ENGINEERING ENGINEER PEOPLE TECHNOLOGY INDUSTRY

12th International Seminar on Industrial Engineering and Management (12th ISIEM)

"Industrial Intelligence System on Engineering, Information, and Management"

ISIEM

March 17-20, 2020
Batu-Malang, East Java
Indonesia

Organized by Industrial Engineering Department

UNIVERSITAS TRISAKTI · UNTAR · UAI Universitas Al Azhar Indonesia · UNIVERSITAS PASUNDAN · Esa Unggul · PODOMORO UNIVERSITY

International Partnership

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BOOK PROGRAMME AND ABSTRACT

12th International Seminar on Industrial Engineering and Management (12th ISIEM)

"Industrial Intelligence System on Engineering, Information, and Management"

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Indonesia

The 12th International Seminar on Industrial Engineering and Management (12th ISIEM)
Amarta Hills Hotel and Resort, Batu-Malang-Indonesia, March 17-19, 2020

PROGRAM BOOK

The 12th International Seminar on Industrial Engineering and Management (12th ISIEM)

Amarta Hill Hotel & Resort, Batu Malang
March 17 – 19, 2020

Organized by :

Industrial Engineering Department of
● **Universitas Pasundan** ● **Universitas Tarumanagara** ●
● **Universitas Trisakti** ● **Al Azhar Indonesia University** ●
● **Universitas Esa Unggul** ● **University of Pancasila** ●
● **Atma Jaya Catholic University of Indonesia** ●

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P R E F A C E

This program book is published in line with the Twelfth International Seminar on Industrial Engineering and Management (12th ISIEM). The International Seminars on Industrial Engineering and Management (ISIEM) is an annual seminar to provide an effective forum for invited speakers, academicians, engineers, professionals and practitioners coming from universities, research institutions, government agencies and industries to share or exchange their ideas, experiences and recent progresses in industrial engineering and management and other related fields in dealing with the dynamics and challenges of the 21st century.

This 12th ISIEM is hosted by seven universities, namely Atma Jaya Catholic University of Indonesia, Universitas Trisakti, Universitas Esa Unggul, Universitas Al-Azhar Indonesia, Universitas Tarumanagara, Universitas Pasundan, and Universitas Pancasila. The seminar main theme for this year is **Industrial Intelligence System on Engineering, Information and Management**. Under this theme, we will explore sustainable innovation in industrial technology, information, and management of global issues. The articles cover a broad spectrum of topics in Industrial Engineering and Management, namely Quality Engineering & Management (QM), Decision Analysis & Information System (DAIS), Supply Chain Management (SCM), Production System (PS), Industrial System (IS), Operation Research (OR), and Ergonomics & Product Design (ER&PD).

The articles in this issue provide an overview of critical research issues reflecting on past achievements and future challenges. Those papers were selected from 149 abstracts, and we will send these papers to IOP for publication as an Open Access Proceeding. This is the third time we have had MOU with IOP in United Kingdom to publishing the papers that is indexed by Scopus. This year's seminar become special as more delegates and papers come and received from various universities as well as countries. We are hosting more than 110 delegates both local and from abroad.

I would like to give special commendation to our keynote speakers **Prof. Dr. Abdul Talib Bon** of Universiti Tun Hussein Onn Malaysia and **Y.BHG. Dato' Professor Dr Hj Mohd Rasid Hussin** of Founder and President of International Institute of Risk Management And Crisis Strategies (IIRMACS). We are also grateful to our International partners, namely Kasetsart University Thailand, Bright Star University Libya, Chung Yuan Christian University Taiwan, and Universiti Tun Hussein Onn Malaysia, for their contribution to enrich the variety of articles and participants. We are deeply grateful to PT. LEN Industri for sponsoring our seminar. We appreciate all reviewers and

editors, for their commitment, effort and dedication in undertaking the task of reviewing all the abstracts and full papers. Examining large number of submissions in a relatively short time frame is always challenging. Highest appreciation is also given to all members of committees for their mutual efforts and invaluable contribution to success of this seminar. Without their help and dedication, it would not be possible to produce this program book in such a short time frame.

Finally, special thanks to all delegates of 12th ISIEM for their contributions. We hope the information in this Program book are useful to all of you. Thank you.

Vivi Triyanti ST., M.Sc.
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- Dr. Pornthep Anussornnitisarn

Day #1 – Tuesday, 17 March 2020

15.00 – 17.30   Hotel Check-in
17.30 – 18.30   Registration
18.30 – 19.30   Dinner
19.30 – 19.45   Opening Ceremony
19.45 – 21.00   Keynote Speech #1 Y.BHG. Dato' Professor Dr Hj Mohd Rasid Hussin of Founder and President of International Institute of Risk Management And Crisis Strategies (IIRMACS) - Malaysia

21.00 – 21.15   Photo Session

Day #2 – Wednesday, 18 March 2020

06.30 – 08.00   Breakfast and Registration
08.00 – 09.15   Keynote Speech #2: Prof. Dr. Abdul Talib Bon; Professor of Technology Management – Universiti Tun Hussein Onn Malaysia

09.15 – 09.30   Coffee and Tea Break
09.30 – 12.10   Parallel session #1
12.10 – 13.00   Lunch break
13.30 – 15.40   Parallel session #2
15.40 – 16.00   Coffee and Tea Break
18.00 – 19.30   Dinner

Day #3 – Thursday, 19 March 2020

06.30 – 08.00   Breakfast
08.00 – 10.00   Parallel session #3
10.00 – 21.00   City Tour

Day #4 – Friday, 20 March 2020

06.30 – 08.30   Breakfast
        12.00   Check Out

Thursday, 18 March 2020

Session 1 (09.30 – 12.00)				
Track : Production & Maintenance System (PS)				
Venue :		Room 1		
Session Chairs:		Lina Gozali, Ph.D		
Paper ID	Time	Name	Title	University
42	09.30 - 09.45	Niken Parwati, Nurdina, A.T. Purwandari, and W.N. Tanjung	Prototype Design of Plastic Waste Processing Equipment	Universitas Al Azhar Indonesia
121	09.45 - 10.00	Nunung Nurhasanah, Machfud, Djumali Mangunwidjaja an d Muhamamd Romli	The Application Of Soft System Methodology To Design The Conceptual Model For Intelligent Supply Chain Model Of Natural Fibre Agroindustry	IPB University
29	10.00 - 10.15	Rini Prasetyani, Siti Fatimah Aulia, Gita Timang	Design of facility location for new model of medical pharmaceutical refrigerator production area on PT. XYZ	Pancasila University
32	10.15 - 10.30	Rina Fitriana, Johnson Saragih and Dea Larasati	Production Quality Improvement Of Yamalube Bottle With Six Sigma, FMEA And Data Mining In PT. B	Universitas Trisakti
3	10.30 - 10.45	Lina Gozali, Lamto Widodo, Siti Rohana Nasution and Nicholson Lim	Planning The New Factory Layout Of PT Hartekprima Listrindo Using Systematic Layout Planning (SLP) Method	Tarumanagara University
10	10.45 - 11.00	Aditya Tirta Pratama, Triarti Saraswati, Farhan	Improving Productivity And Quality Of Medium Voltage Cable Production	Swiss German University

Paper ID	Time			Name	Title	University
				Prianggara and Theodora Savitri		
19	11.00	-	11.15	Aprilia Tri Purwandari, A Ratnamirah, N Parwati, and W N Tanjung	Determining Optimum Eco Paving Block Compositions By Using Factorial Design Method	Universitas Al Azhar Indonesia
100	11.15	-	11.30	Tai-Jung Chen, Yu-Ching Lee, Chin-Hsin Chiang Lee and Chin-Hsin Chiang	Optimizing Production Layout And Capacity Via Flexsim- A Case Study Of Y Factory	National Tsing Hua University, Taiwan
47	11.30	-	11.45	Wilson Kosasih, Lithrone Laricha Salomon and Alfred Darius Halim	Integration Of Conjoint Analysis And QFD For New Product Development In Manufacturing Small And Medium Enterprises (Case Study: A Food Company)	Universitas Tarumanagara
54	11.45	-	12.00	Sarastya Dewi, Judi Alhilman and Fransiskus Tatas Dwi Atmaji	Evaluation Of Effectiveness And Cost Of Machine Losses Using Overall Equipment Effectiveness (OEE) And Overall Equipment Cost Loss (OECL) Methods, A Case Study On Toshiba CNC Machine	Telkom University

Thursday, 18 March 2020

Session 1 (09.30 – 12.00)				
Track : Ergonomics & Product Design (ER&PD)				
Venue :	Room 2			
Session Chairs:	Dr. Lamto Widodo, S.T., M.T			
Paper ID	Time	Name	Title	University

140	09.30	-	09.45	Bambang Cahyadi, Amanda Maryanti and Gita Timang	Measurement Of Physiological And Psychological Workloads Of Mechanical Department Operator PT. XYZ	Pancasila University
5	09.45	-	10.00	Mira Rahayu, Frans Ariantono Silalahi and Erna Febrianti	Book Trolley Design For Telkom University Library Using User Centered Design (UCD) Method	Telkom University
109	10.00	-	10.15	Ibrahim Mohammed Gana, A A Shhu and A Gbabo	Optimisation of Mechanical Cassava Peeling System Parameters	Federal Polytechnic Bida, Nigeria
51	10.15	-	10.30	Daniel Siswanto, Hardianto Iridiastadi and Khoirul Muslim	The Effects of Sleep Quality on Vigilance and Driving Performance in a Train Simulator	Institut Teknologi Bandung
56	10.30	-	10.45	Muhammad Iqbal and Amalia Suzianti	The NPD Process Design Canvas: Tool for NPD Process Creation	Telkom University
81	10.45	-	11.00	Yansen Theopilus, Sugih Sudharma Tjandra and Billy Sagara	Development of Low-Cost Multi-Input Automated Storage and Retrieval System (AS/RS) for Educational Purposes	Parahyangan Catholic University
83	11.00	-	11.15	Dene Herwanto and Amalia Suzianti	Workplace Design Process at Indonesian Manufacturing SMEs	Universitas Singaperbangsa Karawang
95	11.15	-	11.30	A A Ramadhan, F A Putra, H Wirawan and Taufik Roni Sahroni	Design and Analysis of Electrical Ergonomic Bionic Grip Wrench	Bina Nusantara University
110	11.30	-	11.45	Shiru Jonathan Jocob and Ibrahim Mohammed Gana	Influence Of Moisture Dependent Physical Properties Of Fluted Pumpkin Vital To Development It's Processing Equipments	Federal Polytechnic Bida, Nigeria

6	11.45 - 12.00	Mira Rahayu, Hilman Ardian Ekananda and Ilma Mufidah	Designing A Reading Chair Using Kansei Engineering Approach	Telkom University

Thursday, 18 March 2020

Session 1 (09.30 – 12.00)				
Track : Industrial System (IS)				
Venue :		Room 3		
Session Chairs:		Vivi Triyanti, S.T., M.Sc		
Paper ID	Time	Name	Title	University
142	09.30 - 09.45	Sulistiandi, Budi Marpaung and Oki Sunardi	Clustering On Small-Scale Food Manufacturing Industry In West Jakarta: A Fuzzy Analytical Hierarchy Process Approach	Krida Wacana Christian University
147	09.45 - 10.00	Nina Sevani, Iwan Aang Soenandi and Fajar Saputra.	Implementation Of Backpropagation Artificial Neural Network For Early Detection Of Vitamin And Mineral Deficiency	Krida Wacana Christian University
11	10.00 - 10.15	Arif Nurrahman, Novan Pizary Husein and Otong Rukmana	Designing Information System For Student Practicum Assessment In The Laboratory	Universitas Islam Bandung
138	10.15 - 10.30	Abdelnaser Omran, Targ Ali Omar Ibrahim and Mohamed Saad Hamad Saleh	Study On Crisis Management In The Libyan Construction Industry	Bright Star University, Libya
30	10.30 - 10.45	Carla Olyvia Doaly, Lithrone Laricha Salomon and Kholid Jabal Arta A	Performance Measurement Using Balance Score Card And Analytic Network Process In Elastomer Switch	Universitas Tarumanagara

				Keypad Manufacturers Indonesia	
41	10.45	-	11.00	Steffi Ratanadewi and Marsellin us Bachtiar Wahju	Inventory And Order System Development At PT.X	Atma Jaya Catholic University of Indonesia
48	11.00	-	11.15	Wilson Kosasih, Carla Olyvia Doaly and Sabhara	Reducing Waste In Manufacturing Industry Using A Cost Integrated Value Stream Mapping Approach	Universitas Tarumanagara
68	11.15	-	11.30	Listiani Nurul Huda	Analysis Of Socio-Technical Approach And Socio User Experience Network Analysis (SNA) To Address Objections Ergonomic Loom In The Village Of Lumban Suhi-Suhi	Universitas Sumatera Utara
71	11.30	-	11.45	Arif Wicaksono, Muharman Lubis, Warih Puspitasari and Fritasya Dwiputri S.	Blueprint Of Perceived Convenience Indicators Towards The Quality Of Infrastructure Of Banking Company	Telkom University
137	11.45	-	12.00	Anas Mussa Abdulhafid Alsrah, Diara Md Jadi and Abdelnaser Omran	Relationship Between Safety Management System, Safety Climate And Safety Performance In The Libyan Construction Sites	Bright Star University, Libya

Thursday, 18 March 2020

Paper ID	Time		Name	Title	University
Session 1 (09.30 – 12.00)				

Paper ID	Time		Name	Title	University
Session 1 (09.30 – 12.00)					
Track : Supply Chain Management (SCM)					
Venue :		Room 4			
Session Chairs:		Dr. Ir. Yogi Yogaswara,M.T			
Paper ID	Time		Name	Title	University
144	09.30 - 09.45		Hassan Andrew Fornah and I Nyoman Pujawan	Assessing Supply Chain Practices And How They Are Perceived To Impact Performance Of Firms In Sierra Leone: A Case Study In A Telecommunication Company	Institut Teknologi Sepuluh Nopember
145	09.45 - 10.00		Alimamy Kamara and I Nyoman Pujawan	Investigating The Impact Of Supply Chain Management On The Performance Of Manufacturing Industries In Sierra Leone: Case Study Of Sierra Leone Bottling Company (SLBC)	Institut Teknologi Sepuluh Nopember
13	10.00 - 10.15		Teguh Sri Ngadono and Zulfa Fitri Ikatrinasari	Raw Materials Inventory Planning In Automotive Industries By EOQ Method Consider With The Contract Agreement	Universitas Mercu Buana
126	10.15 - 10.30		Ferdian Suprata, Christine Natalia and Andre Sugioko	Analysing The Cause Of Idle Time In Loading And Unloading Operation At Indonesian International Port Container Terminal: Port Of Tanjung Priok Case Study	Atma Jaya Catholic University of Indonesia
17	10.30 - 10.45		Ardvin Kester S. Ong, Rex Aurelius C. Robielos, Yung-Tsan Jou and Hui-Ming Wee Wee	Three-Level Supply Chain Considering Direct And Indirect Transportation Cost And Carbon Emissions	Chung Yuan Christian University, Taiwan

34	10.45 - 11.00	Dian Dewi, Siddhi Pittayachawan and Elizabeth Tait	A Conceptual Framework For Servitisation Of The Manufacturing Companies To Deliver Product–Service Systems Solutions: A Study Case Of The Indonesian Motorcycle Industry	Widya Mandala Catholic University Surabaya; Royal Melbourne Institute of Technology, Australia
43	11.00 - 11.15	Ahmad , Wilson Kosasih, Helena Kristina, Lamto Widodo, and Christin Pasaribu	Mitigation Of Supply Chain Risk Using HOR Model at PT. Sumber Karya Indah	Universitas Tarumanagara
63	11.15 - 11.30	Aloysius Junianto and Dewinta Sugandha	EPR Approach For Better Waste Management System For Mobile Phone Design In Indonesia	Agung Podomoro University
64	11.30 - 11.45	Satrio Mulyo Nugroho, Laila Nafisah, Muham mad Shodiq Abdul Khannan, Hasan Mastrisiswadi an d Muhammad Nasir Ramdhani	Vehicle Routing Problem With Heterogeneous Fleet, Split Delivery, Multiple Product, Multiple Trip, And Time Windows: A Case Study In Fuel Distribution	Universitas Pembangunan Nasional Veteran Yogyakarta
73	11.45 - 12.00	Parwadi Moengin and Fakhri Darussalam	Scheduling And Allocation Of Airport Service Manpower By Considering Time And Work Constraints Using M-MAPTWTC Method: A Case Study	Universitas Trisakti

Thursday, 18 March 2020

Paper ID	Time			Name	Title	University
	Session 2 (13.00 – 15.30)					
	Track : Decision Analysis and Information System (DA&IS)					
	Venue :			**Room 1**		
	Session Chairs:			**Nunung Nurhasanah, S.T., M.Si**		
8	13.00	-	13.15	Feliks Prasepta Sejahtera Surbakti	What Is Effective Use of Big Data? The Consensual Definition of Effective Use Of Big Data	Atma Jaya Catholic University of Indonesia
114	13.15	-	13.30	Dadan Umar Daihani and Sony Sonjaya	Development Of Electronic-Based Investigation Management (EMP) Of POLRI	Universitas Trisakti
115	13.30	-	13.45	Resti Afiadinie and Moses L Singgih	Optimization Of Interest Income By Determining Interest Rate Of Revolving Credit Line	Institut Teknologi Sepuluh Nopember
39	13.45	-	14.00	Rayinda Pramuditya Soesanto and Wawan Tripiawan	Design of Multi Criteria Decision Making Tools for IT Project Selection: A Case From Software House	Telkom University
70	14.00	-	14.15	Dutho Suh Utomo, Naraphorn Paoprasert and Ramidayu Yousuk	Determinants of Donation Behaviour on Flood Disasters in Indonesia	Kasetsart University, Thailand
61	14.15	-	14.30	Nuzul Fatma Septiana and Iwan Sukarno	Safety Stock Analysis of Ship Fuel In Shipping Company	Universitas Pertamina
79	14.30	-	14.45	Varis Limlawan and Pornthep Anussornnitisarn	Development Of Waiting Time Predictor Based Artificial Neural Network	Kasetsart University, Thailand
134	14.45	-	15.00	Elpawati and Nidaul Hasanati	Designing The E-Marketplace System For Agriculture Products Using Object Oriented Method	UIN Syarif Hidayatulah Jakarta

139	15.00 - 15.15	Johnson Saragih, Rina Fitriana and Tri Andryan	Quality Improvement For Product Body 2-1 At Pt X	Universitas Trisakti
135	15.15 - 15.30	Abdelnaser Omran and Yahya Saad Hamad Saleh	Environmental Management System (EMS) Within Construction Site: A Case Study In Kelantan State, Malaysia	Bright Star University, Libya

Thursday, 18 March 2020

Session 2 (13.00 – 15.30)					
Track : Quality Engineering & Management (QM)					
Venue :		**Room 2**			
Session Chairs:		**Dr. Rina Fitriana, S.T., M.M**			
Paper ID	**Time**		**Name**	**Title**	**University**
7	13.00 - 13.15		Prima Fithri, Dede Jovie Andra, Eri Wirdianto, and Taufik	The Use Of FMEA For The Quality Control Analysis Of Greige Fabrics (Case Study In The Weaving Deparment Of PT. Unitex, Tbk)	Universitas Andalas
26	13.15 - 13.30		Akhmad Wasiur Rizqi and Moh Jufriyanto	Quality Satisfaction Of Academic Service Industrial Engineering In Private Higher Education KOPERTIS VII Surabaya Area	University of Muhammadiyah Gresik
28	13.30 - 13.45		Chaerul Fahmi Yusuf and Nur Mawati Mambuhu	Services Marketing Mix Services Satisfaction Hotel In Luwuk	Universitas Muhammadiyah Luwuk
40	13.45 - 14.00		Indah Hayati and Luciana Andrawina	Comprehensive Framework Of Customer Loyalty In Fixed Broadband Industry	Telkom University

75	14.00 - 14.15	Erwin Widodo, Heri Suprayitno and Suparno	Productivity Analysis Stevedore, A Descriptive Analysis Method With Integration, Importance Performance Analysis, Quality Function Deployment (Study Case: PT. Port Indonesia III (Persero) Branch Gresiks	Institut Teknologi Sepuluh Nopember
57	14.15 - 14.30	Yati Rohayati and Rizka Hasna Delvika	Preparation For The Implementation Of ISO 21001-2018 Using Assistance Program: Case Study Of Telkom Vocational High School	Telkom University
62	14.30 - 14.45	Rahmi Ambarita Saragih, Franka Hendra Sukma, Kartiko Eko Putranto and Supriyono	Designing Templates To Support And Monitoring The Activities Of Material Requipment Planning (MRP)	Institut Sains danTeknologi Nasional
69	14.45 - 15.00	Yenny Sari, Muhammad Rosiawan and Arbi Hadiyat	The Design And Implementation Of A Performance Measurement System To Pursue School Excellence: The Integration Of Indonesian National Accreditation Standard Into Baldrige Education Criteria	University of Surabaya
125	15.00 - 15.15	Rina Fitriana, Johnson Saragih and Salma Defina Fauziyah	Quality Improvement On Common Rail Type-1 Product Using Six Sigma Method And Data Mining On Forging Line In PT. ABC	Universitas Trisakti
94	15.15 - 15.30	Erwin Widodo, Umaiyah and Bambang Syairudin	Integration Of Balanced Scorecard And Game Theory For Business	Institut Teknologi Sepuluh Nopember

			Entity's Performance Measurement.	

Thursday, 18 March 2020

Session 2 (13.00 – 15.30)				
Track : Industrial System (IS)				
Venue :		Room 3		
Session Chairs:		Dr. Winnie Septiani, S.T., M.Si		
Paper ID	Time	Name	Title	University
76	13.00 - 13.15	Yuzar Haspani, Tien F. Kusumasari, Muharman Lubis and Chandra Wardana	The Challenges Of System Usability Scale (SUS) For Testing The Interface Of Android Mobile Application Of Hiking	Telkom University
80	13.15 - 13.30	Meilizar, Ridha Luthvina, Nurike Oktavia and Putranesia	Development Strategy Of The Virgin Coconut Oil Industry And Coconut Farmers Partnership System In Padang Pariaman Regency	Bung Hatta Univesity
136	13.30 - 13.45	Abdelsalam O. Gebril and Abdelnaser Omran	Evaluating The Importance Of Environmental Education Practice In The Libyan Schools In Al-Bayda City, Libya	Bright Star University, Libya
84	13.45 - 14.00	Bayu Dwi Aqsha, Nurhadi Siswanto and Suparno	A System Performance Analysis Of Ship To Shore Operation Considering Crane Availabilties Using Simulation Approach	Institut Teknologi Sepuluh Nopember
86	14.00 - 14.15	Adithya Sudiarno and Adiek Sudarni	Assessment Of Safety Culture Maturity Level In Production Area Of A Steel Manufacturer	Institut Teknologi Sepuluh Nopember
89	14.15 - 14.30	M. Breda Taftayani, Muharman Lubis, Soni F. Surya	Stress And Cross Browsing Testing For Educational Start Up Website Application	Telkom University

		Gumilang and Chandra Wardana		
93	14.30 - 14.45	Muharman Lubis, Rizky Cherthio Annisyah and Lyvia Winiyanti L.	ITSM Analysis Using ITIL V3 In Service Operation In PT. Inovasi Tjaraka Buana	Telkom University
105	14.45 - 15.00	Mahya Indra Tama, Nurhadi Siswanto and Suparno	Discrete Event Simulation Modeling For Classifying The Container Yard Availability Considering Dock Unloading Activity	Institut Teknologi Sepuluh Nopember
107	15.00 - 15.15	Wisnu Dewobroto and Iveline Anne Marie	Lean Startup Approach On Product Design And Manufacture Facility Planning In Uncertain Business Climate	Podomoro University
116	15.15 - 15.30	Alfarid Hendro Yuwono, Muhammad Rivai and Tri Arief Sardjono	Solar Panel-Based Wireless Battery Charging System Using Fuzzy Control Method	Institut Teknologi Sepuluh Nopember

Thursday, 18 March 2020

Session 2 (13.00 – 15.30)				
Track : Operation Research (OR)				
Venue :		Room 4		
Session Chairs:		Dr. Ir. Tjutju Dimyati		
Paper ID	Time	Name	Title	University
149	13.00 - 13.15	Prof. Dr. Abdul Talib Bon	Optimizing Schedule In Furniture Planning	Universiti Tun Hussein Onn, Malaysia
15	13.15 - 13.30	Harummi Sekar Amarilies, A.A.N. Perwira Redi, Ilma Mufidah and Reny Nadlifatin	Greedy Heuristics for The Maximum Covering Location Problem: A Case Study Of Optimal Trashcan Location In Kampung Cipare – Tenjo – West Java	Telkom University
33	13.30 - 13.45	Yosef Daryanto, Bellachintya Reira Christata	Retailer's EOQ model considering demand and holding cost of the	Universitas Atma Jaya Yogyakarta

			and Ika Murti Kristiyani	defective items under carbon emission tax	
50	13.45	-	14.00	Tjutju Dimyati	Integrated Model For Multi-Criteria Supplier Selection And Order Allocation Problem	Universitas Pasundan
106	14.00	-	14.15	Fransiscus Pratikto and B Batara	Dynamic Pricing in a Coffee Shop	Parahyangan Catholic University
78	14.15	-	14.30	James Yu, Sri Retno Purwaningsih and Hui Ming Wee	A Multi-Objective Model For A Chemical Industry Considering Economic Risk And Environment	Chung Yuan Christian University, Taiwan

Track : Entrepreneurship & Technopreneurship (ET)						
12	14.30	-	14.45	Wydzka Tasha Aulia Akbar, Endang Chumaidiyah and Meldi Rendra	Analysis Of Choice Shrimp Technology Based On Business, Productivity, Financial And Risk Process	Telkom University
49	14.45	-	15.00	Hanaa Rosyada Wijayanti and Endang Chumaidiyah	Measurement Of Feasibility And Risk Level On Modern Embroidery Kebaya Boutique Establishment In Jakarta	Telkom University
53	15.00	-	15.15	Meuthia Murfi, Endang Chumaidiyah and Wawan Tripiawan	Feasibility Analysis And Website Design Of Najwa Collections Fashion Products	Telkom University
82	15.15	-	15.30	Muhammad Rifky Kantaprawira, Endang Chumaidiyah and Rahmat Fauzi	Business Feasibility Analysis And Website Based E-Commerce System Design Using System Usability Scale On Zauber Denim Company	Telkom University

Thursday, 18 March 2020

Paper ID	Time			Name	Title	University
Session 3 (15.45 – 18.15)						
Track : Production & Maintenance System (PS)						
Venue :			Room 1			
Session Chairs:			Dr. Ir. Arum Sari, M.Sc			
123	15.45	-	16.00	Bagus Susilo Pramuwicaksono Susanto and Nani Kurniati	Multi Sensor-Based Failure Diagnosis Using The Mahalanobis Taguchi System	Institut Teknologi Sepuluh Nopember
27	16.00	-	16.15	Lithrone Laricha Salomon, Wilson Kosasih and Carla O Doaly	Lean Service Applications Using FMEA And VSM Approaches (Case Study: Public Healthcare Unit In Jakarta)	Universitas Tarumanagara
67	16.15	-	16.30	Melviani Karolin Kamaralo, Judi Alhilman and Fransiskus Tatas Dwi Atmaji	Life Cycle Cost Analysis In Construction Of Green Building Concept, A Case Study	Telkom University
141	16.30	-	16.45	Agung Sasongko, Iveline Anne Marie and Fakhrul Arifin	Forecasting For Steel Production Using Artificial Neural Networks And Feasibility Analysis Of Plant Regeneration Acid Development In Pt. XYZ	Universitas Trisakti
Track : Quality Engineering & Management (QM)						
112	16.45	-	17.00	Arum Sari and Rifqi Yanuar	Performance Evaluation Of An EWMA P Chart Based On Improve Square Root Transformation To Detect Small Shift Process Variation	Universitas Pasundan
117	17.00	-	17.15	Yudha Prasetyawan and Naufal Ghani Ibrahim	Warehouse Improvement Evaluation Using Lean Warehousing Approach And Linear Programming	Institut Teknologi Sepuluh Nopember
118	17.15	-	17.30	Yudha Prasetyawan, Farouk	The Proposed OEE-SIGMA Prediction For Increased Profits	Institut Teknologi Sepuluh Nopember

Paper ID	Time			Name	Title	University
				Giffari and Bagas Saestu Adi Putera		
124	17.30	-	17.45	Arief Suwandi and Zulhilmi Naufal Aulia	Improved YM Laser Machine Performance With Overall Equipment Effectiveness And Fault Tree Analysis Methods Implementation at Pt. XYZ	Universitas Esa Unggul
90	17.45	-	18.00	Muqimuddin and Moses Laksono Singgih	Integrated FMEA-MCDM For Prioritizing Operational Disruption In Production Process	Institut Teknologi Sepuluh Nopember
146	18.00	-	18.15	Mohammad Yudi Masduky Sholihin, Rini Prasetyani and Bintang Catur Mukti Pangestu	Analysis Of The Impacts Of Motor Vehicle Exhaust Emissions at Pancasila University On Health In Order To Create A Green Campus	Pancasila University

Thursday, 18 March 2020

Session 3 (15.45 – 18.30)						
Track : Industrial System (IS)						
Venue :			Room 2			
Session Chairs:			Dr. Ir. Nofi Erni , M.M			
Paper ID	Time			Name	Title	University
20	15.45	-	16.00	Vivi Triyanti and Domia Indah Rudolf	Development Of Tool For Measuring Human Reaction Time	Atma Jaya Catholic University of Indonesia
25	16.00	-	16.15	Winnie Septiani, Gebby Aqiilah Aqiilah Divia and Sucipto Adi Suwiryo	Warehouse Layout Designing of Cable Manufacturing Company Using Dedicated Storage and Simulation Promodel	Universitas Trisakti
36	16.15	-	16.30	Kirana Rukmayuninda Ririh, Siswanto Wahyu Wibowo, Nur Yulianti Hidayah and	Risk Impact Analysis Using House of Risk Method and Probability Impact Matrix in Double-Double Track (DDT) Project PT. Hutama Karya	Pancasila University

				Desinta Rahayu Ningtyas		

77	16.30	-	16.45	Ambreen Khattak, Tayyaba Shaheen, Muhammad Hamza, Iphov Kumala Sriwana, Muhammad Shafiq, N T X Hoa and Ayesha Kamal	Factors Influencing Customers' Satisfaction: A Case Study Of SMES From Pakistan	University of the Punjab, Pakistan

Track : Ergonomics & Product Design (ER&PD)

37	16.45	-	17.00	Lamto Widodo, Silvi Ariyanti and Andreas Jason	Ergonomic Intervention To Improve The Productivity Of Brick Press Tools In Small And Medium Enterprise Akheng Kobar	Universitas Tarumanagara
113	17.00	-	17.15	Vivi Triyanti, Hastian Abdul Azis, Hardianto Iridiastadi and Yassierli	Workload and Fatigue Assessment on Air Traffic Controller	Atma Jaya Catholic University of Indonesia
131	17.15	-	17.30	Nofi Erni and Krisna Karamiko Alexander	Implementation Cognitive Ergonomic on Measurement Mental Workload (Case study : Marketing Employee of Insurance Company)	Universitas Esa Unggul

Track : Decision Analysis and Information System (DA&IS)

1	17.30	-	17.45	Wawan Tripiawan, Shofita Widiana and Yenny	Designing Bank Guarantee Website Tracking Model using UML	Telkom University
9	17.45	-	18.00	Dino Rimantho and Dwi Ardinia	Selection Strategy Implementation of Cleaner Production Using ISM and AHP Method In Chemical Laboratory Of Services Industry	Pancasila University
52	18.00	-	18.15	Judi Alhilman, Muhammad Fadhil Habibie and Wawan Tripiawan	Web-Based Application of Reliability Availability Maintainability and Cost of Unreliability Method to	Telkom University

Paper ID	Time			Name	Title	University
					Analyze Performance of the Machine	
87	18.15	-	18.30	Asrul Ismail, Natalia Hartono, S Zeybek, D T Pham[1]	Using The Bees Algorithm To Solve Combinatorial Optimisation Problems From TSPLIB	Pancasila University; University of Birmingham, UK

Thursday, 18 March 2020

Session 3 (15.45 – 18.15)						
Track : Industrial System (IS)						
Venue :			Room 3			
Session Chairs:			Aprilia Tri Purwandari, S.T., M.T			
Paper ID	**Time**			**Name**	**Title**	**University**
72	15.45	-	16.00	Alif Miftahul J., Muharman Lubis , Rd. Rohmat Saedudin and Fritasya Dwiputri S.	Designing The Smart Health Function Towards Puskesmas (Citizen Health Centre) Based On Smart City Concept	Telkom University
101	16.00	-	16.15	Muharman Lubis , Exa Parmita and Lyvia Winiyanti L.	ERP Implementation In Crisis Management: A Case Study Of Government-Owned Electricity Company	Telkom University
133	16.15	-	16.30	Fitri Suryanti and Adithya Sudiarno	Combination Of Value Stream Mapping And House Of Risk Methods To Eliminate Waste In Productivity Enhancement In Production Area Of Fertilizer Company	Institut Teknologi Sepuluh Nopember
143	16.30	-	16.45	Tiena Amran	Management Of Plastic Waste Recycling By Value Stream Mapping	Universitas Trisakti
Track : Supply Chain Management (SCM)						
85	16.45	-	17.00	Dewi Rekno and I Nyoman Pujawan	Analysis Of Comparison Of Onion Production Efficiency (Allium Ascalonicum) Tajuk	Institut Teknologi Sepuluh Nopember

Paper ID	Time			Name	Title	University
					Variety In Rejoso Sub-District – Nganjuk	
97	17.00	-	17.15	Mia Mutiasari, Widya N. Tanjung, Niken Parwati, , Aprilia Tri Purwandari, and Us Watun Islamiah	User Interface Design In Supply Chain Risk Assessment Of Excel-Based Wooden Toy Industry Using WFMECA Method	Universitas Al Azhar Indonesia
98	17.15	-	17.30	Us Watun Islamiah, Widya N. Tanjung, Niken Parwati, , Aprilia Tri Purwandari, and Mia Mutiasari	Information System Design In Supply Chain Risk Evaluation Of Excel Based Wooden Toy Industry Using Fuzzy House Of Risk (F-HOR)	Universitas Al Azhar Indonesia
Track : Decision Analysis and Information System (DA&IS)						
102	17.30	-	17.45	Muhammad Ariyon, Aldo Setiawan and Refiandi Reza	Economic Feasibility Study Of Onshore Exploration Oil Field Developmment Using Gross Split Contract	Universitas Islam Riau
Track : Ergonomics & Product Design (ER&PD)						
108	17.45	-	18.00	T Eben Haezar, W Samdan, A Yudha and Taufik Roni Sahroni	Design of Mobile and Integrated Tire Repair Tools for Motorcycle	Bina Nusantara University
148	18.00	-	18.15	Taufiqur Rachman and Stefanny Liyanawati Zalukhu.	Determination of Standard Time and Output Production of Spring Frame Mattress Components Using Work Sampling Method	Universitas Esa Unggul

Thursday, 18 March 2020

Session 3 (15.45 – 18.30)						
Track : Supply Chain Management (SCM)						
Venue :			Room 4			
Session Chairs:			Dr. Iphov Kumala Sriwana, S.T., M.Si			
Paper ID	Time			Name	Title	University
21	15.45	-	16.00	Stefani Prima Dias, Chendrasari Wahyu Oktavia,	Risk Mitigation Strategies On Supply Chain PT. X	Atma Jaya Catholic University of Indonesia

			Riana Magdalena, M A Lilajati		
23	16.00 - 16.15	Christine Natalia, Chendrasari Wahyu Oktavia and Trifenaus Prabu Hidayat	Integrated ISM-ANP Method For Supplier Selection Criteria Analysis : A Case Study Of Construction Company	Atma Jaya Catholic University of Indonesia
45	16.15 - 16.30	Yogi Yogaswara and Neng Resi Andriyani	Determination Of Multi-Product Distribution Using Capacitated Vehicle Routing Problem (CVRP) And Product Cubication Dimensions Restriction	Universitas Pasundan
74	16.30 - 16.45	Shahzada Zaman Khan, Muhammad Azhar Ashfaq, Muhammad Usman Awan, Hakeem Rehman, Ayesha Kamal, N T X Hoa and Muhammad Shafiq	Investigating Supply Chain Issues In The Food Processing Industry	University of the Punjab, Pakistan
Track : Quality Engineering & Management (QM)				
31	16.45 - 17.00	Syarif Hidayat, Syita Fauzia and Nunung Nurhasanah	Managing Internal Bullwhip Effect To Plan Product Distribution In A Garment Factory	Universitas Al Azhar Indonesia
44	17.00 - 17.15	Anggina Sandy Sundari, Eka Putri Setyawati and Dino Rimantho	Quality Control Analysis Of Tube Sandwich Using Six Sigma Method In Indonesian Cement Company	Pancasila University
111	17.15 - 17.30	Wahyukaton	Preventive Maintenance Scheduling For Sifter Machine In Flour Mills	Universitas Pasundan
Track : Operation Research (OR)				
14	17.30 - 17.45	Nur Yulianti Hidayah, Muhammad Syafrizal and	Analysis Of Textile Dye Production Scheduling Using FCFS, CDS And Heuristic Pour Methods	Pancasila University

		Muchtar Darmawan		
46	17.45 - 18.00	Riana Magdalena, Stefani Prima Dias, and A P Ginting[1]	Allocation of Maltodextrin Raw Material Orders by Fuzzy Analytic Network Process (FANP) and Goal Programming Methods (Study Case: PT. Neopangan Selaras Indonesia)	Atma Jaya Catholic University of Indonesia
119	18.00 - 18.15	Iphov Kumala Sriwana and Nadya Syauqillah	Analysis of Overall Effectiveness on Hall Separator Punching Machine at PT. DNIA	Universitas Esa Unggul
96	18.15 - 18.30	Farra Nabila Murti and Ahmad Chirzun	Balanced Scorecard Using ISM-ANP at the Directorate of Human Resources, Al Azhar University, Indonesia	Universitas Al Azhar Indonesia

QM-Quality Engineering & Management

No	Title	Author
1	The Use Of FMEA For The Quality Control Analysis Of Greige Fabrics (Case Study In The Weaving Department Of PT. Unitex, Tbk)	Prima Fithri, Dede Jovie Andra, Eri Wirdianto, and Taufik
2	Quality Satisfaction Of Academic Service Industrial Engineering In Private Higher Education KOPERTIS VII Surabaya Area	Akhmad Wasiur Rizqi and Moh Jufriyanto
3	Services Marketing Mix Services Satisfaction Hotel In Luwuk	Chaerul Fahmi Yusuf and Nur Mawati Mambuhu
4	Comprehensive Framework Of Customer Loyalty In Fixed Broadband Industry	Indah Hayati and Luciana Andrawina
5	Productivity Analysis Stevedore, A Descriptive Analysis Method With Integration, Importance Performance Analysis, Quality Function Deployment (Study Case: PT. Port Indonesia III (Persero) Branch Gresik	Erwin Widodo, Heri Suprayitno, Suparno and Umaiyah
6	Preparation For The Implementation Of ISO 21001-2018 Using Assistance Program: Case Study Of Telkom Vocational High School	Yati Rohayati and Rizka Hasna Delvika
7	Designing Templates To Support And Monitoring The Activities Of Material Requipment Planning (MRP)	Rahmi Ambarita Saragih, Franka Hendra Sukma, Kartiko Eko Putranto and Supriyono
8	The Design And Implementation Of A Performance Measurement System To Pursue School Excellence: The Integration Of Indonesian National Accreditation Standard Into Baldrige Education Criteria	Yenny Sari, Muhammad Rosiawan and Arbi Hadiyat
9	Quality Improvement On Common Rail Type-1 Product Using Six Sigma Method And Data Mining On Forging Line In PT. ABC	Rina Fitriana, Johnson Saragih and Salma Defina Fauziyah
10	Integration Of Balanced Scorecard And Game Theory For Business Entity's Performance Measurement.	Erwin Widodo, Umaiyah and Bambang Syairudin
11	Managing Internal Bullwhip Effect To Plan Product Distribution In A Garment Factory	Syarif Hidayat, Syita Fauzia and Nunung Nurhasanah
12	Quality Control Analysis Of Tube Sandwich Using Six Sigma Method In Indonesian Cement Company	Anggina Sandy Sundari, Eka Putri Setyawati and Dino Rimantho
13	Preventive Maintenance Scheduling For Sifter Machine In Flour Mills	Wahyukaton
14	The Proposed OEE-SIGMA Prediction for Increased Profits	Y Prasetyawan, F Giffari and B S A Putera

The design and implementation of a performance measurement system to pursue school excellence: the integration of Indonesian National Accreditation Standard into Baldrige Education Criteria

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Abstract. In order to measure the school performance, Indonesian educational institutions used to pay attention only to the result of National Accreditation by the Government. However, it is not sufficient if they want a higher performance achievement. In pursuit of excellent school, educational institutions also need to make continuous improvements to enhance its performance and strive to deploy any initiatives that can help the schools to reach their excellent performance. This research aimed to develop an assessment tool for measuring the performance of excellent school, in which the design integrated the current measurement system (i.e. National Accreditation System) into the existing performance excellence model (i.e.Malcolm Baldrige Education Criteria for Performance Excellence). The integration is necessary due to the needs that the current measurement system should be upgraded with any performance excellence models, but the design itself will retain the local content that exists in National acreditation System. The first outcome of this research was a performance measurement model which is packaged into an online software called *KiSekul v.1.0* (first edition). Then, the implementation of the design was done in two Indonesian high school institutions, namely SMAN 15 Surabaya and MAN Lamongan. The results showed that both schools have performance at advanced stage level. In terms of maturity level, SMAN 15 Surabaya was at the stage of benchmark leader, whereas MAN Lamongan was categorized as a world leader. As the final result, the evaluation was also made to the design and results of the implementation, hence its revision, KiSekul v.2.0 (second edition) was designed as a form of continuous improvement to revise the initial design of KiSekul.

Keywords: performance excellence, excellent school, National Accreditation Standard, Baldrige Education Criteria, Indonesian high school institution

1. INTRODUCTION

In the competitive world and globalization era, to have excellence performance is important as one of the prerequisites of sustained success. Therefore, to learn and apply performance excellence model in an organization, which contains a management philosophy, a set of principles, criteria and approaches, will produce the best overall results in the medium and long term, to support the organization spirit of continuous improvement [1]. There are various performance excellence models that are implemented worldwide, which aim to establish guidelines and criteria for the evaluation and improvement of

organizational excellence performance, such as MBNQA, EFQM, ISO 9001, ISO 9004, etc [2]. In Indonesia, Quality Management System Standard (ISO 9001) is applied in various organizations, both for manufacture and service organizations. For service organizations, ISO 9001 has been deployed in various education institutions because its ability to conjunct with Indonesian National Accreditation Standard which is published by the National Accreditation Body.

A preliminary study was done towards the results of ISO 9001:2008 audit at several high school institutions at about ten cities in East Java, Indonesia,which showed that those schools have already deployed ISO 9001:2008 for their management ystem. Problems mostly arise when those schools, which have already been certified by ISO 9001:2008 and even have reached the excellent accreditation level from National Accreditation Body, are mainly getting stuck in routines for documentation or procedural processes in order to meet ISO 9001:2008 requirements but neglecting the achievement of excellent school vision [3]. A frequently asked question (or a challenging one) is that, "*After being certified by ISO 9001 and accredited with the excellent level,what else should a school do to achieve excellent performance?*".

There are some initiatives that can be done by those schools in pursuit of excellent school performance. One of the approachesis to adoptsome of performance excellence modelthat can lead the organization to higher performance stage [4], such models as ISO 9004, Total Quality Management [5], Malcolm Baldrige National Quality Award [6], and European Foundation for Quality Management [7].

Malcolm Baldrige National Quality Award (MBNQA) model is a performance excellence model that contains seven criteria for an organization to assess and map its maturity level towards performance excellence. MBNQA can identify any quality managementofbestpractices as well as provide the framework ofworld-class performancein a comprehensive manner, so that it is widely usedas a referencemodel forprocess and organization performance improvement [8]. In accordance with ISO 9001, MBNQA can help an organization increase its competitiveness by delivering value to customer and improving overall operational performance [9], meanwhile ISO 9001 focuses on providing confidence to customers that the organization conforms to customer requirement and maintains documented quality system [10].

The purpose of this research was to develop a self-assessment model derived from the criteria of National Accreditation Standard for schools and Baldrige Education Criteria. The strength of MBNQA is mainly in identifying the factors of people, cultures, and its organizational values that cannot be fully captured by models such as ISO 9001 standards or education standard [9]. Furthermore, compared with ISO 9004, Baldrige Education Criteria is easier for education institution to adopt and integrate it into its current assessment model (i.e. National Accreditation Standard). In that way, Baldrige model and its framework was selected in this research in order to enhance current performance measurement system [10]. Hence, an assessment model was developed by the integration between National Accreditation Standard and Baldrige Education Criteria with the benefit that it was able to support the schools to evaluate their performance and to know their maturity level of organization. The assessment was developed into an application software named as Ki-Sekul (abbreviation of Indonesian terms of "*Kinerja Sekolah Unggul*" or meaning of "*Excellence School Performance*"). The software would not only reduce time for analyzing the performance excellence criteria but also be able to find the strengths and weaknesses of schools at a time. Therefore, the schools can prepare the corrective action needed accordingly. The databases and performance score would also be recorded in this software periodically and the performance result could be compared among periods and the trend of continuous quality improvement could be analysed.

2. METHODS

The background of this research was done due to a number of high schools that have been accredited with good results ("A" rank by National Accreditation Body) and have deployed ISO 9001:2008 as their Quality Management System, as well as their purpose of pursuing continuous improvement efforts toward performance excellence institutions. The research framework in Figure 1 shows that the

quality of education institutions that has been measured and evaluated need to be improved in pursuit the excellent school performance while performance excellence of an institution can be evaluated using Baldridge Education criteria for Performance Excellence ([6], [11]).
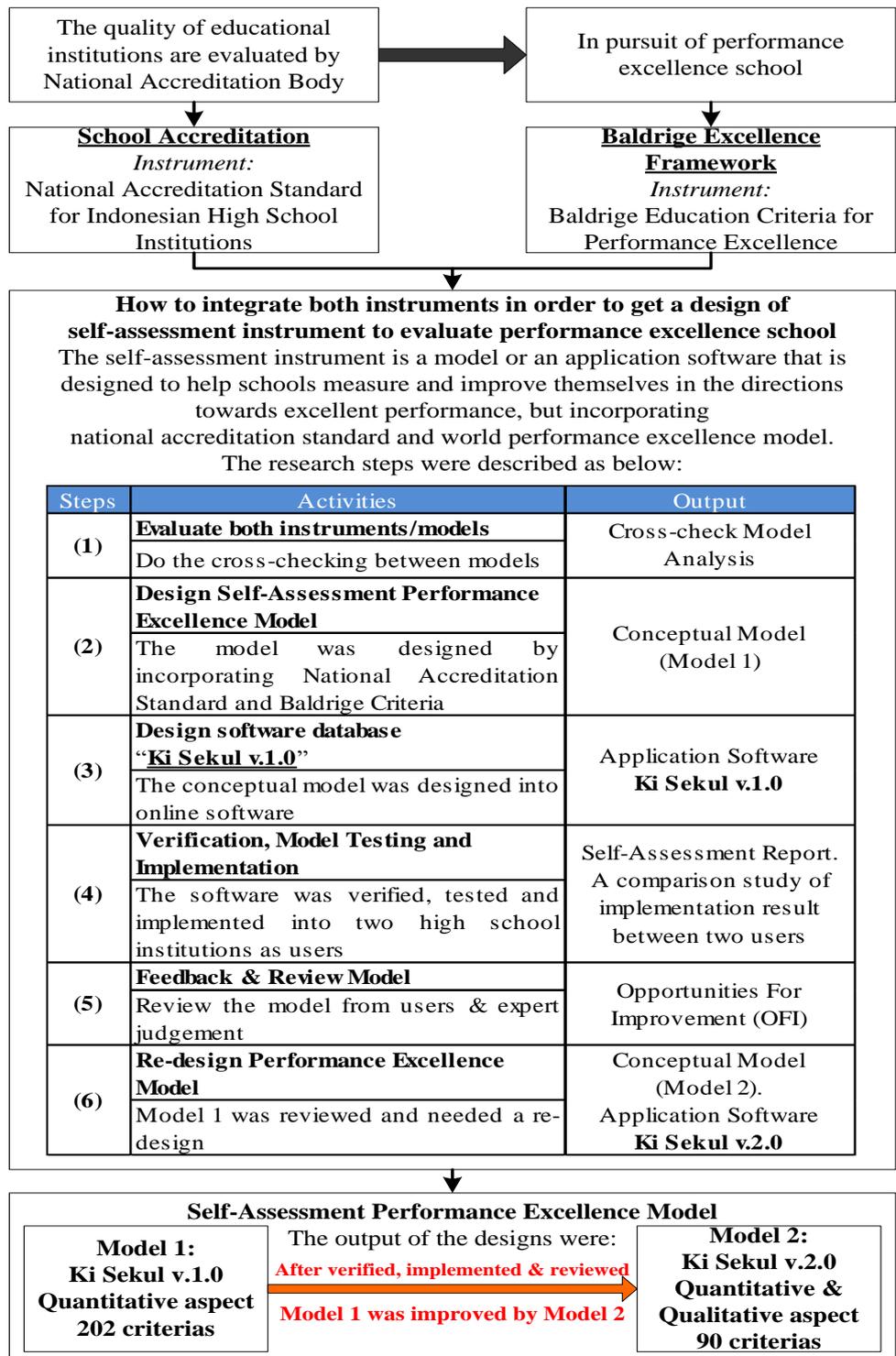
| The quality of educational institutions are evaluated by National Accreditation Body | → | In pursuit of performance excellence school |

School Accreditation
Instrument:
National Accreditation Standard for Indonesian High School Institutions

Baldrige Excellence Framework
Instrument:
Baldrige Education Criteria for Performance Excellence

How to integrate both instruments in order to get a design of self-assessment instrument to evaluate performance excellence school
The self-assessment instrument is a model or an application software that is designed to help schools measure and improve themselves in the directions towards excellent performance, but incorporating national accreditation standard and world performance excellence model.
The research steps were described as below:

Steps	Activities	Output
(1)	**Evaluate both instruments/models** Do the cross-checking between models	Cross-check Model Analysis
(2)	**Design Self-Assessment Performance Excellence Model** The model was designed by incorporating National Accreditation Standard and Baldrige Criteria	Conceptual Model (Model 1)
(3)	**Design software database "Ki Sekul v.1.0"** The conceptual model was designed into online software	Application Software **Ki Sekul v.1.0**
(4)	**Verification, Model Testing and Implementation** The software was verified, tested and implemented into two high school institutions as users	Self-Assessment Report. A comparison study of implementation result between two users
(5)	**Feedback & Review Model** Review the model from users & expert judgement	Opportunities For Improvement (OFI)
(6)	**Re-design Performance Excellence Model** Model 1 was reviewed and needed a re-design	Conceptual Model (Model 2). Application Software **Ki Sekul v.2.0**

Self-Assessment Performance Excellence Model

| **Model 1:**
 Ki Sekul v.1.0
 Quantitative aspect
 202 criterias | The output of the designs were:
 After verified, implemented & reviewed →
 Model 1 was improved by Model 2 | **Model 2:**
 Ki Sekul v.2.0
 Quantitative &
 Qualitative aspect
 90 criterias |

Figure 1. Research Framework: The integration of National Accreditation Standard into Baldrige Education Criteria

In order to achieve performance excellence, it is necessary for the schools to do self-assessment periodically by using certain instrument [12]. The research would integrate two models, National Accreditation Standards (NAS) and Baldridge framework, to obtain a self-assessment instrument which contains the criterias from both models; but maintain the measurement method in NAS which the schools are familiar with. Therefore, as shown in Figure 1, the research steps would be:

- Evaluate each model and do the cross-checking between NAS and Baldridge framework, so the analysis would be resulted on the shortages of NAS which can be covered by Baldrige criterias in order to provide the assessment of performance excellence stage or maturity level
- Design the conceptual model
- Translate the conceptual model into an application software namely *KiSekul v.1.0*. It is an online self-assessment for Performance Excellence School, first edition with no revision yet (refer to the term of v.1.0).
- Implement*KiSekul v.1.0*in two high school institutions as real users; the users were selected using convenience sampling. The outputs were self-assessment reports that would be used for comparison study.
- Evaluate users' feedbacks and expert judgment which resulted on opportunities for improvement for the assessment model.
- Revise, improve and re-design the model; this step was actually repeating the second and third steps above. It began by designing the conceptual model then continued by the design of KiSekul v.2.0 (the application software of improved model).

3. RESULT AND DISSCUSSION

3.1. Cross-check Model Analysis

The assessment of NAS used 8 standards and 165 items of measurement, whereas Baldrige framework used 7 criteria and 90 items. The analysis of cross-checking model was done by comparing 165 points of NAS across each criteria/sub criteria in Baldrige Framework. For instance, an assessment item in NAS, i.e. *students gain the learning experience so that they can develop self-confidence and responsibility* (NAS item no. 36 in *Competences of Graduates Standard*) was confirmed to Baldrige sub-criteria of *Student Learning and Student-Focused Process Results* (one of Baldrige criteria no. 7 related to *Results*). The result of cross-checking model (see Table 1) showed that there was about 55.8% of NAS assessment items centered on Baldrige criteria no. 6 (namely *Operation Focus*) and 15.8% of them centered on the Baldrige criteria no. 7 (namely *Results*). The analysis indicates a focal issue that, in pursuit of performance excellence school by using current performance measurement system, NAS will have a shortage on three previous criterias, i.e *Leadership*, *Strategic Planning* and *Customer Focus*.

Table 1. Cross-check assessment (NAS vs. Baldrige)

No	National Accreditation Standard (NAS)	Assessment items	Conformity with Baldrige Education Criteria						
			1	2	3	4	5	6	7
1	Content	18	-	-	-	-	-	18	-
2	Process	9	-	-	-	4	-	4	1
3	Competences of Graduates	25	-	-	-	1	-	2	22
4	Educators and Supporting Staffs	20	-	-	-	1	16	3	-
5	Facilities	30	-	-	-	-	-	30	-
6	Management	20	5	3	1	3	1	7	-
7	Financial	24	4	1	-	-	-	19	2*
8	Assessment of Education	19	-	1	-	6	-	9	3
Total		165	9	5	1	15	17	92	26
Percentage of Conformity (%)			**5.5**	**3**	**0.6**	**9**	**10.3**	**55.8**	**15.8**

Although the evaluation points of NAS item were mostly centered on *Operation Focus* and *Result* in Baldrige criteria, throughout a more detailed breakdown analysis (in Figure 2), the cross-checking result showed that the conformity level of NAS was dominant only on few Baldrige sub-criterias. As an illustration, for Baldrige criteria no. 6, there was 100% conformity level of NAS item on Baldrige sub-criteria 6.1 (*Work Process*) but 20% to sub-criteria 6.2 (*Operational Effectiveness*). Another one was that there was 100% conformity level of sub-criteria 7.5 (*Budgetary, Financial dan Market Results*) but zero percent conformance on sub-criteria 7.2 (*Customer-focused Results*) and 7.3 (*Workforce-focusedResults*).

There were 11 out of 17 Baldrige sub-criterias that had low conformity level which reinforced the need for the integration between NAS and Baldrige criteria in order to have a better self-assessment instrument.
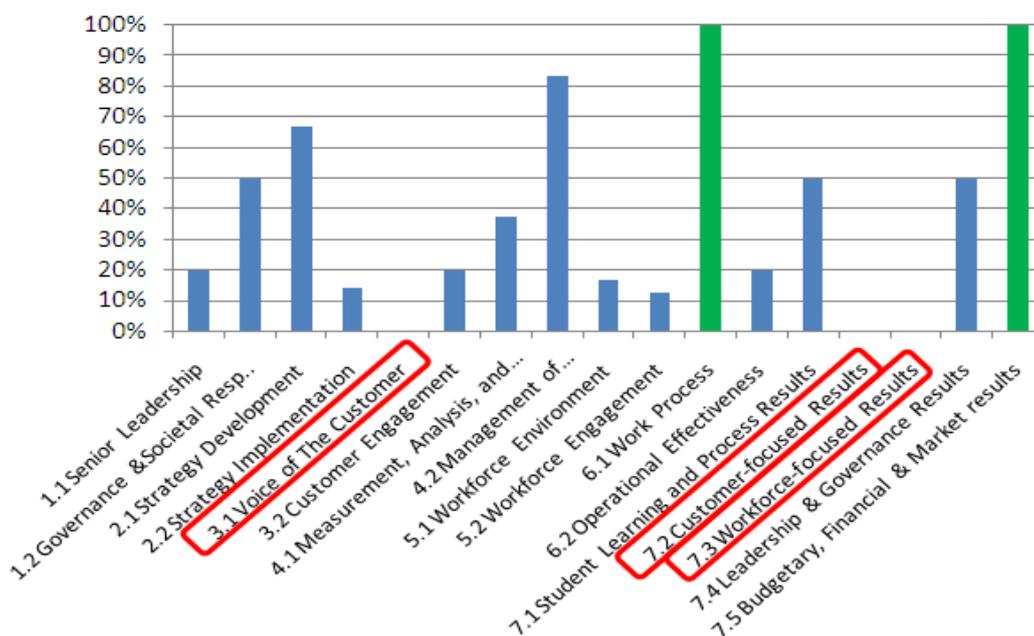
Figure 2. Conformity Levels of NAS in Baldrige Criteria

3.2. Conceptual Model & Application of KiSekul v.1.0

Regarding the shortages of NAS, the evaluation points of NAS was expanded from 165 items to 202 items for the proposed self-assessment model (by maintaining 165 existing items and adding 37 new items that derived from the requirements in Baldrige criterias/sub-criterias). The evaluations method for the proposed instrument was as same as the one in NAS i.e. using multiple choice questions. It was assumed that all Indonesian high schools (as potensial users) are already familiar with it. The answer of each multiple question contained five options which were structured as similar as possible to the any existing questions. An example of the multiple choice question was arranged as below in KiSekul (it was derived from Baldrige sub-criteria 3.2*Voice of Customer*):

In addition to identify the voice of customer (from students and stakeholders), it is important for the school to measure customer satisfaction in such ways as: (1) measure the customer satisfaction periodically, (2) use customer feedback as inputs for planning, (3) compare the customer satisfaction level with its competitor, (4)identify customer dissatisfaction, along with corrective action.

A. *Customer satisfaction is measured using (1), (2), (3) and (4)*
B. *Customer satisfaction is measured using (1), (2), and (3) or (4)*
C. *Customer satisfaction is measured using (1) and (2)*
D. *Customer satisfaction is measured using (1) only*
E. *No measurement of customer satisfaction*

The conceptual model has been translated into manual instruction and its application software, namely ***KiSekul v.1.0***, which can be accessed online through web. The interface of the application software *KiSekul v.1.0* consists of three main pages: (a) Home page, including login menu, menu for Baldrige criteria and sub-criteria (adding, editing and deleting), (b) Assessment page, consisting full questionnaires and (c) Reporting page, displaying the self-assessment report.

The self-assessment model developed into an online software *KiSekulv.1.0*, was then implemented in two public schools, which were selected by using purposive sampling, namely Sekolah Menengah Atas Negeri (SMAN) 15 Surabaya and Madrasah Aliyah Negeri (MAN) Lamongan. The characteristic of these two users are explained as below: (a) SMAN 15 is a public senior high school which is located in Surabaya, East Java-Indonesia. It has been accreditated "A" (the highest achievement) using National Accreditation Standard. In 2015, SMAN 15 had 1.440 students and 83 teachers, and it is one of the region school; (b) MAN, which is located in Lamongan, East Java-Indonesia, is also a public school but a specific type of religious school with Islamic religion as foundation. The school which has about 80 teachers, is also accreditated A and certified by ISO 9001:2008.Every evalution point was done by examining the supporting required data, and then, the headmaster and its management team verified the level of achievement, from the grade of E (the worst) to A (the best).

Meanwhile, the highest achievement of SMAN 15 was on *Measurement, Analysis, and Knowledge* criteria. It was because SMAN 15 is a public school which needs to be accountable to the government operations so that the school management is accustomed to controling through measurement and analysis based on the data. In addition, the five-yearly NAS also requires documentation of measurement data stored neatly and easily accessible. Lowest achievement of SMAN 15 was on *Customer Focus* criteria, where the criteria is composed of two sub-criteria, that is, *Customer Engagement* and *Voice of the Customer*. The analysis showed that SMAN 15 Surabaya had not measured its customer satisfaction including: (1) identifying the process to measure customer satisfaction, (2) taking advantage of customer satisfaction information as inputs for planning, (3) using the comparison between its customer satisfaction and its competitors/ as important information, and (4) identifying customer dissatisfaction, their feedback and follow-up treatment. In addition, the SMAN 15 Surabaya has not prepared any media for students to access the school program as well as the necessity to create activities frequently that involve the community and building partnerships with other relevant institutions.

Table 2. Assessment Result by *KiSekul v.1.0*

No	Assessment Criteria in *KiSekul v.1.0*	Items	Max Score	Assessment Score		% Assessment to Max. Score		Baldrige Score	Maturity Score	
				SMAN15	MAN	SMAN15	MAN		SMAN15	MAN
1	*Leadership*	27	108	77	103	71%	95%	120	*85.6*	*114.4*
2	*Strategic Planning*	8	32	25	29	78%	91%	85	*66.4*	*77.0*
3	*Customer Focus*	7	28	17	27	61%	96%	85	*51.6*	*82.0*
4	*Measurement, Analysis, and Knowledge Management*	15	60	56	56	**93%**	**93%**	90	*84.0*	*84.0*
5	*Workforce Focus*	19	76	68	74	89%	97%	85	*76.1*	*82.8*
6	*Operation Focus*	95	380	293	371	77%	**98%**	170	*131.1*	*166.0*
7	*Result*	31	124	102	121	82%	**98%**	365	*300.2*	*356.2*
TOTAL		**202**	**808**	**638**	**781**	**79%**	**95%**	**1000**	*794.9*	*962.3*

To determine the maturity score from each school, then it was calculated by multiplying the percentage of achievement with scores of Baldrige assessment system. The result (Table 2) showed that SMAN 15 gained Baldrige score of 794.9; while MAN Lamongan got the score of 962.3. If these two values are plotted on a graph Maturity Score, as shown in Figure 3, the two schools are both classified into the stage of maturity as leader education institutions. SMAN 15 is classified as a benchmark organization leader in which a stage of a school that has maturity in management schools

and programs. SMAN 15 deserves to be the benchmark leader for some facts such as SMAN 15 is also one of the partner schools working with the Federal Republic of Germany in a joined program (or a partner school), and the school becomes a benchmark reference and is visited by outstanding teachers from West Sumatera, Indonesia. Meanwhile, MAN Lamongan was at the highest maturity stage i.e. *World Leader*.

Based on the results of the mapping on the maturity scale graph, the implementation *KiSekul v.1.0* as a self-assessment can be scattered so that the performance of the various schools can be seen. With this important information, the government can figure out the mapping and the composition of maturity levels among the schools whether the majority of schools are in early stages/beginning, emerging or advanced/leader level. Thus, regulations, policies and guidance for managing those schools can be customized.
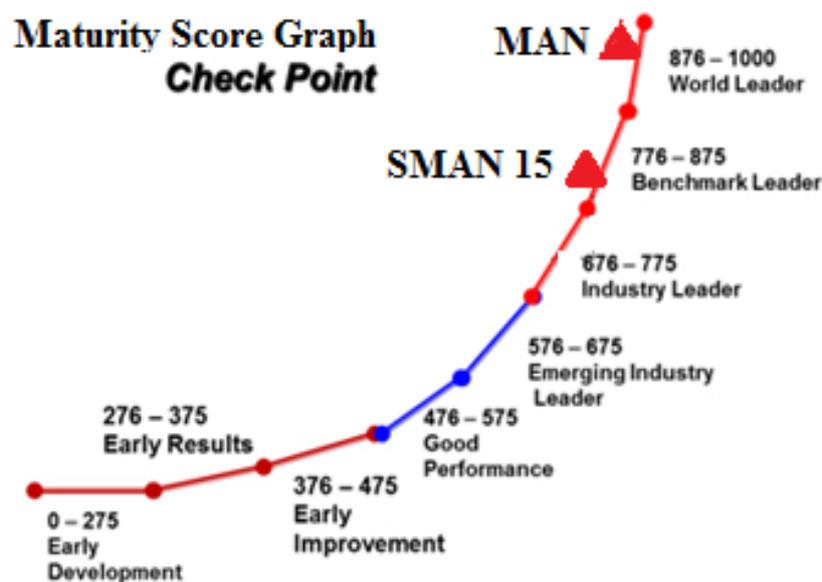

Figure 3. Maturity score of those two schools

After *KiSekul v.1.0* software is done through a series of structured and systematic planning, then tested and implemented, and evaluated the results of implementation, then some focal issues for opportunities for improvement that could be done include: (a) reducing the evaluation points that arise due to factor redundant, (b) simplifying the questions, and (c) using quantitative as well as qualitative measurement. The improved assessment model, re-designed into *KiSekul v.2.0* (second version), resulted on the reduction of evaluation points from 202 points to 96 points.

4. CONCLUSION
The design of a self-assessment model becomes an important part of evaluation system for school performance and it can be used to identify the maturity level of its quality management system and organizational performance. The designed model integrates two models between a worldwide-known model and a local content-based one, i.e. between Baldrige Education Criteria for Performance Excellent Model and National Accreditation Standards for Indonesian education institutions. The integration resulted on an assessment model that could not only cover the limitation of National Accreditation Standard that focuses mainly on operations or process management but also incorporate leadership, customer focus and strategic planning factors to pursue the school management to achieve performance excellence. The assessment model was built in application software called as *KiSekul*. The usage of information technology gave mutual benefits for the schools as users and accreditation body so that they can use the data and information simultaneously without having to re-enter similar data.

For future research, more public or private Indonesian high schools with a wider geographic coverage should be selected as potential users for implementing the designed model. Therefore, the maturity level of schools located regionally can be mapped and analysed.

Acknowledgement

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