



Volume 01, Issue 06

**June 16-17, 2018
Seoul, South Korea**

CONFERENCE PROCEEDINGS

BOOK OF ABSTRACTS ROEES-2018

**International Conference on
“Multidisciplinary Approaches in Business Economics and
Social Sciences Disciplines”
(MBES-2018), Seoul, South Korea**



Book of Abstracts Proceeding

**International Conference on
“Multidisciplinary Approaches in Business Economics and
Social Sciences Disciplines”
(MBES-2018)
Seoul, South Korea**



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Proceedings of the International Conference on

**“Multidisciplinary Approaches in Business Economics and
Social Sciences Disciplines”
(MBES-2018)**

ISBN: 978-969-670-841-4

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**International Conference on
“Multidisciplinary Approaches in Business
Economics and Social Sciences Disciplines”
Seoul, South Korea
Venue: Nine Tree Premier Hotel Myeongdong 2**

ORGANIZING COMMITTEE

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CONFERENCE CHAIR MESSAGE

Mr. Jiyong

International Conference on “Multidisciplinary Approaches in Business Economics and Social Sciences Disciplines” MBES-2018 serves as platform that aims to help the scholarly community across nations to explore the critical role of multidisciplinary innovations for sustainability and growth of human societies. This conference provides opportunity to the academicians, practitioners, scientists, and scholars from across various disciplines to discuss avenues for interdisciplinary innovations and identify effective ways to address the challenges faced by our societies globally. The research ideas and studies that we received for this conference are very promising, unique, and impactful. I believe these studies have the potential to address key challenges in various sub-domains of social sciences and applied sciences.

I am really thankful to our honorable scientific and review committee for spending much of their time in reviewing the papers for this event. I am also thankful to all the participants for being here with us to create an environment of knowledge sharing and learning. We the scholars of this world belong to the elite educated class of this society and we owe a lot to return back to this society. Let’s break all the discriminating barriers and get free from all minor affiliations. Let’s contribute even a little or single step for betterment of society and welfare of humanity to bring prosperity, peace and harmony in this world. Stay blessed.

Thank you.

Mr. Jiyong

Conference Chair

Email: jiyong@roees.org

ROEES-2018



Conference Schedule

DAY 01 Saturday (June 16, 2018)

Venue Nine Tree Premier Hotel Myeongdong 2

| | |
|---------------------|---|
| 09:00 am – 09:30 am | Welcome Reception & Registration |
| 09:30 am – 09:45 am | Opening Ceremony |
| 09:40 am – 09:50 am | Welcome Remarks Conference Coordinator ROEES |
| 09:50 am – 09:55 am | Introduction of Participants |
| 09:55am – 10:00 am | Group Photo Session |
| 10:00am – 10:30 am | Grand Networking Session and Tea Break |



DAY 01 Saturday (June 16, 2018)

Session I (10:30 am – 12:30 pm)

Session Chair: Leon Yap

Track A: Engineering, Technology Computer and Applied Sciences

| | | |
|------------------------|---|------------------------------|
| TASPE-068-KR102 | Industry 4.0 Implementation Framework for the Producing Industry | Guenther Schuh |
| TASPE-068-KR103 | Cooperative, digital interconnected order processing process in the tool and die industry | Thilo Schultes |
| GSEI68-102 | Notebook Computer Component Breakdown Pattern Recognition and Prediction by using Hidden Markov Model | Satria Arief Wicaksono Bakri |

Track A: Business, Economic, Social Sciences and Humanities

| | | |
|---------------------|---|---|
| NDMA68-101 | The Effects of One-time Laughter Therapy on Stress Response, School Life Adjustment and Ego-resilience of Female University Students | Prof. Dr. Cha MiYoun |
| NDMA68-102 | Functional Perspectives on Strategic Significance of R&D and Export Activity for Firms Economic Performance in U.S. Manufacturing Industries | Prof. Dr. Jooh Lee |
| SEO-368-101B | A Study of Tourist Preference on cultural tourism: The Case of Chiayi in Taiwan | Hui Chen fang |
| SEO-368-102B | Impact Of Employee Satisfaction In Employee Loyalty, Retention And Organizational Performance | Sarantuya Jigjiddorj , Altanchimeg Zanabazar |
| MBES-JUN-102 | The Effects of Domestic Saving and Investment on the US Current Account Deficit: Using Three Cointegration Analyses and the Error Correction Models | Young Cheol Jung |
| MBES-JUN-110 | The Impact of R&D Expenditure and Marketing Spending on Firm Sales: Evidence from Turkey | G. Canberk Buluş |

Lunch (12:30 pm – 01:30 pm)



DAY 01 Saturday (June 16, 2018)
Session II (1:30 pm – 3:00 pm)
Session Chair: Leon Yap

Track B: Business, Economic, Social Sciences and Humanities

| | | |
|---------------------|---|---------------------------|
| MBES-JUN-115 | The Empirical Study Of Student Satisfaction As A Determinant of Teachers Skills, Attitudes And Training Environment: The Case Of Mongolian Private University | Domboo Altanbat |
| MBES-JUN-116 | The Factors on Overall Job Satisfaction: The Case of Mongolia | Bayantsatsral Gunsennorov |
| SEO-368-103B | Improvements in Chinese agricultural Industry – Go Global Impementation Perspective | Karolina Łopacińska |
| SEO-368-104B | The Effect of Pension Expenditure on Fiscal Deficit: Global Evidence | Jhih Sian Pan |
| MBES-JUN-113 | Entrepreneurship in retailing: Resources, capabilities, buying, use of marketing tools, internationalization, and entrepreneur’s life management | Youngjin Bahng |
| MBES-JUN-114 | Reminiscence video, popup store, and retail business plan competition: Three steps to nurture future entrepreneurs in class | Youngjin Bahng |

Tea Break (3:00 pm – 3: 15pm)
Closing Ceremony



List of Conference Attendees

The following Scholars/ practitioners/educationist who don't have any paper presentation, however they will attend the conference as delegates & observers.

| Sr. No | Official ID | Name | Affiliation Details |
|--------|------------------|--------------------------|--|
| 1. | TASPE-068-KR104A | Mr Aly Kromah | Cross Atlantic Trading, Liberia |
| 2. | SBTM-068-ANI101A | Lawrence Mwangi | Kenya |
| 3. | NDMA68-105A | Chuluunchimeg | Byatskhan Mongol Tstesterleg Institute, Mongolia |
| 4. | NDMA68-106A | Johnson Joseph Olumuyiwa | Segi University , Malaysia |



DAY 02 Sunday (June 17, 2018)

City Tour and Shopping Day

All respective guests are free to conduct their own sightseeing and tour. The second day of the event is reserved for this memorable purpose.



**TRCAK A: BUSINESS MANAGEMNET, ECONOMICS,
SOCIAL SCIENCES AND HUMANITITES**

The Effects of Domestic Saving and Investment on the US Current Account Deficit: Using Three Cointegration Analyses and the Error Correction Models

Young Cheol Jung*

Abstract The US has been experiencing a chronic current account deficit since 1982. Using a quarterly dataset of the current account deficit, domestic savings and investment from 1947 Q1 to 2017 Q1, this paper examines whether private savings, government savings or domestic investment is a primary factor to incur the current account deficits of the US. Additionally, we test ‘Feldstein and Horioka Puzzle’ and ‘Twin Deficit Hypothesis’ by investigating the empirical link between saving and investment, and the government savings and the current account, respectively. The whole sample period is split into three samples: (1) 1947Q1- 1984Q3 (2) 1984Q4- 1999Q4 (3) 2000Q1- 2017Q1 to see if the relationships has changed over time. This is done through applying cointegration tests and the error correction models (ECM). In particular, we practiced most widely used three cointegration tests (Engle & Granger, Johansen and ARDL bound test) altogether in order to check the sensitivity of test results. From the comprehensive empirical analysis, we find several interesting results. First, the long-run relationship between domestic savings and investment in the US only existed until the early 80s in which the economic variables were more stable. Thus ‘Feldstein and Horioka puzzle’ may not be a contemporary phenomenon any more. Second, the current account of the US has been more affected by the investment rather than saving. That is, a higher investment rather than a low savings has been the main reason for the CA deficits of the US in all three sample periods. Third, ‘Twin Deficit Hypothesis’ is not empirically supported in all three sample periods.

Keywords: Saving, Investment, Current Account Deficit, Cointegration, Error Correction Model

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The Impact of R&D Expenditure and Marketing Spending on Firm Sales: Evidence from Turkey

İbrahim Bakirtaş¹, Hülya Bakirtaş², G. Canberk Buluş^{*3}

Abstract Along with accelerating globalization, the new economic understanding is based on science, technology and innovation, also in this time the competition between firms is increasing sharply. Companies focus on more R&D and consumer value creation to differentiate from its competitors. R&D expenditures through product differentiation and marketing activities through customer value creation contribute to companies' ability to maintain their assets and to compete. For creating value to consumer, many of the most successful companies spend on more marketing for each of a lot of categories such as market research, product development, promotions, sales and service etc. Marketing expenditure is an important role in companies in terms of sales revenue and profitability. Consumers influence by marketing efforts because marketing efforts have a positive and important effect on consumer's decision making. Similarly, firms can increase the quality of existing products, reduce average production costs and improve product range by developing new products through R&D expenditures. In this respect, R&D expenditures play an important role in both firm's sales and firm's profitability. The main purpose of this study is measure the impact of these two important expenditure patterns on firm sales. In accordance with this purpose, analyzes made 94 Turkish Stock Exchange firm for the period 1996-2010. In this study Pooled Ordinary Least Squares Method (POLS), Fixed Effects Method (FE) and System Generalized Moments of Method (GMM) were used as the analysis method. According to the analysis results, R&D expenditures and marketing spending made in the period (t-1), statistically significant and positive affect the firm's sales in the period (t). In addition, other variables used in the research; investment, number of employees, and exports statistically significant and positive affect firm's sales.

Keywords: R&D Expenditures, Marketing Spending, Firm Sales, GMM

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The Empirical Study of Student Satisfaction as A Determinant of Teachers Skills, Attitudes and Training Environment: The Case of Mongolian Private University

Bayantsatsral Gunsennorov¹, Gantumur Ganjargal²,
Altanhuyag Altanjoloo³, Munkhbayar Odmaa⁴, Jugder
Enkhzaya⁵

Abstract The aim of this study seeks to examine the correlations between teachers' skills, attitude and training environment for student satisfaction. We try and understand the factors which influence student satisfaction in higher education, as well as the consequences of it. Students will often choose their university or specific academic department based on its reputation, and universities and even the same school's academic departments will often compete in attracting the best students. We collected and analyzed data from descriptive research can help understand factors on student satisfaction. The data were collected from 164 participants who study in the first courses for School of Finance and Economics at IKH ZASAG International University. This study discussed the effects of above mentioned results, the implications for theory and practice along with the limitations of the research and the implications for further research. Our study is significant in considering both theoretical and practical issues and for practices in Mongolian private higher education sector. Data were estimated by SPSS 21 and Smart PLS 3.0 statistic programs.

Keywords: Student Satisfaction, Teachers Skills, Attitude, Training Environment

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The Factors on Overall Job Satisfaction: The Case of Mongolia

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Domboo Altanbat³, Delgerkhangai Bat-Orshikh⁴,
Buyanbadrakh Erdenesuvd⁵

Abstract Overall job satisfaction is one of the main influential factors for the effectiveness of human resource development. We try to study more theoretical framework of job satisfaction in political administration position and public administration position in Mongolia. The aim of this study is to investigate the impacts of organizational justice, organizational culture on job satisfaction among public officers. This research topic has been studied and is well-known in worldwide. In Mongolia, context the topic of study has been developed at low level. Data collected and analyzed from descriptive research can help public sector employees understand factors of job satisfaction. Therefore, the research methodology organized and used some information from statistical calculations in Mongolia. Data were collected from 104 participants who work in political administration position. The participants were from Mongolian cities such as Ulaanbaatar, Darkhan and Erdenet. The results showed that effects of all factors had a positive relationship on job satisfaction. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) and SmartPLS-3.0 programs.

Keywords: Mongolia, OCTAPACE Profile, Organizational Justice, Organizational Culture, Job Satisfaction

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Entrepreneurship in Retailing: Resources, Capabilities, Buying, Use of Marketing Tools, Internationalization, and Entrepreneur's Life Management

Youngjin Bahng*

Abstract Entrepreneurship is an important field of research study. However, entrepreneurship research may still be regarded as only an aspect of small businesses or new ventures rather than an independent conceptual domain (Shane & Venkataraman, 2000). The purpose of this study is to understand entrepreneurship in retailing based on the small retail store owners' thoughts regarding marketing resources, capabilities, buying, internationalization, and life management. The findings of this study may contribute to entrepreneurship and retail area by suggesting unique concepts, themes, and research topics to current or future entrepreneurs and scholars, and particularly this will be useful for small retail owners with extremely limited resources, networks, and/or governmental support. This study was conducted based on the Resource-based theory (RBT) and dynamic capabilities view (DCV). RBT has been used by a number of management and marketing scholars, and some of their studies have examined the relationships or linkages between a firm's marketing resources and performance (e.g., Cavusgil & Zou, 1994; Luo et al., 2005). Dynamic capabilities have also been investigated by researchers in their marketing/management research studies, such as the impact of dynamic capabilities in the new product development (Acikdilli & Ayhan, 2013). A total of 20 requests for participation were sent out to 20 fashion retail store/company owners who were selected based on their diversity in their size of the company, types of products they manufacture, and years of experience. 12 owners of 12 firms responded and. The owners were interviewed regarding their overall marketing and management resources, capabilities, overall firm performance, buying, sourcing, target market, effort of internationalization, and their life management as an entrepreneurs. The researcher then grouped the distinctive themes and concepts by repeating the examination several times (Spiggle, 1994). In conducting the thematic content analysis, the researcher adopted the concept of Strass and Corbin's (1998) conceptual ordering (i.e., the organization of data into discrete categories based on its properties and dimension).

Keywords: Entrepreneurship, Resources, Internationalization

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Reminiscence Video, Popup Store, and Retail Business Plan Competition: Three Steps to Nurture Future Entrepreneurs in Class

Youngjin Bahng*

Abstract As one of large retailers that carried tons of fashion products in the U.S., Macy's has closed 81 stores since August 2016 and will shut down another 19 stores. Therefore, Macy's, which had almost 800 offline stores in 2014, will have fewer than 600 offline stores after it's closures as they planned. (Peterson, 2018). These entrepreneurship courses based in general business concept may not be able to go over many sources of knowledge about fashion and/or retailing field that includes many aspects of dissimilarity to other industry sectors. For college students who want to have their own retail business, an entrepreneurship class that focusing on fashion and/or retailing with valuable and useful hands-on experience projects is necessary to get them ready to jump into the real retail industry. This entrepreneurship course is a capstone course for juniors and seniors. In this course, reminiscence has been chosen for students to learn about a person's life as an entrepreneur beyond the story about how they made their retail business successful. The next project is a popup store. Therefore, students make an effort to make it real, opening a retail store by cooperating and collaboratively working to each other. After three days of running a popup store, they write a paper and do oral presentations by the department/group. The last step is having students participate in retail business plan competition with their business plans they write in class. Three winners receive cash prizes that may help their business startup and effort besides teaching the class. However, there was a student in the class who expressed her thankfulness to me for giving her an opportunity to talk to professionals about her business ideas and plans, which became one of the most exciting experiences at school. The three steps- learning about senior entrepreneur's life and experiences by making a reminiscence video, planning and testing products/services at a popup store, and presenting business plans in front of professionals and getting feedback at the retail business plan competition may be effective methods to nurture future retail entrepreneurs in class as well as differentiating the class from general entrepreneurship courses in business school.

Keywords: Entrepreneurs, Reminiscence, Retail Store, Products, Business Plan, Competition

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A Study of Tourist Preference on Cultural Tourism: The Case of Chiayi in Taiwan

Hui Chen Fang*

Abstract In recent years, with the advancement of income, the development of leisure travel has gradually moved away from rush travelling, but moves toward deep experience of cultural tourism. Chiayi Township in Taiwan which owns precious culture and historical assets has a good condition for the development of cultural tourism. The aim of this study is to understand the demands and expectations of tourists for Chiayi cultural tourisms. The subjects were tourists who visiting the cultural tourism industry in Chiayi. 397 valid samples were collected. This study used SPSS to analyze the relationship among motivations, experience values, satisfactions and revisiting willing of tourists for the cultural tourism industry of Chiayi. The statistical methods include descriptive statistics, factor analysis, reliability analysis, t-test, one-way ANOVA, Pearson's correlation and regression. The results of this study were briefly showed as below. 1. Demographic variables of visitors were showed partially significant difference in motivations, experience values, satisfactions and revisiting willing. 2. The factor analysis of motivation shows that there are three factors including chasing local cultural and knowledge; leisure and relax, and as a passive tourist. 3. There are two factors extracted from experience values which are pleasant sensory value and cultural educational value. 4. Chasing local culture and knowledge of motivation has a significant positive influence on satisfaction and revisiting willing. The leisure and relax of motivation only has a significant positive influence on revisiting willing. 5. Both pleasant sensory value and cultural educational value have significant positive influences on satisfaction and revisiting willing. However, the effect of pleasant sensory value is stronger than cultural educational value. According to the results of this study, valuable implications were provided for researchers and practitioners.

Keywords: Cultural Tourism, Motivations, Experience Value, Satisfaction, Revisiting Willing

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Impact of Employee Satisfaction in Employee Loyalty, Retention and Organizational Performance

Sarantuya Jigjiddorj*¹, Altanchimeg Zanabazar²

Abstract Retention of highly skilled and loyal employees enable improving the organizational performance that significantly contributes to maintaining its competitiveness in the market and competitive advantages. Therefore, one of the key aspects of employee retention is improving employee satisfaction for sustaining high organizational performances. Studying the factors influencing employee satisfaction and their impacts are essential for addressing numerous issues like organizational development, corporate policy formulation, organizational performance and organizational competitiveness. The current paper aims at researching how the employee satisfaction has an impact employee retention, loyalty as well as organizational financial and non-financial performances of the organization based on the case of a cashmere and wool garment company in Mongolia. The research results indicate that satisfied employees tend to be loyal and committed to the organization and contributed positively on the organizational non-financial performances. However, no correlation is indicated between employee retention and organizational financial performance.

Keywords: Job Satisfaction, Employee Loyalty, Employee Retention, Organizational Performance-Financial

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Improvements in Chinese agricultural Industry – Go Global Impementation Perspective

Karolina Łopacińska*

Abstract The aim of the article is to present the directions of Go Global strategy oriented on modernizing Chinese agri-food sector by implementing modern solutions and deepening technological progress, which in turn allows to increase the competitiveness of entities in this sector. The article will present the implementation of modern agricultural technologies that allow for environmentally friendly production, as an expression of shaping the social responsibility and ecological awareness of producers in Chinese agri-food sector. They are aimed at increasing the quality of agricultural products, in the context of increasing the level of needs fulfillment and increasing the nutritional security of consumers. The next part of the article will show the expenditures earmarked as part of the Go Global strategy for the development of new technologies in various links of the agri-food sector. The consideration will be supported by examples of solutions implemented by Chinese producers in selected areas of this sector. In the final part, the outcomes and prospects for further development of the agri-food sector in China in the context of Go Global strategy will be outlined. The article will be based on the analysis of data obtained from reports of specialist research institutes and consulting agencies, as well as other secondary sources of information.

Keywords: Chinese Agri-Food Industry, Go Global, Innovations In Agriculture, New Technologies

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The Effect of Pension Expenditure on Fiscal Deficit: Global Evidence

Jih Sian Pan*¹, Yi Chung Hsu²

Abstract Population Aging has become a demographic trend in the world, and after Greece's bankruptcy, countries have begun to examine the fiscal situation and a wave of pension reform. In Taiwan, for example, the central government's fiscal situation has been in deficit for eight consecutive years from 2009 to 2016, and its pension spending has increased from more than 130 billion yuan to 140 billion. Therefore, the aim of this article attempts to explore how the effect of retirement expenditure on fiscal deficit. This paper using fiscal deficit as dependent variable, retirement pension expenditure, dependency ratio, crude birth rate, economic growth rate, unemployment rate, public health expenditure and defense expenditure are used as independent variables to analyze the panel data of 29 countries from 1999 to 2012. The research involved ordinary least square method and quantile regression method. There are two kinds of empirical results below: 1. The results of ordinary least square method showed that the pension expenditure, dependency ratio, crude birth rate and economic growth rate had a negative effect on the fiscal deficit, while the unemployment rate, public health expenditure and defense expenditure had a positive effect on the fiscal deficit. 2. The empirical results of the quantile regression method are slightly different from the ordinary least square method. The result of empirical shows that the ability of the variables to explain the fiscal deficit under each quantile. There is an interesting finding in this study: whether it is ordinary least square method or the quantile regression method, the empirical results show that public health expenditure increases, which results in the government running a fiscal deficit. However, due to the increase of public health expenditure, the life expectancy of people is longevity and lead to the population aging, thus creating a different kind of senior economy, making pension expenditure and dependency ratio have a negative effect on fiscal deficit.

Keywords: Fiscal Deficit, Pension Expenditure, Quantile Regression

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The Effects of One-Time Laughter Therapy on Stress Response, School Life Adjustment and Ego-resilience of female university students

Cha Mi-Youn*

Abstract This study has developed a one-time laughter therapy program for university nursing students and has investigated the effects of their stress response, school life adjustment and ego-resilience. It is a quasi-experimental research using a nonequivalent control group pre/post-test design. 33 people each of an experimental group and a control group were participated in this study (total=66). After operating the one-time laughter therapy to the two groups, it measured their stress response, school life adjustment and ego-resilience at the same period of time. At the result, their stress response of the one-time laughter therapy was $p = .040$ and their school life adjustment was $P = .012$, which means that the one-time laughter therapy has exerted a significant influence on them. Therefore, it is suggested that the one-time laughter therapy will be able to help female university students relieve their stress and adjust to their school life well.

Keywords: One-Time Laughter Therapy, Stress Response, School Life Adjustment, Ego-Resilience

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Functional Perspectives on Strategic Significance of R&D and Export Activity for Firms Economic Performance in U.S. Manufacturing Industries

Jooh Lee*

Abstract Over the past decades, the strategic determinants of performance have been one of the central concerns among scholars and practitioners in business and economic fields. Although it is widely accepted that R&D and exporting activity are essential strategic factors with respect to the firm's performance, the issue of proper exploitation with respect to diverse performance measures is conspicuously absent. This study is designed to empirically explore the nature of the strategic impact of R&D and export Activity on the firm's diverse dimensions of performance (accounting-and marketbased performance) in US manufacturing firms. In addition, this study also explores the interactive significance of R&D and export activity on firm performance. The major findings of this study show that R&D and export activity can be significantly considered as major determinants of firm performance, particularly with respect to market-based performance. But the univocal consideration of R&D and export activity for improving performance is relatively controversial because the validity and applicability of the conventional findings previously posited by diverse industry contexts have been determined through unidimensional measure of performances. Considering all possible limitations that might exist with regard to selected samples and methods, this study demonstrates that R&D, export activity and firm size are relatively and significantly associated with most performance measures, but the strategic significance of selected strategic factors on firm performance is most likely to be different depending on which performance measure is used across different industry settings based on technology.

Keywords: R&D Intensity, Export Activity, Interaction Effect, Firm Economic Performances

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**TRACK B: ENGINEERING, TECHNOLOGY AND
APPLIED SCIENCES**

Industry 4.0 Implementation Framework For The Producing Industry

Günther Schuh¹, Michael Salmen², Maximilian Stark³, Felix Stracke⁴*

Abstract The competitive pressure induced by progressing globalization has forced companies to find new ways of differentiation. Industry 4.0 as the synonym for the next significant step in value creation advancement offers new technologies and procedures to obtain further improvements in competitiveness. The real-time networking of people, machines and objects is not only an opportunity to leverage productivity potentials; it also enables new data-driven business models to achieve increase in revenues. Although the concept and enablers of industry 4.0 are widely known across the producing industry, companies struggle with its successful and sustainable implementation. Due to the often insufficient embedding of individual solutions in a coherent overall concept, implemented solutions cannot exploit potential synergies within the company. The presented paper introduces a framework to centrally control and synchronize Industry 4.0 activities within a company. By integrating bottom-up and top-down perceptions the framework facilitates the early identification and assessment of potential industry 4.0 applications as well as efficient development of specific solutions up to the implementation in series production. Consisting of an operationalization process and an organizational model optimized for horizontal and vertical exchange within the company, the framework enables a faster and more robust implementation of industry 4.0.

Keywords: Industry 4.0, Implementation, Business Strategy

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Cooperative, Digitally Interconnected Order Processing Process In The Tool And Die Industry

Günther Schuh¹, Christoph Kelzenberg², Jan Wiese³, Thilo Schultes^{*4}

Abstract The tool and die industry, characterized by single and small series production of tools and dies used for mass production, is facing new challenges due to decreasing product life cycles in key customer industries and increasing global competition. Since customers still demand constantly high tool quality for a low price, tool shops need to collaborate with a network of suppliers. However, due to high expenses for supplier qualification and quality checks during the order processing process, cooperation often is limited to a small number of local suppliers. Chances to improve the quality and delivery time of procured parts and services are not exploited. Current technological developments in the context of Industry 4.0 (e.g. digital supplier platforms and smart glasses) provide chances to change the way of cooperation during the order processing process. Therefore, the solution presented in this paper describes an approach for a need-based cooperative, digitally interconnected order processing process instead of a stage-gate process.

Keywords: Procurement, Supply Chain Management, Collaboration

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Notebook Computer Component Breakdown Pattern Recognition and Prediction by using Hidden Markov Model

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Abstract For notebook computer companies, managing component spare part inventory for repair service centers is vital. While there are plenty of researchers perform forecast in repair time and repair volume of component spare-part, there is a limited number of research that perform recognition and prediction on component breakdown pattern for notebook computers. This work, in the quest of providing valuable inputs for inventory management practice of repair service center, will focus on recognizing and predicting the component breakdown pattern of notebook computers. In this work, sequential repair history was gathered from a notebook computer repair service center in Taiwan and treated as sets of observation sequences for a hidden Markov model (HMM), while the component breakdown treated as hidden states. Subsequently, Baum-Welch algorithm is executed to learn the HMM parameters. Several models based on various observation sequence length were trained and ranked based on the log-likelihood. The best HMM is selected as the model to reveal the component breakdown sequence. The decoding of component breakdown sequence was performed by using Viterbi Algorithm and revealed 1511 instances of component breakdown pattern from 25 service sequence types. Afterwards, to predict the next possible component breakdown, possible sets of future repair sequence were ranked by their log-likelihood. By using Viterbi Algorithm, the next most probable component breakdown was predicted.

Keywords: Pattern Recognition, Component Breakdown Prediction, Hidden Markov Model (HMM)

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