acoustics requirement for open air stages to be applied for music performance, including the type of amphitheatre and its sound enhancement which offers high acoustic comfort. The study presented in this paper based on literature review of scientific papers and researches conducted outside Indonesia. It is highly expected that those experiences could be adjusted in Indonesia.

Keywords : open air stages; outdoor music performance; amphitheatre

Exploring the Transition to Eudaimonic Tourism

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Growing population with rising income, advances in information and transportation technologies, preventive medicines, moderated nationalism that translate into less restrictive border measures against people flows have combined to fuel a durable progressive growth in tourism, domestic and international. As tourism grows, carrying capacity is stretched or even overstretched in some places and industries. The “Waldo effect” or the overcrowding of a destination in the latter’s life cycle is familiar to popular tourism sites. Energy consumption, CO₂ emission, non-degradable and toxic wastes, biodiversity loss and loss of cultural diversity add to the downsides of growing tourism. We doubt the inclusivity and sustainability of the current dominant design of tourism in developing economies such as Indonesia. A shift toward a more eudaimonic tourism is needed. The innovative elements of eudaimonia include geographical treasure, biodiversity, and local deep culture. Indonesia is well endowed with peculiar geographical resources which in turn result in rich biodiversity. Long history of migration has also accumulated Indonesia’s cultural diversity. Bali offers an imperfect road to eudaimonic tourism as will be discussed as evidence that the shift away from exclusive and unsustainable tourism to a more inclusive and sustainable one is a realistic option.

Keywords : eudaimonic; tourism; inclusivity; sustainability

The Presence of Global Value Chain in Coastal Marine Tourism

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Indonesia, as part of the Coral Triangle region has become an attractive destination for coastal and marine tourism (CMT). The government has been promoting this tourism sector intensively with 10 priority destinations program, wherein most of the destinations are categorised as CMT. The Thousand Islands is used as the case study as it is one of these 10 priority destinations. It has a unique feature with its territory consists of hundreds of small islands and located near the center of the capital city of Jakarta. Moreover, as CMT, it has the specific character of widely scattered, small-medium sized enterprises (SMEs) and also involves stakeholders from various sectors. This paper identifies the actors in the Global Value Chain (GVC) for CMT in the Thousand Islands and analyses SWOT for the lodging and transportation sectors. In-depth interviews and focus group discussions were conducted with the actors who are managers of lodgings and travel agents, transportation business owners, tour guides, and government organisations. This study first reveals the stakeholders involved in the GVC are the community, government, and private companies. It also confirms the tourist type that are dominated by organised mass tourists. Secondly, SWOT analysis is used to describe the situation of the lodging and transportation sectors. Infrastructure is the main concern of transportation, while for accommodations, there are wide ranges of resorts and homestays with the majority managed by the local community. In addition, technology improvement also contributes to the ease of information access, facilities, and tourism product purchase.

Keywords: Global Value Chain Model, Coastal Marine Tourism, Thousand Islands, SWOT Analysis



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A Social and Community Based Approach to Accelerate Renewable Energy Development in Indonesia

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Biodiesel is a biofuel made from various plants and in Indonesia is widely produced from Crude Palm Oil (CPO). CPO is commonly used as main cooking oil in Indonesia which is used every day in households, hotels, restaurants, etc. These activities generate a substantial amount of used cooking oil which is mostly dumped directly to the environment without processing (i.e sewer, soil, etc). Dumping UCO directly to the environment will cause contamination. Furthermore, some threats arise from irresponsible people who recycle the UCO by purifying it with improper method. The recycled UCO then resold to the market without proper labeling and packaging. This act may create health hazard for the community. In line with Government of Indonesia's policy to increase the use of clean and renewable energy for the future, a community based social movement was established which consists of volunteers from various background (i.e. college students, housewives, etc). The community conducts online and offline awareness campaign to the community explaining the best usage of plant based oil for frying, the health and environment impact of UCO, and proper recycling of UCO. This movement also collects UCO from the community and the UCO is sent to biodiesel plant for processing.

Keywords: biodiesel; used cooking oil; social movement; renewable energy

Challenges of Social Entrepreneurs Collaboration to Alleviate Disparity at Periphery

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The problem of Indonesian periphery are very complex. The government's systemic planning to accelerate periphery growth by building infrastructure will not sufficient if the human capital are not fostered proportionally. However, building human capital is task challenging, especially for the people who live in periphery. In this case, social entrepreneurs are the appropriate actors that deserved this responsibilities because they have social objective mission, volunteering passion, and creativity as entrepreneurs. Unfortunately, most social entrepreneurs often operated contextually. For that reason, collaboration of social entrepreneurs is the efficient and effective way to overcome inequality problem in periphery. Nevertheless, collaboration is not an easy thing to conduct. According to Berger, Cunningham, and Drumwright (2004), there are 6 things that routinely become problems, namely misunderstanding, misallocation of cost and benefits, mismatches of power, mismatched partners, misfortunes of time, and mistrust. Through in-depth interviews to the multi-field social entrepreneurial representatives who are likely to collaborate, the research will observe if these 6 issues are likely to occur and then identify whether there are potential of other problems and what collaborative model is most appropriate to reduce potential problems. This research is expected to obtain valuable information about factors that must be prepared by enablers to ensure the realization of social entrepreneur's collaboration.

Keywords: social entrepreneur; collaboration; periphery; mis matched; challenges

Driving Social Innovation through the effective use of Social Hubs

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Although the use of social hubs as a way of driving social innovation is creating significant global interest among researchers and policy makers, a common understanding of social innovation hub is missing as well as a sound knowledge about how to run such social innovation hubs successfully. Documentation of how successful hubs have been in facilitating growth of local entrepreneurs, start-ups as well as small and medium-sized enterprises (SMEs) is lacking. This paper addresses a gap in the research to provide a better understanding of the essential components of a successful social hub. It suggests that key success factors of social hubs are collaboration and engagement amongst the hub's start-ups, SMEs and members. In a qualitative survey of senior managers from 20 social hubs in Europe and North America, this research provides insights into the success of social hubs, exploring what makes some hubs more effective and what creates “added value”. Our research illustrates a high diversity of social hubs with different models running on social entrepreneurial as well as business principles. It also highlights the different approaches to business models and focus of hubs under consideration in different contexts, with a primary consideration of providing sustainable growth of SMEs as well as societal value. Finally, the paper provides with a series of guidelines, which suggests best practices for practical implications.

Keywords: social innovation; innovation hubs; success factors; social business; incubator

Innovation in Learning: Comparative, Repetitive Cross-Sectional Surveys in Higher Education

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This survey was carried out in Tangerang Selatan, a university town in Indonesia. The theoretical framework of this study was based on Felder-Silverman Learning Styles Model which proposes eight categories of learning dimension. The purpose of this study was to understand learning styles of high schools students entering university in order to promote innovation in teaching delivery and enhance the quality of student learning experience. This study was conducted using repetitive cross-sectional survey for over a 3-year period to 2325 of high school students. A systematic analysis was applied to investigate learning styles in terms of genders, desired undergraduate programs in management and accounting, and years of admission. Descriptive statistics and Pearson Chi-square analysis were used to measure the significance of result for each variables. The findings of this study revealed that male students has significant differences in one learning dimension compared to female students, while in terms of years of admission, the proportion of sequential learners show a significant increase from 2014 to 2016; this may imply that students from science or analytical background are increasingly preferred management school. As predicted, students who take management programs are mainly active learner, except in accounting program where sensing learner is dominant. Other notable finding is the importance of implementing innovative visual based learning process in higher education institutions.

Keywords: Learning styles; Quality; Management; Higher Education; Teaching-Learning Methodologies

How an Entrepreneurial Intention Proceeds into Real Behaviour: a Perspective from Complexity Thinking Process of an Entrepreneur

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Understanding the process on how people starting a business and what kind of factors that motivate them are one of the most interesting topics in Entrepreneurship study. While most research in Entrepreneurial Intention (EI) could answer about the main factors that heighten the intention of someone to do business, but the transformation of EI into entrepreneurial behavior still surprisingly left behind. This paper tries to offer new perspective model to linkage EI into entrepreneur behavior through the complexity theorem by integrating Cognitive Adaptive System (CAS) as a process in ascertain the transformation of EI into entrepreneurial behavior. Rather than considering the creation of business as a revolutionary process, it might be more suitable in thinking that entrepreneurship creation is more of evolutionary process by integrating complex system thinking into the process. Moreover, CAS might be able to assist in explaining the reason of relationship between factors of EI with the type of business one will build and how entrepreneur progress into a tangible business.

Keywords: entrepreneur complex thinking process; entrepreneurial intention; entrepreneurial behavior; cognitive adaptive system

Social Entrepreneurship, Innovation, and Equality: The Consequences of Innovation for the Craft Communities in Flores, Indonesia

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Innovation is an essential tool for any social entrepreneur to exploit opportunities and achieve sustainable development. I critically examine how innovation in social entrepreneurship affects social structure and equality in the target communities. While, on the one hand, social entrepreneurship may successfully expand the economy and improve welfare, on the other hand, innovations tend to widen the socioeconomic gap. For example, the partnership of two Jakarta-based social enterprises with craft-making communities on the rural island of Flores, Indonesia, has resulted in economic growth. However, the adoption of innovation by some groups has created socioeconomic gaps between adopters and non-adopters within the target communities. Thus, the issue of adoption of innovation in the field of social entrepreneurship needs to be studied further. In particular, I propose that equality is a crucial component in achieving sustainable development, a topic that remains unexplored in social entrepreneurship studies.

Keywords: social entrepreneurship; adoption of innovation; Indonesia; sustainable development; equality

Indonesia's Demographic Future

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Some empirical evidence advocates that large population size, especially with a high proportion of working age population, played a significant part in creating economic growth. The typical long-run demographic scenario for an emerging economy like Indonesia is that an increase in the number of working-age persons will lead to an increase in the labor force, thereby boosting potential economic growth. The central objective of this paper is to better understand the challenges of Indonesian future's population profiles. This paper serves to highlight the fact that policy decisions in Indonesia need to be made with an eye to the longer term. Two questions to be discussed in this paper are what will be Indonesian future demographic profile look like in the future and what types of policies can Indonesia undertake to fully achieve its demographic potential. Several scenarios will be presented later on before the last section that summarizes and provide some policy commentaries. The different scenario results suggest that the Indonesian dependency ratio will reverse in the next 20 years, suggesting a time-limited window for Indonesia to reap the positive condition of the demographic dividend.

Keywords : demographic dividend; Indonesia; population; projection

The Effect of Firm Scale and CSR Geographical Scope of Impact on Consumers' Response

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The role of corporate social responsibility (CSR) in shaping consumer perception and attitude has received many attentions both in the academia and practitioner world. While this domain has invited numerous research, but research highlighting how consumers react toward learning the size of a firm conducting CSR and geographical scope of the CSR impact is still scarce. We investigate how consumers shape their attitude and consumption behavior after knowing that the CSR action is done by a small, locally-owned business that brings impact to the local community through an experimental study. Our study adds a shade in understanding how the effect of a firm size and geographical scope of CSR impact might increase consumers' favorable attitude and behavior toward the business and its products. Our findings show that when consumers learn that the firm conducting CSR is a small, locally-owned (in coffee shop business) that directs its action toward local beneficiaries, they demonstrate more favorable attitudes toward the action and the firm, which manifest in the form of better intentions to acquire the product as well as willingness to pay premium prices for it. Our findings confirm the US consumers' love affair with local businesses, in particular. While the findings generally benefit small, locally-owned businesses, they also suggest recommendations for large, multinational businesses to design their marketing strategy in an attempt to increase favorable reactions from consumers.

Keywords : Corporate social responsibility; Firm scale; Geographical scope; Attitude; Purchase intentions; Willingness to pay



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Corporate Social Responsibility and Community Development on Beyond Compliance of Environmental Protection and Management

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This study aims to analyze the role of corporate social responsibility and community empowerment in exceeding the compliance of environmental protection and management as well as the role of stakeholders to realize in accelerating the implementation of agroindustry areas based on environmental management system. This research was conducted a survey on agroindustry company in Central Java. The sample of research is 200 respondents by using proportional stratified random sample technique. Methods of data collection using questionnaires, interviews, observation and documentation. Analytical techniques used structural equation modeling (SEM). The results of this study indicate that the increasing corporate social responsibility and community empowerment in the form of expansion of new business groups of small medium enterprises and assistance development of product variants in the area of agroindustry companies the more agroindustry companies are able to exceed compliance in the Protection and Management of the environment.

Keyword: corporate social responsibility; community development; SME's; beyond compliance; agroindustry

Rural Electrification Development to Enhance Human Development Index in Majalengka District

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There is a positive relation between infrastructure development program and economic growth. One of outcome is to fulfill rural electrification. In 2018, almost 99% of West Java region take benefit of electric infrastructure implementation. Majalengka district as part of West Java is one of priority area for rural electrification program. The result of this research is prospering and convincing. The Result using qualitative data during 2009 – 2015 rural electrification program is converse to electricity production and also resident has shown positive outcome and significant to Human Development Index (HDI).

Keywords: rural electrification; economic growth; human development index

Preliminary Design and Sustainability Study of Rosella Jam Factory Utilizing Renewable Solar Energy

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Rosella is a flower with red and purple hue, having antioxidant pigments called anthocyanins, which is promising for health improvement. It actually could be potentially developed as a health-promoting food in the form of rosella jam. As the market for rosella jam in Indonesia is not established yet, and in the advent on the development of renewable energies in the 21st century, it is a fascinating idea to design a rosella jam factory employing solar energy as one of the renewable energies in the future that might lead the sustainable food business in Indonesia. The rosella jam factory is designed to produce 40000 bottles of rosella jam (weight: 250 g) per month, sold for Rp. 25000, rendering income of Rp. 1 billion per month. It needs a one-off capital cost of Rp. 2.56 billion for production equipments and machines (not including solar panels), with monthly manufacturing cost of 624 million (included 20 kW electricity) that will reach break-even point (BEP) at 13th month. Solar panels (mainly consists of 840 solar panels, 200 Wp working for 4 hours) worth of 2.64 billion is recommended to be installed on the 19th month to avoid negative cumulative net present value (CNPV).

Keywords: rosella; renewable energy; solar energy; solar panel; BEP; CNPV

Innovation and Development of Polyetherimide-diaminoethane Nanofiltration Membrane for Textile Wastewater Dye Removal Towards Sustainable Environment of Indonesia

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In this work, diaminoethane (DAE) is applied to improve the properties of polyetherimide (PEI) nanofiltration (NF) membranes via crosslinking process for the applications in separating textile dye from wastewater. The membranes were fabricated by phase inversion thin film casting technique, from PEI/acetone/NMP (n-methyl pyrrolidone) dope solution, crosslinked with DAE 2.5 % v/v in methanol. In this study, the parameters of composition of polyetherimide dope solution having acetone as non-solvent content are investigated to obtain a potential membrane for clarifying wastewater, which is one of major problems in Indonesia. A model dye was utilized, namely Reactive Red 120 (RR120) as a synthetic wastewater. It is found that the rejection of dye is increased along with the acetone content, and also by the crosslinking duration. The crosslinking between PEI and DAE is analyzed from the physical and chemical aspects, by using scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR), respectively. A good performance in nanofiltration of RR120 synthetic dye wastewater is demonstrated with 92-98% dye rejection. This PEI-DAE NF is therefore promising not just for sustainable waste management, but also for the innovation and development in the ecology and environment of Indonesia.

Keywords: membrane; nanofiltration; polyetherimide; diaminobenzene; acetone

Techno-economic Assessment on the Application of Waste to Energy Technologies in Indonesia

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An increase in human living standard leads not only to the higher intensity of generated municipal solid waste (MSW), but also to the shifting of its component towards complex and non naturally-degradable materials such as plastic, glass, metal, and chemical waste. The waste management system, which is capable of handling such large amounts of, and complex types of, waste, is therefore important to support the progression of a society. Meanwhile, the traditional waste management systems that rely on natural decomposition, e.g. land-fill, should eventually be replaced. Inappropriate handling of MSW will lead to health problems and the deterioration of the environment carrying capacity on the built civilization. Conversely, a better MSW management system will not only solve health and environmental problems, but also can generate economic benefits. In this study, the technical and economical assessments of the implementation of waste to energy technologies in Indonesia were performed. We review the technical options of the available technologies, namely: (1) waste to electricity by incineration, (2) waste to solid fuel by hydrothermal treatment, and (3) plastic waste to fuel oil by pyrolysis. Two cities namely Jakarta and South Tangerang were selected as case studies. Technical assessment was conducted by investigating chemical and physical properties of MSW, resulting in a comprehensive review of the technical feasibility and expected output of applying the treatment technologies. Economical assessment was conducted by simulating a business model that satisfies some economic parameters. This economic assessment shows the needs of

variables adjustment for making the technologies economically feasible. Results of this study are expected to bring a clearer picture of its potential and challenge in bringing the waste to energy technologies to commercial application, especially in Indonesia.

Keywords: municipal solid waste; waste to energy technologies; incinerator; hydrothermal; pyrolysis; techno-economic assessment

Welding Products Defects Analysis with Fault Tree Analysis and Failure Modes and Effects Analysis

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In manufacturing companies, high number of defects translates to high costs. Some types of products that have defects can be reworked to minimize wastes. However, not all types of products can be reworked, especially welding products. Companies need to find ways to reduce defects before they occur. Reduced defects mean better sustainability, both in economical terms and in ecological terms. This paper discusses the results of a field study conducted in an automotive company that uses Resistance Spot Welding (RSW) in its processes. Fault Tree Analysis (FTA) and Failure Modes and Effects Analysis (FMEA) method is used in identifying causes of defects and in developing action plan to reduce Risk Priority Numbers (RPN) as a way to reduce defects and defects-related costs.

Keywords : FTA; FMEA; Resistance Spot Welding

Time-Varying Vehicle Routing and Scheduling

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This study examines logistics problem that encompasses reducing the length of its delivery routes, decreasing its number of vehicles, and operating in more efficient. The problem is to find an optimal routes for several vehicles from a central supply depot to a number of customers and returning to the depot without exceeding the capacity constraint and total travel time of each vehicle, so that the total cost of the routes is minimized. A mathematical model of time-varying vehicle routing and scheduling is developed to address this problem. Furthermore, *time-varying shortest path* (TVSP) algorithm is implemented to develop a solution algorithm. The solution algorithm presented is applied to a realistic case study.

Keywords : time-varying optimization; vehicle routing; shortest problem

Tide Level Prediction Using Hybrid, Supervised and Unsupervised Neural Networks

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Artificial Neural Network (ANN) is become one of most used and popular method for forecasting time series data. The evolving of ANN make its algorithm more flexible to solve different prediction study case. Developing of ANN can be seen in various type of ANN namely supervised, unsupervised and hybrid. This paper intended to compare the performance of supervised, unsupervised and hybrid ANN to predict tide level. The results obtained illustrated that hybrid ANN has the best peromance than supervised and unsupervised with accuracy for tide level forecast is 92.14 %.

Keywords : supervised; unsupervised; hybrid; prediction