MEDIATION IMPACT OF MANUFACTURING STRATEGIES ON EXTERNAL ENVIRONMENTAL FACTORS AND MANUFACTURING PERFORMANCE

RISYAWATI MOHAMED ISMAIL

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RISYAWATI MOHAMED ISMAIL

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Tarikh: **23 April 2014**
(Date)

Nama Pelajar (Name of Student)	:	**Risyawati bt. Mohamed Ismail**
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ABSTRAK

Persaingan global yang semakin sengit telah mendedahkan firma di seluruh dunia, termasuklah pengilang di Malaysia, dengan pelbagai cabaran yang baru. Persekitaran yang mencabar ini telah mendorong para pengilang untuk menguna pakai strategi pembuatan tertentu yang terbukti berkesan seperti pelaksanaan teknik pengilangan *lean*, penambahan teknologi pengilangan dan penggunaan fleksibiliti yang strategik. Dalam hal pengilang *lean* di Malaysia, tidak banyak kajian yang telah dilakukan untuk mengenal pasti formula yang terbaik bagi mengatasi cabaran yang semakin banyak dalam persekitaran perniagaan. Dalam kajian ini, ketiga-tiga strategi yang dikenal pasti, iaitu teknik pengilangan *lean*, teknologi pengilangan dan fleksibiliti yang strategik, telah diteliti secara mendalam sebagai faktor yang bersepadu yang boleh memberikan kesan yang positif terhadap prestasi pengilang. Kerangka kajian ini menyelidik kesan pendekatan bersepadu dan strategi terhadap prestasi pengilang *lean di Malaysia*. Data dikutip menerusi kaedah tinjauan dengan soal selidik berstruktur diedarkan kepada pengilang *lean* di Semenanjung Malaysia. Model persamaan berstruktur (SEM) digunakan untuk menguji pelbagai model perantaraan. Hasil kajian memperlihatkan ketiga-tiga strategi memberikan impak yang signifikan dan bertindak sebagai perantara antara faktor persekitaran luaran dengan prestasi pengilang. Dapatan kajian turut menekankan beberapa hubungan 'quasiparodixical' yang menarik. Pengilang *lean* di Malaysia memilih pendekatan yang lebih berhati-hati dalam pelaksanaan teknologi pengilangan. Mereka lebih cenderung untuk menggunakan teknologi pengilangan dalam keadaan persekitaran perniagaan yang lebih stabil dan menganggap fleksibiliti yang strategik sebagai tidak membantu meningkatkan prestasi. Kajian ini menghasilkan model ramalan yang kukuh untuk menjelaskan kesan perantara strategi pengilangan terhadap faktor persekitaran luar dan prestasi pengilangan yang bermanfaat untuk membantu pengurusan syarikat sebegini. Batasan utama kajian ini ialah jumlah bilangan responden yang kecil. Penyelidikan akan datang perlu menggunakan dimensi yang lebih luas untuk mengukur prestasi, termasuklah menambah strategi pembuatan yang lain sebagai sebahagian daripada kerangka kajian serta membesarkan skop kajian untuk meningkatkan generalisasi hasil penyelidikan.

Kata kunci: Malaysia, pengilangan *lean*, teknologi, fleksibiliti yang strategik

ABSTRACT

The growing global competition has presented firms around the world, including manufacturers in Malaysia, with unprecedented challenges to ensure survival. Such a challenging environment should propel these manufacturers to adapt certain, well-proven manufacturing strategies, such as lean manufacturing, the inclusion of manufacturing technology and the appliance of a strategic level of flexibility. With respect to Malaysia insufficient research has been done on what are the winning formulae to overcome the mounting challenges in the business environment. In this study, all three identified strategies – lean, manufacturing technology and strategic flexibility – were investigated in depth as integrated factors that could positively improve manufacturing performance. The research framework examined the impact of such an integrated and strategic approach on the performance of Malaysian manufacturers. Data was collected using survey method, through the distribution of structured questionnaires to lean manufacturers in Peninsula Malaysia. Structural equation modeling (SEM) was used to test multiple mediator models the results of which indicated that all three strategies had a significant impact and mediated the relationship between external environmental factors and manufacturing performance. The results from this study also emphasized several interesting quasi-paradoxical relationships that implied that Malaysian lean manufacturers preferred a cautious approach towards manufacturing technology implementation, preferring to incorporate technology in a more stable business environment and viewed strategic flexibility as unfavorable toward performance improvement. This study produced a strong predictive model that explained the mediation impact of manufacturing strategies on external environmental factors and manufacturing performance that would be useful to those managing such companies. The main limitation found in this research was the small number of respondents. Future research should focus on a wider dimension for performance measurement, include additional manufacturing strategies as part of the research framework and enlarge the scope of this study in order to increase the generalizability of the research outcome.

Key words: Malaysia, lean manufacturing, technology, strategic flexibility

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LIST OF ABBREVIATIONS

AMOS – Analysis of a Moment Structure

AMT - Advance Manufacturing Technology

ASEAN- Association of Southeast Asian Nation

CAD – Computer Aided Design

CAE – Computer Aided Engineering

EEF – External Environmental Performance

FMC – Flexible Manufacturing Cells

FMM – Federation of Malaysian Manufacturers

FMS – Flexible Manufacturing System

IEPT – Information exchange and Planning Technology

HVAT – High Volume Auto Technology

IMS – Integrative Managerial System

JIT – Just In Time

LAN – Local Area Network

LM – Lean Manufacturing

MATRADE – Malaysia External Trade Development Corporation

MFP – Multi Factor Productivity

MIDA – Malaysia Investment Development Authority

MITI- Ministry of International Trade and Industry

MP – Manufacturing Performance

MT – Manufacturing Technology

MNC – Multi National Corporation

NC – Numerical Control Machine

PDT – Product Design Technology

PLS- Partial Least Square

ROE – Return on Equity

SF – Strategic Flexibility

SDS – System Device Station

SEM – Structural Equation Modelling

SPC – Statistical Process Control

TPM – Total Productive/Preventive Maintenance

TPS – Toyota Production System

LIST OF APPENDICES

CHAPTER ONE

INTRODUCTION

1.0 Background of Study

Malaysia's development has been largely fuelled by export-led growth. However, globalization has increasingly intensified competition and has sharpened the distinction between victors and losers. As a nation, Malaysia is an open economy, which depends heavily on external trade to achieve its economic growth (Al-Yousif, 1999; Choong, Zulkornain & Khim-Shen, 2003; Yusoff, 2005; Liang, Abdul Ghani, Jusoh & Chin, 2011; Talib, 2012). Given the openness of its economy, the negative wealth effects of the global crisis on demand and world trade have resulted in a decline in Malaysia's industrial production and manufacturing exports. Due to a relatively small population, Malaysia's domestic market is insufficient to finance additional growth for its economy. Consequently, international trade has been crucial in the development of the Malaysian economy, and foreign trade has been a significant and substantially increasing portion of the nation's gross domestic product (GDP) over the last three decades (Talib, 2012). The findings from a study by Hamid (2010) suggest that trade is an important variable in promoting economic growth for Malaysia; hence, its exposure to international instability is inevitable. Due to such heavy dependence on external trade, Malaysia's economy can be considered sensitive to any external shocks that could range from economic crises to intensifying global competition.

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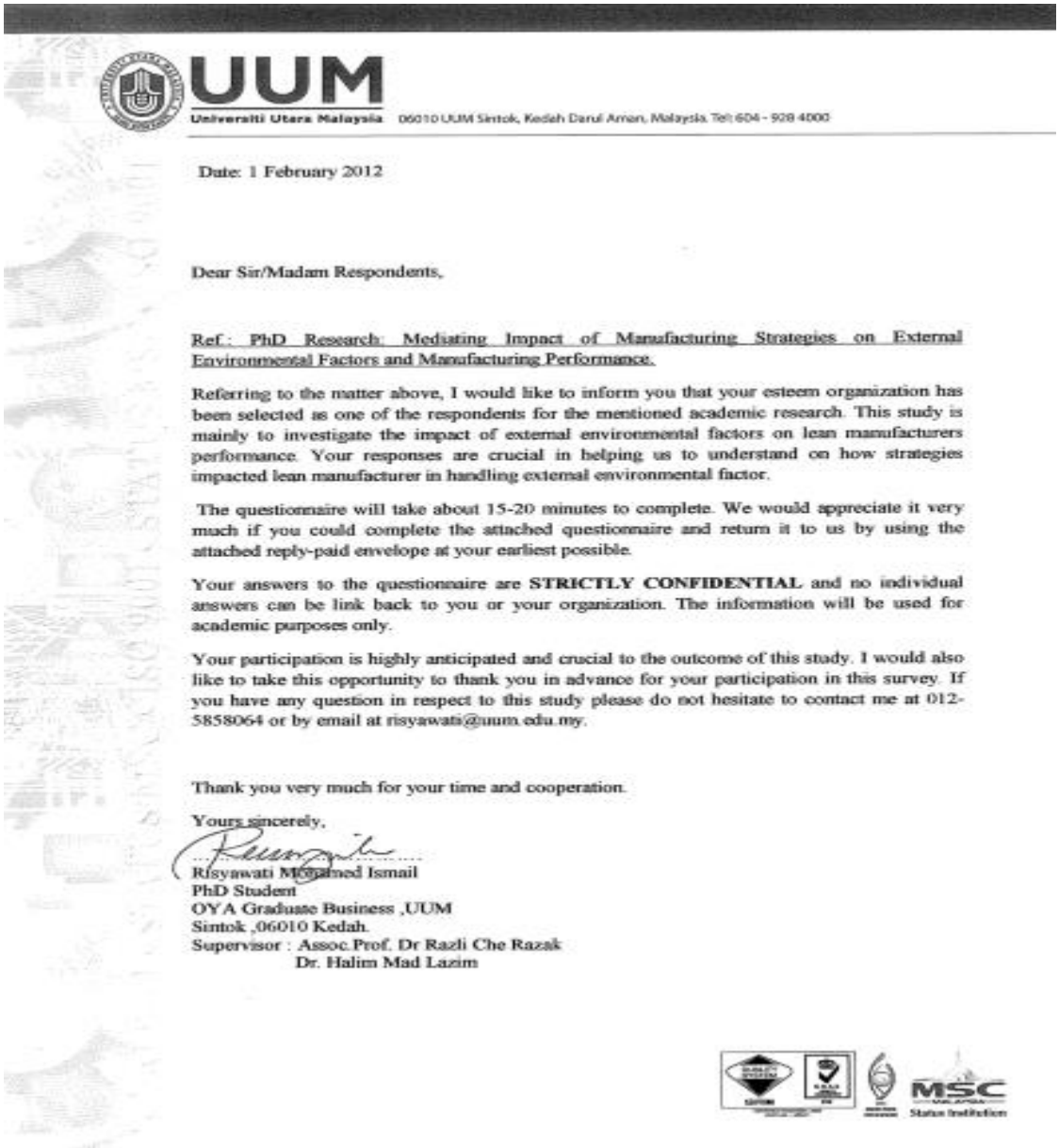
APPENDICES:

APPENDIX 1 – Survey Cover Letter



UUM
Universiti Utara Malaysia 06010 UUM Sintok, Kedah Darul Aman, Malaysia. Tel: 604 - 928 4000

Date: 1 February 2012

Dear Sir/Madam Respondents,

Ref.: PhD Research: Mediating Impact of Manufacturing Strategies on External Environmental Factors and Manufacturing Performance.

Referring to the matter above, I would like to inform you that your esteem organization has been selected as one of the respondents for the mentioned academic research. This study is mainly to investigate the impact of external environmental factors on lean manufacturers performance. Your responses are crucial in helping us to understand on how strategies impacted lean manufacturer in handling external environmental factor.

The questionnaire will take about 15-20 minutes to complete. We would appreciate it very much if you could complete the attached questionnaire and return it to us by using the attached reply-paid envelope at your earliest possible.

Your answers to the questionnaire are **STRICTLY CONFIDENTIAL** and no individual answers can be link back to you or your organization. The information will be used for academic purposes only.

Your participation is highly anticipated and crucial to the outcome of this study. I would also like to take this opportunity to thank you in advance for your participation in this survey. If you have any question in respect to this study please do not hesitate to contact me at 012-5858064 or by email at risyawati@uum.edu.my.

Thank you very much for your time and cooperation.

Yours sincerely,

Risyawati Mohamed Ismail
PhD Student
OYA Graduate Business ,UUM
Sintok ,06010 Kedah.
Supervisor : Assoc.Prof. Dr Razli Che Razak
Dr. Halim Mad Lazim

PART A : MANUFACTURING PERFORMANCE

The following questions are designed to measure your firm's performance . Please circle the answer that indicates your plant performance compares to your competitors in your industry on local or global basis.

		Low end of industry				*High end of industry*
FI	Profit	*1*	*2*	*3*	*4*	*5*
F2	Return on assets	*1*	*2*	*3*	*4*	*5*
F3	Sales revenue	*1*	*2*	*3*	*4*	*5*
F4	Cash flow	*1*	*2*	*3*	*4*	*5*
F5	Operating income	*1*	*2*	*3*	*4*	*5*
NF1.	Market share	*1*	*2*	*3*	*4*	*5*
NF2.	Sales growth	*1*	*2*	*3*	*4*	*5*
NF3.	Number of new product launched	*1*	*2*	*3*	*4*	*5*
NF4.	Time-to-market launches	*1*	*2*	*3*	*4*	*5*
NF5.	Quality of product performance	*1*	*2*	*3*	*4*	*5*

PART B : LEAN MANUFACTURING PRACTICE

The following questions are designed to measure lean implementation in your firm. Please circle the answer that indicates the implementation of lean in the following practices at your plant

		Strongly Disagree				*Strongly Agree*
L1.	We are in frequent contact with our suppliers	*1*	*2*	*3*	*4*	*5*
L2.	We often receive visits from our suppliers	*1*	*2*	*3*	*4*	*5*
L3.	We seldom visit our suppliers' plants	*1*	*2*	*3*	*4*	*5*
L4.	We give our suppliers feedback on quality and delivery performance	*1*	*2*	*3*	*4*	*5*
L5.	We strive to establish a long-term relationship with our suppliers	*1*	*2*	*3*	*4*	*5*
L6.	Suppliers are directly involved in the new product development process	*1*	*2*	*3*	*4*	*5*
L7.	Our key suppliers deliver to plant on JIT basis	*1*	*2*	*3*	*4*	*5*
L8	We have a formal supplier certification program	*1*	*2*	*3*	*4*	*5*
L9.	Our suppliers are contractually committed to annual cost reductions	*1*	*2*	*3*	*4*	*5*
L10.	We have corporate level communication on import issues with key suppliers	*1*	*2*	*3*	*4*	*5*
L11.	We take active steps to reduce the number of suppliers in each category	*1*	*2*	*3*	*4*	*5*
L12.	Our key suppliers manage our inventory	*1*	*2*	*3*	*4*	*5*

		Strongly Disagree				Strongly Agree
L13.	We evaluate suppliers on the basis of total cost of bulk purchasing and not per unit price of individual purchased item	1	2	3	4	5
L14.	We are frequently in close contact with our customers	1	2	3	4	5
L15.	Our customers give us feedback on quality and delivery performance	1	2	3	4	5
L16.	Our customers seldom visit our plants	1	2	3	4	5
L17.	Our customers give us feedback on quality and delivery performance	1	2	3	4	5
L18	Our customers are actively involved in current and future product offerings	1	2	3	4	5
L19.	Our customers are directly involved in the producing of current and future product offerings	1	2	3	4	5
L20.	Our customers frequently share current and future demand information with marketing department	1	2	3	4	5
L21.	We regularly conduct customer satisfaction surveys	1	2	3	4	5
L22.	Production is "pulled" by the shipment of finished goods	1	2	3	4	5
L23.	Production at stations is "pulled" by the current demand of the next station	1	2	3	4	5
L24.	We use 'pull" production system	1	2	3	4	5
L25.	We use Kanban, squares, or containers of signals for production control	1	2	3	4	5
L26	Products are classified into groups with similar processing requirement	1	2	3	4	5

		Strongly Disagree				Strongly Agree
L27	Products are classified into groups with similar routing requirement	1	2	3	4	5
L28	Equipment is grouped to produce a continuous flow of families of products	1	2	3	4	5
L29	Families of products determine our factory layout	1	2	3	4	5
L30	Pace of production is directly linked to the rate of customer demand	1	2	3	4	5
L31	Our employees practice setups to reduce the time required	1	2	3	4	5
L32	We are working to lower setup times in our factory	1	2	3	4	5
L33	We have a low set up time of equipment in our plants	1	2	3	4	5
L34	Long production cycle times delay respond to customer requests	1	2	3	4	5
L35	Long supply lead times prevent responding quickly to customer requests	1	2	3	4	5
L36	Large number of equipment/processes on shop floor are currently under SPC	1	2	3	4	5
L37	Extensive use of statistical techniques to reduce process variances	1	2	3	4	5
L38	Chart showing defect rates are used as tools on shop-floor	1	2	3	4	5
L39	We use fishbone type diagrams to identify causes of quality problems	1	2	3	4	5
L40	We conduct process capability studies before product launch	1	2	3	4	5
L41	Shop floor employees are key to problem solving teams	1	2	3	4	5

		Strongly Disagree				Strongly Agree
L42	Shop floor employees drive suggestion programs	1	2	3	4	5
L43	Shop floor employees lead product/process improvement efforts	1	2	3	4	5
L44	Shop floor employees undergo cross functional training	1	2	3	4	5
L45	We dedicate a portion of every day to planned equipment maintenance related activities	1	2	3	4	5
L46	We maintain all our equipment regularly	1	2	3	4	5
L47	We maintain excellent records of all equipment maintenance related activities	1	2	3	4	5
L48	We post equipment maintenance records on shop floor for active sharing with employees.	1	2	3	4	5

PART C : STRATEGIC FLEXIBILITY

These questions are designed to gauge the level of strategic flexibility in your firm. Please circle the answer that indicates the level of flexibility for the items in your plant.

		Strongly Disagree				*Strongly Agree*
SF1.	Our firm can quickly and easily respond to changes in customer demand	*1*	*2*	*3*	*4*	*5*
SF2.	Our firm can quickly and easily expand into new regional or international markets	*1*	*2*	*3*	*4*	*5*
SF3	Our firm can quickly and easily introduce new pricing schedules in response to changes in competitors' prices	*1*	*2*	*3*	*4*	*5*
SF4.	Our firm can quickly and easily react to new product launches by competitors	*1*	*2*	*3*	*4*	*5*
SF5.	Our firm can quickly and easily adopt new technologies to produce better, products	*1*	*2*	*3*	*4*	*5*
SF6.	Our firm can quickly and easily adopt new technologies to produce faster process	*1*	*2*	*3*	*4*	*5*
SF7.	Our firm can quickly and easily adopt new technologies to produce cheaper products	*1*	*2*	*3*	*4*	*5*
SF8.	Our firm can quickly and easily switch to new suppliers to avail of lower costs, better quality or improved delivery times.	*1*	*2*	*3*	*4*	*5*
SF9	Our major suppliers can quickly and easily respond to changing production volume	*1*	*2*	*3*	*4*	*5*
SF10	Our major suppliers can quickly and easily respond to changing production variety	*1*	*2*	*3*	*4*	*5*

		Strongly Disagree				Strongly Agree
SF11	Our firm can quickly and easily customize a product or service to suit an individual customer	1	2	3	4	5
SF12	Our firm can quickly and easily introduce new product to customer	1	2	3	4	5
SF13	Our firm can quickly and easily reduce the variety of products available for sale	1	2	3	4	5
SF14	Our firm can quickly and easily add the variety of products available for sale	1	2	3	4	5

PART D : MANUFACTURING TECHNOLGY

These questions are designed to gauge the usage of manufacturing technology in your firm. Please circle the answer that indicates the level of implementation for the following technology in your plant

		Strongly Disagree				Strongly Agree
MT1	We use Local Area Network for factory in our firm	1	2	3	4	5
MT2	We use Computers used for control on Factory Floor in our firm	1	2	3	4	5
MT3	We use Local Area Network for Technical Data in our firm	1	2	3	4	5
MT4	We use Computers for Production Scheduling in our firm	1	2	3	4	5
MT5	We use Electronic Data Interchange in our firm	1	2	3	4	5
MT6	We use Material Requirement Planning (MRP) and Manufacturing Resource Planning (MRP II) systems in our firm	1	2	3	4	5
MT7	We use Intercompany Networks in our firm	1	2	3	4	5
MT8	We use Automated Drafting Technologies in our firm	1	2	3	4	5

MT9	We use Computer Aided Design (CAD) in our firm	1	2	3	4	5
MT10	We use Computer Aided Engineering (CAE) in our firm	1	2	3	4	5
MT11	We use Computer Aided Quality Control Performed on final products in our firm	1	2	3	4	5
MT12	We use Computer Aided Inspection Performed on incoming or in process material in our firm	1	2	3	4	5
MT13	We use Robots others than 'Pick and Place'in our firm	1	2	3	4	5
MT14	We use 'Pick and Place' Robots	1	2	3	4	5
MT15	We use Manufacturing Automation Protocol in our firm	1	2	3	4	5
MT16	We use Numerical Control(NC)/ Computerized Numerical Control (CNC) machines in our firm	1	2	3	4	5
MT17	We use programmable controllers in our firm	1	2	3	4	5
MT18	We use Computer Aided Design (CAD)/ Computer Aided Manufacturing(CAM) in our firm	1	2	3	4	5
MT19	We use Flexible Manufacturing System (FMS) in our firm	1	2	3	4	5

PART E : ENVIRONMENTAL FACTORS

The following questions are designed to assess environmental factors that surrounded your firm's operation. Please circle the appropriate answer that best describe your firm's operating environment.

PART 1 : ENVIRONMENTAL DYNAMISM

		Strongly Disagree				*Strongly Agree*
ED1	Our firm rarely changes its marketing practices to keep up with competitors	*1*	*2*	*3*	*4*	*5*
ED2	There is a high obsolescence rate for our products	*1*	*2*	*3*	*4*	*5*
ED3	Our competitors action are easily predicted	*1*	*2*	*3*	*4*	*5*
ED4	Our customers' demand are easily forecast	*1*	*2*	*3*	*4*	*5*
ED5	The rate of process technology innovation in our industry is high	*1*	*2*	*3*	*4*	*5*

PART 2 : ENVIRONMENTAL HOSTILITY

		Strongly Disagree				*Strongly Agree*
EH1	Our overall business environment is threatening	*1*	*2*	*3*	*4*	*5*
EH2	There is tough price competition in our industry	*1*	*2*	*3*	*4*	*5*
EH3	There is competition in product quality in our industry	*1*	*2*	*3*	*4*	*5*
EH4	There is scarce supply of labor in our industry	*1*	*2*	*3*	*4*	*5*
EH5	The market is dwindling for our product	*1*	*2*	*3*	*4*	*5*
EH6	There is a scarce supply of material	*1*	*2*	*3*	*4*	*5*
EH7	There is no government interference in our industry	*1*	*2*	*3*	*4*	*5*

PART F : DEMOGRAFIC INFORMATION

1. What is the main product produced by this company?

☐ Electrical ☐ Electronic ☐ Aeronautical

☐ Automotive

2. Number of full time employees in this company:

☐ <50 ☐ 51-150 ☐ 151 and more

3. Annual sales turnover (in RM)

☐ Less than RM10 millions

☐ RM10 - RM25millions ☐ More than RM25 millions

4. Types of company

☐ Multinational Corporation (MNC)

☐ Joint ventures ☐ Locally owned

5. How long have you firm been implementing lean ?

☐ Never implement ☐ < 1 year

☐ 1 -3 years ☐ More than 3 years

6. What is your position in the company?

☐ Engineers/Executives ☐ Junior Manager

☐ Middle Manager ☐ Senior Managers

7. What department are you attached to?

☐ Maintenance /Engineering ☐ Production

☐ Quality (QA/QC) ☐ Operation

☐ Others. Please state: _____

8. How long have you been with the company?

☐ < 1 year ☐ 1-3 years ☐ More than 3 years

9. Types of process. You can choose **more** than 1 answer.

☐ Job shop ☐ Batch

☐ Continuous flow ☐ Project

☐ Others .Please state:_____

10. Number of product produced.

☐ One ☐ Two

☐ Three and more

APPENDIX III - Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
F1	.213	85	.000	.895	85	.000
F2	.265	85	.000	.862	85	.000
F3	.231	85	.000	.884	85	.000
F4	.248	85	.000	.882	85	.000
F5	.269	85	.000	.858	85	.000
NF1	.247	85	.000	.883	85	.000
NF2	.258	85	.000	.851	85	.000
NF3	.228	85	.000	.863	85	.000
NF4	.235	85	.000	.896	85	.000
NF5	.263	85	.000	.880	85	.000
SUPP1	.227	85	.000	.882	85	.000
SUPP2	.243	85	.000	.874	85	.000
SUPP3	.170	85	.000	.902	85	.000
SUPP4	.277	85	.000	.734	85	.000
SUPP5	.278	85	.000	.735	85	.000
SUPP6	.200	85	.000	.904	85	.000
JIT1	.209	85	.000	.894	85	.000
JIT2	.230	85	.000	.887	85	.000
JIT3	.198	85	.000	.906	85	.000
JIT4	.238	85	.000	.890	85	.000
JIT5	.224	85	.000	.890	85	.000
JIT6	.184	85	.000	.901	85	.000
JIT7	.193	85	.000	.909	85	.000
CUSTINV1	.238	85	.000	.821	85	.000
CUSTINV2	.185	85	.000	.899	85	.000
CUSTINV3	.202	85	.000	.898	85	.000
CUSTINV4	.282	85	.000	.824	85	.000
CUSTINV5	.245	85	.000	.869	85	.000
CUSTINV6	.249	85	.000	.887	85	.000
CUSTINV7	.244	85	.000	.890	85	.000
CUSTINV8	.215	85	.000	.880	85	.000
PULL1	.245	85	.000	.868	85	.000
PULL2	.268	85	.000	.832	85	.000
PULL3	.219	85	.000	.871	85	.000
PULL4	.240	85	.000	.857	85	.000
FLOW1	.245	85	.000	.870	85	.000
FLOW2	.228	85	.000	.888	85	.000
FLOW3	.282	85	.000	.832	85	.000
FLOW4	.291	85	.000	.857	85	.000
FLOW5	.246	85	.000	.858	85	.000

Normality test (Continued)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	**Sig.**	Statistic	df	**Sig.**
SETUP1	.256	85	.000	.837	85	.000
SETUP2	.286	85	.000	.843	85	.000
SETUP3	.207	85	.000	.894	85	.000
SETUP4	.164	85	.000	.891	85	.000
SETUP5	.224	85	.000	.879	85	.000
SPC1	.195	85	.000	.914	85	.000
SPC2	.208	85	.000	.907	85	.000
SPC3	.204	85	.000	.889	85	.000
SPC4	.220	85	.000	.866	85	.000
SPC5	.249	85	.000	.837	85	.000
EMPINV1	.273	85	.000	.851	85	.000
EMPINV2	.337	85	.000	.798	85	.000
EMPINV3	.355	85	.000	.782	85	.000
EMPINV4	.320	85	.000	.812	85	.000
TPM1	.287	85	.000	.849	85	.000
TPM2	.255	85	.000	.823	85	.000
TPM3	.289	85	.000	.807	85	.000
TPM4	.255	85	.000	.859	85	.000
CAPCHA1	.289	85	.000	.835	85	.000
CAPCHA2	.197	85	.000	.904	85	.000
CAPCHA3	.211	85	.000	.902	85	.000
CAPCHA4	.200	85	.000	.903	85	.000
PROEFF1	.297	85	.000	.847	85	.000
PROEFF2	.246	85	.000	.856	85	.000
PROEFF3	.195	85	.000	.890	85	.000
PROEFF4	.232	85	.000	.893	85	.000
PROEFF5	.183	85	.000	.910	85	.000
PROEFF6	.182	85	.000	.910	85	.000
PRODEV1	.201	85	.000	.902	85	.000
PRODEV2	.206	85	.000	.910	85	.000
PRODEV3	.237	85	.000	.878	85	.000
PRODEV4	.206	85	.000	.909	85	.000
IEPT1	.280	85	.000	.741	85	.000
IEPT2	.254	85	.000	.814	85	.000
IEPT3	.209	85	.000	.827	85	.000
IEPT4	.259	85	.000	.785	85	.000
IEPT5	.216	85	.000	.838	85	.000
IEPT6	.225	85	.000	.812	85	.000
IEPT7	.183	85	.000	.852	85	.000
PD1	.163	85	.000	.882	85	.000
PD2	.226	85	.000	.811	85	.000

Normality test (Continued)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	**Sig.**	Statistic	df	**Sig.**
PD3	.200	85	.000	.843	85	.000
HVAT1	.195	85	.000	.853	85	.000
HVAT2	.156	85	.000	.887	85	.000
HVAT3	.182	85	.000	.891	85	.000
HVAT4	.154	85	.000	.888	85	.000
HVAT5	.157	85	.000	.889	85	.000
LVAT1	.216	85	.000	.851	85	.000
LVAT2	.203	85	.000	.835	85	.000
LVAT3	.205	85	.000	.827	85	.000
LVAT4	.185	85	.000	.890	85	.000
ED1	.183	85	.000	.908	85	.000
ED2	.204	85	.000	.903	85	.000
ED3	.243	85	.000	.892	85	.000
ED4	.201	85	.000	.898	85	.000
ED5	.249	85	.000	.876	85	.000
EH1	.279	85	.000	.850	85	.000
EH2	.284	85	.000	.838	85	.000
EH3	.284	85	.000	.836	85	.000
EH4	.201	85	.000	.903	85	.000
EH5	.261	85	.000	.865	85	.000
EH6	.224	85	.000	.887	85	.000
EH7	.194	85	.000	.903	85	.000

APPENDIX IV – Descriptive statistic and skewness test result

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
F1	85	1	5	3.46	0.101	0.933	-0.148	0.261
F2	85	1	5	3.39	0.092	0.846	-0.122	0.261
F3	85	1	5	3.44	0.097	0.892	-0.367	0.261
F4	85	1	5	3.4	0.098	0.902	-0.092	0.261
F5	85	1	5	3.34	0.085	0.78	-0.069	0.261
NF1	85	1	5	3.45	0.098	0.906	-0.428	0.261
NF2	85	1	5	3.34	0.089	0.825	-0.583	0.261
NF3	85	1	5	3.21	0.09	0.832	-0.418	0.261
NF4	85	1	5	3.13	0.106	0.973	-0.107	0.261
NF5	85	1	5	3.45	0.115	1.064	-0.618	0.261
SUPP1	85	1	5	3.68	0.117	1.082	-0.485	0.261
SUPP2	85	1	5	3.46	0.104	0.958	-0.629	0.261
SUPP3	85	1	5	3.29	0.134	1.233	-0.272	0.261
SUPP4	85	1	5	4.25	0.09	0.83	-0.647	0.261
SUPP5	85	1	5	4.24	0.086	0.797	-0.61	0.261
SUPP6	85	1	5	3.34	0.118	1.086	-0.208	0.261
JIT1	85	1	5	3.46	0.1	0.92	-0.111	0.261
JIT2	85	1	5	3.32	0.132	1.217	-0.516	0.261
JIT3	85	1	5	3.25	0.108	0.999	-0.152	0.261
JIT4	85	1	5	3.55	0.117	1.075	-0.553	0.261
JIT5	85	1	5	3.2	0.097	0.897	0.097	0.261
JIT6	85	1	5	2.56	0.123	1.139	0.183	0.261
JIT7	85	1	5	3.24	0.121	1.12	-0.221	0.261
CUSTINV1	85	1	5	4.11	0.09	0.831	-0.839	0.261
CUSTINV2	85	1	5	3	0.145	1.336	0.031	0.261
CUSTINV3	85	1	5	3.18	0.121	1.115	-0.411	0.261
CUSTINV4	85	1	5	3.99	0.101	0.932	-0.86	0.261
CUSTINV5	85	2	5	3.78	0.098	0.905	-0.328	0.261
CUSTINV6	85	1	5	3.61	0.11	1.013	-0.488	0.261
CUSTINV7	85	1	5	3.46	0.118	1.086	-0.548	0.261
CUSTINV8	85	1	5	3.72	0.117	1.076	-0.585	0.261
PULL1	85	1	5	3.75	0.108	0.999	-0.729	0.261
PULL2	85	1	5	3.73	0.095	0.878	-0.841	0.261
PULL3	85	1	5	3.73	0.108	0.993	-0.625	0.261
PULL4	85	1	5	3.68	0.13	1.197	-0.806	0.261
FLOW1	85	1	5	3.71	0.115	1.056	-0.748	0.261
FLOW2	85	1	5	3.56	0.121	1.117	-0.585	0.261
FLOW3	85	1	5	3.73	0.116	1.073	-0.833	0.261
FLOW4	85	1	5	3.62	0.111	1.023	-0.821	0.261
FLOW5	85	1	5	3.75	0.122	1.122	-0.839	0.261

APPENDIX IV (Continued)

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
SETUP1	85	1	5	3.76	0.118	1.087	-0.994	0.261
SETUP2	85	1	5	3.79	0.114	1.048	-0.961	0.261
SETUP3	85	1	5	3.38	0.113	1.046	-0.302	0.261
SETUP4	85	1	5	3.36	0.139	1.28	-0.37	0.261
SETUP5	85	1	5	3.48	0.137	1.259	-0.582	0.261
SPC1	85	1	5	3.09	0.117	1.076	-0.132	0.261
SPC2	85	1	5	3.29	0.12	1.111	-0.343	0.261
SPC3	85	1	5	3.61	0.118	1.092	-0.518	0.261
SPC4	85	1	5	3.76	0.119	1.098	-0.731	0.261
SPC5	85	1	5	3.74	0.123	1.135	-0.97	0.261
EMPINV1	85	1	5	3.76	0.112	1.031	-0.911	0.261
EMPINV2	85	1	5	3.58	0.1	0.918	-0.83	0.261
EMPINV3	85	1	5	3.55	0.101	0.932	-0.951	0.261
EMPINV4	85	1	5	3.65	0.1	0.922	-0.899	0.261
TPM1	85	1	5	3.27	0.1	0.918	-0.097	0.261
TPM2	85	2	5	4.08	0.079	0.727	-0.318	0.261
TPM3	85	2	5	4.06	0.074	0.679	-0.306	0.261
TPM4	85	1	5	3.59	0.104	0.955	-0.763	0.261
CAPCHA1	85	2	5	3.95	0.085	0.785	-0.52	0.261
CAPCHA2	85	1	5	3.44	0.115	1.063	-0.345	0.261
CAPCHA3	85	1	5	3.32	0.11	1.014	-0.188	0.261
CAPCHA4	85	1	5	3.29	0.112	1.033	-0.357	0.261
PROEFF1	85	1	5	3.56	0.105	0.969	-0.87	0.261
PROEFF2	85	1	5	3.61	0.103	0.952	-0.752	0.261
PROEFF3	85	1	5	3.46	0.109	1.007	-0.387	0.261
PROEFF4	85	1	5	3.35	0.117	1.077	-0.516	0.261
PROEFF5	85	1	5	3.33	0.115	1.062	-0.211	0.261
PROEFF6	85	1	5	3.32	0.115	1.06	-0.181	0.261
PRODEV1	85	1	5	3.48	0.118	1.087	-0.381	0.261
PRODEV2	85	1	5	3.09	0.114	1.054	-0.192	0.261
PRODEV3	85	1	5	3.41	0.104	0.955	-0.582	0.261
PRODEV4	85	1	5	3.29	0.122	1.121	-0.245	0.261
IEPT1	85	1	5	3.91	0.148	1.368	-0.926	0.261
IEPT2	85	1	5	3.72	0.146	1.342	-0.919	0.261
IEPT3	85	1	5	3.72	0.143	1.315	-0.842	0.261
IEPT4	85	1	5	3.82	0.143	1.32	-0.898	0.261
IEPT5	85	1	5	3.48	0.157	1.444	-0.607	0.261
IEPT6	85	1	5	3.53	0.16	1.477	-0.706	0.261
IEPT7	85	1	5	3.49	0.151	1.394	-0.568	0.261
PD1	85	1	5	3.27	0.148	1.366	-0.334	0.261
PD2	85	1	5	3.78	0.143	1.322	-0.938	0.261

APPENDIX IV (Continued)

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
PD3	85	1	5	3.6	0.148	1.365	-0.647	0.261
HVAT1	85	1	5	3.49	0.15	1.385	-0.593	0.261
HVAT2	85	1	5	3.27	0.148	1.366	-0.22	0.261
HVAT3	85	1	5	3.13	0.15	1.387	-0.182	0.261
HVAT4	85	1	5	3.04	0.152	1.401	-0.117	0.261
HVAT5	85	1	5	3.12	0.15	1.384	-0.05	0.261
LVAT1	85	1	5	3.39	0.16	1.473	-0.291	0.261
LVAT2	85	1	5	3.72	0.141	1.297	-0.797	0.261
LVAT3	85	1	5	3.68	0.146	1.347	-0.803	0.261
LVAT4	85	1	5	3.26	0.139	1.283	-0.224	0.261
ED1	85	1	5	3.01	0.13	1.2	-0.192	0.261
ED2	85	1	5	2.72	0.112	1.031	0.262	0.261
ED3	85	1	5	3.06	0.1	0.917	-0.024	0.261
ED4	85	1	5	3.18	0.101	0.928	-0.18	0.261
ED5	85	1	5	3.22	0.098	0.905	-0.264	0.261
EH1	85	1	5	3.11	0.103	0.951	-0.641	0.261
EH2	85	1	5	3.8	0.109	1.009	-0.907	0.261
EH3	85	1	5	3.78	0.106	0.98	-0.908	0.261
EH4	85	1	5	3.42	0.111	1.028	-0.193	0.261
EH5	85	1	5	2.88	0.116	1.074	-0.47	0.261
EH6	85	1	5	2.6	0.115	1.06	-0.115	0.261
EH7	85	1	5	2.66	0.124	1.14	0.215	0.261
CONTROL	85	1	2	1.54	0.054	0.501	-0.168	0.261
Valid N (listwise)	85							

APPENDIX V – Results of Cross loadings on constructs

	ED	EH	F	NF	FLOW	EMPINV	JIT	PULL	SETUP	SPC
ED1	**0.760**	0.467	0.120	0.045	-0.140	-0.239	-0.102	0.005	-0.186	-0.190
ED2	**0.812**	0.438	0.286	0.278	-0.262	-0.233	-0.083	0.042	-0.199	-0.181
ED3	**0.780**	0.323	0.325	0.319	-0.223	-0.205	-0.203	0.021	-0.229	-0.209
ED4	**0.739**	0.166	0.264	0.184	-0.331	-0.296	-0.180	-0.069	-0.243	-0.251
EH4	0.212	**0.700**	0.054	0.063	-0.195	-0.204	-0.058	0.133	-0.166	-0.151
EH6	0.177	**0.501**	0.192	0.175	0.212	0.298	0.228	0.143	0.276	0.283
EH7	0.491	**0.873**	0.144	0.122	-0.282	-0.248	-0.081	0.027	-0.330	-0.326
F1	0.346	0.154	**0.871**	0.672	0.070	0.175	0.216	0.316	0.164	0.161
F2	0.289	0.128	**0.881**	0.615	0.241	0.279	0.302	0.408	0.278	0.174
F3	0.209	0.087	**0.823**	0.620	0.185	0.213	0.361	0.431	0.226	0.255
F4	0.274	0.188	**0.868**	0.644	0.207	0.280	0.272	0.338	0.206	0.114
F5	0.251	0.177	**0.845**	0.622	0.154	0.237	0.246	0.369	0.107	0.118
NF1	0.251	0.139	0.682	**0.806**	0.090	0.190	0.303	0.284	0.142	0.145
NF2	0.093	0.097	0.657	**0.822**	0.132	0.133	0.236	0.339	0.096	0.104
NF3	0.284	0.229	0.591	**0.702**	0.144	0.254	0.299	0.285	0.271	0.203
NF4	0.140	0.048	0.539	**0.768**	0.183	0.329	0.387	0.249	0.309	0.231
NF5	0.269	0.090	0.654	**0.759**	0.142	0.305	0.296	0.353	0.271	0.233
FLOW1	-0.229	-0.205	0.202	0.113	**0.872**	0.668	0.439	0.537	0.612	0.585
FLOW2	-0.212	-0.135	0.126	0.112	**0.865**	0.599	0.465	0.482	0.523	0.511
FLOW3	-0.301	-0.163	0.201	0.220	**0.887**	0.705	0.567	0.494	0.701	0.658
FLOW4	-0.281	-0.170	0.158	0.216	**0.854**	0.728	0.545	0.405	0.617	0.596
FLOW5	-0.277	-0.219	0.163	0.083	**0.812**	0.602	0.481	0.462	0.646	0.553
EMPINV1	-0.238	-0.087	0.372	0.358	0.753	**0.872**	0.616	0.556	0.767	0.710
EMPINV2	-0.311	-0.231	0.258	0.266	0.670	**0.921**	0.620	0.340	0.634	0.710
EMPINV3	-0.248	-0.112	0.202	0.256	0.730	**0.920**	0.605	0.392	0.696	0.647
EMPINV4	-0.326	-0.167	0.141	0.218	0.598	**0.865**	0.532	0.315	0.659	0.677
JIT1	-0.075	0.111	0.224	0.261	0.359	0.355	**0.736**	0.358	0.387	0.282
JIT2	-0.157	0.057	0.187	0.279	0.632	0.717	**0.807**	0.425	0.633	0.620
JIT3	0.045	0.070	0.218	0.334	0.211	0.356	**0.737**	0.199	0.361	0.376
JIT4	-0.345	-0.227	0.264	0.288	0.573	0.672	**0.770**	0.388	0.710	0.681
JIT5	-0.012	-0.074	0.272	0.257	0.309	0.316	**0.695**	0.320	0.345	0.371
JIT6	-0.111	0.079	0.310	0.336	0.303	0.439	**0.655**	0.169	0.311	0.415

APPENDIX V (Continued)

	ED	EH	F	NF	FLOW	EMPINV	JIT	PULL	SETUP	SPC
PULL1	0.183	0.229	0.248	0.194	0.232	0.069	0.264	**0.628**	0.278	0.060
PULL2	0.277	0.199	0.456	0.300	0.193	0.074	0.185	**0.734**	0.175	0.101
PULL3	0.220	0.207	0.503	0.433	0.240	0.128	0.240	**0.833**	0.260	0.174
PULL4	-0.264	-0.069	0.236	0.276	0.659	0.646	0.460	**0.788**	0.588	0.674
SETUP1	-0.311	-0.123	0.198	0.231	0.732	0.745	0.566	0.577	**0.880**	0.693
SETUP2	-0.315	-0.258	0.204	0.279	0.634	0.739	0.545	0.470	**0.882**	0.656
SETUP3	-0.116	-0.215	0.305	0.282	0.588	0.704	0.643	0.386	**0.810**	0.678
SETUP4	-0.167	-0.095	0.184	0.227	0.486	0.492	0.486	0.354	**0.788**	0.553
SETUP5	-0.223	-0.181	0.053	0.125	0.568	0.506	0.544	0.376	**0.833**	0.536
SPC1	-0.145	-0.092	0.204	0.252	0.405	0.530	0.501	0.351	0.666	**0.733**
SPC2	-0.211	-0.200	0.225	0.149	0.404	0.611	0.527	0.311	0.531	**0.839**
SPC3	-0.154	-0.148	0.130	0.143	0.654	0.683	0.565	0.388	0.687	**0.868**
SPC4	-0.280	-0.233	0.163	0.260	0.698	0.765	0.595	0.482	0.701	**0.847**
SPC5	-0.303	-0.153	0.104	0.178	0.630	0.717	0.565	0.481	0.660	**0.896**
SUPP1	0.025	0.056	0.612	0.573	0.270	0.463	0.332	0.411	0.376	0.414
SUPP2	-0.044	-0.046	0.310	0.261	0.298	0.349	0.416	0.326	0.382	0.249
SUPP4	-0.170	-0.078	0.256	0.289	0.345	0.367	0.355	0.467	0.402	0.339
SUPP5	-0.111	0.026	0.387	0.350	0.373	0.393	0.414	0.549	0.452	0.322
SUPP6	0.023	0.195	0.215	0.327	0.209	0.323	0.552	0.235	0.335	0.239
CUSTINV4	-0.130	-0.028	0.153	0.199	0.434	0.462	0.264	0.330	0.407	0.392
CUSTINV5	-0.076	-0.113	0.212	0.240	0.506	0.386	0.322	0.350	0.252	0.267
CUSTINV6	0.012	-0.036	0.090	0.199	0.408	0.304	0.337	0.315	0.279	0.301
CUSTINV7	-0.299	-0.242	-0.037	-0.079	0.589	0.535	0.455	0.269	0.494	0.447
TPM1	-0.246	-0.196	0.018	-0.025	0.500	0.556	0.477	0.299	0.605	0.547
TPM4	-0.244	-0.085	0.170	0.242	0.569	0.715	0.537	0.255	0.590	0.667
HVAT1	0.162	-0.153	0.440	0.376	0.108	0.145	0.223	0.163	0.159	0.161
HVAT2	0.175	-0.089	0.503	0.395	0.179	0.223	0.266	0.203	0.240	0.242
HVAT3	0.294	0.150	0.623	0.539	0.106	0.064	0.164	0.289	0.141	0.089
HVAT4	0.377	0.141	0.659	0.510	-0.019	0.020	0.126	0.201	0.061	0.090
HVAT5	0.144	0.019	0.547	0.498	0.174	0.175	0.249	0.213	0.215	0.131

APPENDIX V (Continued)

	ED	EH	F	NF	FLOW	EMPINV	JIT	PULL	SETUP	SPC
IEPT1	0.196	0.154	0.526	0.598	0.030	0.196	0.306	0.133	0.178	0.082
IEPT2	0.045	0.114	0.434	0.493	0.003	0.187	0.316	0.028	0.122	0.085
IEPT3	0.195	0.185	0.452	0.542	-0.045	0.088	0.261	0.024	0.019	0.066
IEPT4	0.234	0.158	0.547	0.571	-0.033	0.145	0.300	0.100	0.043	0.065
IEPT5	0.269	0.030	0.530	0.559	0.099	0.203	0.245	0.109	0.137	0.172
IEPT6	0.285	0.158	0.536	0.533	0.080	0.208	0.217	0.029	0.114	0.146
IEPT7	0.197	-0.036	0.452	0.392	0.201	0.172	0.238	0.219	0.236	0.178
LVAT1	0.154	0.033	0.448	0.304	0.213	0.142	0.211	0.128	0.129	0.138
LVAT2	0.172	0.010	0.490	0.326	0.156	0.140	0.236	0.118	0.130	0.155
LVAT3	0.192	-0.020	0.527	0.416	0.156	0.180	0.293	0.125	0.099	0.129
LVAT4	0.240	-0.004	0.519	0.414	0.212	0.120	0.220	0.169	0.158	0.185
PD1	0.226	-0.040	0.572	0.434	0.179	0.149	0.196	0.219	0.145	0.091
PD2	0.118	-0.138	0.521	0.438	0.167	0.268	0.380	0.162	0.168	0.145
PD3	0.210	-0.114	0.573	0.444	0.146	0.245	0.318	0.156	0.134	0.171
PRODEV1	-0.430	-0.467	0.168	0.068	0.536	0.567	0.402	0.286	0.488	0.586
PRODEV3	-0.314	-0.357	0.195	0.132	0.558	0.599	0.459	0.251	0.566	0.533
PRODEV4	-0.182	-0.356	0.297	0.162	0.598	0.573	0.541	0.262	0.533	0.467
PROEFF1	-0.357	-0.281	0.208	0.242	0.585	0.633	0.455	0.253	0.588	0.525
PROEFF2	-0.375	-0.288	0.133	0.098	0.629	0.630	0.474	0.253	0.575	0.510
PROEFF3	-0.279	-0.290	0.105	0.123	0.600	0.596	0.514	0.291	0.597	0.526
PROEFF4	-0.239	-0.324	0.200	0.159	0.535	0.601	0.560	0.278	0.590	0.507
PROEFF5	-0.403	-0.280	0.179	0.154	0.615	0.580	0.612	0.327	0.577	0.525
PROEFF6	-0.472	-0.384	0.050	0.015	0.594	0.546	0.489	0.292	0.495	0.492
CAPCHA1	0.054	-0.142	0.315	0.316	0.153	0.284	0.191	0.243	0.296	0.233
CAPCHA2	-0.251	-0.307	0.208	0.166	0.542	0.565	0.388	0.332	0.578	0.489
CAPCHA3	-0.297	-0.287	0.181	0.052	0.539	0.519	0.328	0.260	0.497	0.390
CAPCHA4	-0.296	-0.351	0.206	0.237	0.459	0.564	0.401	0.302	0.567	0.464

APPENDIX V (Continued)

	SUPP	CUSTINV	TPM	HVAT	IEPT	LVAT	PD	PRODEV	PROEFF	CAPCHA
ED1	-0.114	-0.110	-0.210	0.079	0.073	0.087	-0.016	-0.336	-0.343	-0.326
ED2	-0.020	-0.066	-0.190	0.251	0.317	0.231	0.181	-0.370	-0.377	-0.274
ED3	0.002	-0.174	-0.305	0.254	0.213	0.172	0.239	-0.211	-0.283	-0.088
ED4	-0.132	-0.221	-0.190	0.256	0.169	0.174	0.258	-0.148	-0.283	-0.068
EH4	-0.015	-0.170	-0.235	-0.028	-0.020	-0.049	-0.214	-0.245	-0.225	-0.163
EH6	0.123	0.158	0.323	0.165	0.195	0.102	0.052	-0.039	0.062	0.008
EH7	0.011	-0.185	-0.234	-0.026	0.120	-0.006	-0.054	-0.509	-0.437	-0.398
F1	0.424	0.128	0.068	0.686	0.544	0.555	0.611	0.196	0.085	0.248
F2	0.542	0.175	0.121	0.674	0.543	0.618	0.629	0.260	0.201	0.225
F3	0.435	0.084	0.110	0.506	0.449	0.474	0.519	0.198	0.209	0.170
F4	0.368	0.112	0.116	0.442	0.458	0.385	0.475	0.212	0.140	0.258
F5	0.321	0.026	0.100	0.471	0.482	0.360	0.409	0.215	0.112	0.195
NF1	0.351	0.068	0.060	0.526	0.546	0.409	0.431	0.071	0.083	0.105
NF2	0.341	0.103	0.021	0.381	0.499	0.345	0.362	0.064	0.104	0.126
NF3	0.275	0.066	0.122	0.410	0.477	0.282	0.313	0.062	0.138	0.173
NF4	0.516	0.267	0.182	0.371	0.446	0.242	0.352	0.176	0.223	0.217
NF5	0.420	0.131	0.180	0.413	0.480	0.305	0.421	0.168	0.073	0.211
FLOW1	0.342	0.444	0.570	0.086	0.075	0.147	0.149	0.598	0.630	0.490
FLOW2	0.279	0.559	0.513	0.051	0.011	0.136	0.073	0.464	0.501	0.370
FLOW3	0.341	0.507	0.608	0.132	0.092	0.196	0.180	0.495	0.582	0.432
FLOW4	0.405	0.645	0.572	0.143	0.082	0.160	0.210	0.538	0.609	0.397
FLOW5	0.399	0.581	0.455	0.142	0.013	0.248	0.161	0.680	0.695	0.535
EMPINV1	0.516	0.512	0.629	0.175	0.307	0.157	0.237	0.600	0.634	0.596
EMPINV2	0.480	0.504	0.705	0.205	0.191	0.218	0.295	0.642	0.657	0.503
EMPINV3	0.494	0.552	0.666	0.112	0.169	0.212	0.235	0.591	0.669	0.441
EMPINV4	0.350	0.432	0.728	0.032	0.068	-0.016	0.092	0.537	0.577	0.539
JIT1	0.387	0.382	0.359	0.171	0.193	0.160	0.234	0.274	0.380	0.280
JIT2	0.513	0.520	0.592	0.056	0.203	0.177	0.203	0.483	0.574	0.375
JIT3	0.366	0.189	0.339	0.153	0.250	0.170	0.231	0.288	0.305	0.145
JIT4	0.457	0.342	0.569	0.243	0.247	0.267	0.281	0.565	0.583	0.364
JIT5	0.327	0.256	0.262	0.240	0.210	0.196	0.250	0.295	0.305	0.191
JIT6	0.340	0.207	0.397	0.263	0.350	0.224	0.267	0.330	0.427	0.294

APPENDIX V (Continued)

	SUPP	CUSTINV	TPM	HVAT	IEPT	LVAT	PD	PRODEV	PROEFF	CAPCHA
PULL1	0.342	0.213	0.022	0.080	0.008	0.095	0.090	0.068	0.048	0.105
PULL2	0.387	0.199	-0.037	0.285	0.096	0.189	0.261	0.008	-0.012	0.103
PULL3	0.431	0.199	0.042	0.321	0.137	0.212	0.257	0.084	0.118	0.198
PULL4	0.458	0.436	0.529	0.140	0.087	0.053	0.090	0.443	0.490	0.392
SETUP1	0.506	0.462	0.659	0.134	0.049	0.102	0.085	0.563	0.620	0.493
SETUP2	0.541	0.438	0.648	0.208	0.151	0.162	0.232	0.634	0.624	0.566
SETUP3	0.444	0.439	0.666	0.301	0.196	0.263	0.313	0.608	0.597	0.577
SETUP4	0.355	0.278	0.447	0.134	0.213	0.074	0.048	0.301	0.439	0.382
SETUP5	0.360	0.368	0.500	0.012	0.030	-0.015	-0.021	0.378	0.533	0.393
SPC1	0.259	0.196	0.576	0.267	0.188	0.138	0.124	0.373	0.386	0.381
SPC2	0.408	0.318	0.576	0.238	0.130	0.187	0.193	0.523	0.434	0.338
SPC3	0.320	0.432	0.629	0.113	0.057	0.139	0.118	0.550	0.541	0.396
SPC4	0.394	0.536	0.642	0.032	0.136	0.107	0.091	0.563	0.616	0.474
SPC5	0.408	0.425	0.609	0.101	0.106	0.157	0.118	0.505	0.546	0.387
SUPP1	**0.663**	0.295	0.255	0.387	0.490	0.302	0.364	0.339	0.241	0.346
SUPP2	**0.683**	0.398	0.256	0.183	0.219	0.257	0.295	0.371	0.344	0.216
SUPP4	**0.821**	0.471	0.252	0.104	0.066	0.047	0.100	0.385	0.295	0.166
SUPP5	**0.886**	0.409	0.219	0.280	0.199	0.159	0.246	0.379	0.270	0.267
SUPP6	**0.580**	0.377	0.241	0.190	0.263	0.167	0.261	0.205	0.200	0.208
CUSTINV4	0.529	**0.669**	0.282	0.163	0.147	0.202	0.222	0.362	0.327	0.271
CUSTINV5	0.337	**0.828**	0.216	0.226	0.208	0.239	0.287	0.342	0.422	0.381
CUSTINV6	0.328	**0.819**	0.245	0.114	0.091	0.070	0.099	0.284	0.335	0.324
CUSTINV7	0.425	**0.779**	0.500	-0.070	-0.091	-0.083	-0.040	0.503	0.488	0.389
TPM1	0.154	0.245	**0.813**	-0.017	-0.039	-0.051	0.049	0.522	0.482	0.406
TPM4	0.386	0.450	**0.874**	0.176	0.211	0.204	0.210	0.444	0.532	0.429
HVAT1	0.235	0.129	0.115	**0.788**	0.433	0.698	0.710	0.272	0.253	0.290
HVAT2	0.298	0.172	0.172	**0.880**	0.494	0.674	0.719	0.336	0.267	0.321
HVAT3	0.263	0.091	0.023	**0.850**	0.536	0.645	0.572	0.113	0.090	0.127
HVAT4	0.217	0.030	0.034	**0.858**	0.560	0.630	0.615	0.162	0.068	0.163
HVAT5	0.312	0.112	0.097	**0.877**	0.564	0.757	0.707	0.224	0.215	0.205

APPENDIX V (Continued)

	SUPP	CUSTINV	TPM	HVAT	IEPT	LVAT	PD	PRODEV	PROEFF	CAPCHA
IEPT1	0.393	0.119	0.088	0.364	**0.835**	0.367	0.408	0.021	0.089	0.157
IEPT2	0.295	0.072	0.116	0.404	**0.854**	0.392	0.418	0.121	0.176	0.214
IEPT3	0.254	0.082	0.026	0.381	**0.891**	0.445	0.418	0.013	0.056	0.095
IEPT4	0.274	0.072	0.079	0.390	**0.841**	0.373	0.440	0.091	0.116	0.139
IEPT5	0.226	0.080	0.147	0.655	**0.877**	0.664	0.652	0.159	0.159	0.282
IEPT6	0.211	0.015	0.134	0.640	**0.867**	0.649	0.632	0.071	0.085	0.178
IEPT7	0.300	0.147	0.056	0.731	**0.623**	0.650	0.640	0.212	0.197	0.191
LVAT1	0.165	0.111	0.035	0.702	0.473	**0.880**	0.657	0.251	0.223	0.124
LVAT2	0.216	0.097	0.088	0.713	0.604	**0.926**	0.715	0.261	0.247	0.180
LVAT3	0.236	0.021	0.109	0.665	0.594	**0.883**	0.846	0.226	0.229	0.230
LVAT4	0.263	0.216	0.133	0.758	0.554	**0.849**	0.689	0.251	0.233	0.207
PD1	0.286	0.177	0.080	0.721	0.594	0.731	**0.876**	0.227	0.155	0.190
PD2	0.337	0.164	0.196	0.577	0.546	0.702	**0.908**	0.339	0.287	0.337
PD3	0.299	0.118	0.166	0.694	0.580	0.784	**0.914**	0.346	0.285	0.312
PRODEV1	0.444	0.444	0.465	0.140	0.018	0.193	0.226	**0.861**	0.709	0.603
PRODEV3	0.386	0.386	0.514	0.235	0.167	0.209	0.264	**0.907**	0.767	0.673
PRODEV4	0.384	0.475	0.506	0.303	0.135	0.330	0.391	**0.851**	0.742	0.626
PROEFF1	0.255	0.393	0.486	0.258	0.256	0.263	0.245	0.685	**0.860**	0.701
PROEFF2	0.253	0.428	0.514	0.219	0.166	0.280	0.264	0.734	**0.903**	0.702
PROEFF3	0.308	0.451	0.532	0.285	0.142	0.301	0.301	0.727	**0.839**	0.618
PROEFF4	0.324	0.425	0.526	0.241	0.179	0.261	0.300	0.748	**0.831**	0.705
PROEFF5	0.380	0.472	0.502	0.075	0.059	0.169	0.158	0.659	**0.819**	0.592
PROEFF6	0.353	0.453	0.480	-0.036	-0.042	0.043	0.067	0.725	**0.796**	0.603
CAPCHA1	0.320	0.316	0.147	0.221	0.241	0.202	0.238	0.453	0.444	**0.706**
CAPCHA2	0.291	0.411	0.543	0.214	0.150	0.181	0.238	0.681	0.748	**0.920**
CAPCHA3	0.238	0.410	0.421	0.199	0.110	0.150	0.242	0.664	0.693	**0.877**
CAPCHA4	0.292	0.376	0.504	0.257	0.278	0.199	0.336	0.652	0.732	**0.893**

APPENDIX VI – Mediation confidence interval calculation (Bootstrapping)

Calculation Method (Hayes, 2013)

1. With *n* = 85 , generate a bootstrap sampling of indirect distribution *a* and *b*
2. Estimate *a*b* in the bootstrap sample, where *a* and *b* are from #1
3. Repeat the process over and over, 5000 times
4. Sort from lowest to highest value
5. For ci% of 95% , BootLLCI = 5000 x 2.5% ; BootULCI=5000 x 97.5%
6. At CI of 95% , a normal distribution curve sorted then at point 125 (2.5%) and 4875(97.5%) out of k = 5000
7. P < 0.05 if a 95% CI does not include zero

K=5000	a1b1(LM)	a2b2(SF)	a3b3(MT)
125	-0.1253	0.1001	0.0391
4875	-0.0415	0.1943	0.1374