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PREFACE

Proceedings of the 2nd International Conference on Inter-Disciplinary, Social Science, Supply Chain, Technology, Economy & Business, Engineering and Education (ISSED2021)

It is my pleasure to welcome you to **2nd International Conference on Inter-Disciplinary, Social Science, Supply Chain, Technology, Economy & Business, Engineering and Education (ISSED2021). ISSED2021** aims to provide a platform for connecting academic scholars and industry practitioners world-wide to share the research findings from various disciplines and create a space for intellectual discussion, exploration and reflection of key issues that are shaping the world today. This is a great opportunity for delegates to expand knowledge, plan and implement innovative strategies, overcome barriers and move forward with the initiatives that benefit the community. There will be huge opportunities for networking, informed dialogues and collaborations.

Your participation in this conference and submission of research papers is greatly appreciated and on behalf of the Organizing Committee, I wish you all the safety and health and together we must strive to get over with the Covid-19 pandemic challenge as soon as possible. Our research works must endure despite these challenges to continue contributing to the body of knowledge from new research ideas, methods and problem resolutions.

Thank you.

Dr. Safaie Mangir
Conference Chairman

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ABSTRACT

The objective of this conference is to provide a platform for scholars, intellectuals and professionals from various academic and industrial disciplines to share the research findings from various disciplines and create a space for intellectual discussion, exploration and reflection of key issues that are shaping the world today. The conference welcomes all authors from related fields of research to submit and/or present the research papers. All accepted papers will be published in the conference proceeding book with ISBN number. More importantly, the accepted papers will also be published in refereed journals indexed by Malaysia Citation Centre (MCC). Papers that have the merits for publication in high index journals will be selected for publication in SCOPUS-indexed journals.

The conference has attracted quite a number of participations especially in the Video Presentation category and accepted research papers from various research disciplines for publication in proceeding book and journals. All submitted papers were reviewed by the review committee and the corresponding acceptance notifications were emailed to the authors upon acceptance approval by the review committee. Subsequently all accepted papers will be published in conference proceeding book which is targeted to complete by middle of June 2021. All accepted papers correspondingly, will be published in June 2021 Issue of the refereed journals. The proceeding (with ISBN) will be provided in PDF format while the journal is online and the related online URL links will be provided via email upon successful journal publication of the papers.

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APLIKASI PEMBELAJARAN BERASASKAN PERMAINAN DALAM PENGAJARAN BAHASA MELAYU

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Abstrak: *Kajian tindakan dijalankan bertujuan untuk mengenal pasti pencapaian dan minat murid dalam aplikasi pembelajaran berasaskan permainan Kahoot! dalam pembelajaran bahasa Melayu. 20 orang responden dikaji sebagai peserta kajian. Hasil ujian awal mendapati responden tidak berminat untuk belajar dan menunjukkan prestasi pembelajaran yang rendah. Pembelajaran berasaskan permainan Kahoot! diaplikasikan dalam pengajaran guru. Instrumen yang digunakan ialah ujian pra, ujian pos dan temu bual separa berstruktur. Data analisis menggunakan peratus dan min. Dapatan kajian menunjukkan peningkatan dalam pencapaian dan minat murid terhadap pembelajaran selepas pembelajaran berasaskan permainan Kahoot! dijalankan.*

Kata kunci: pembelajaran berasaskan permainan, Kahoot!, minat, pencapaian.

1. Pengenalan

Penggunaan kaedah yang dinamik dan kreatif melalui pengintegrasian pembelajaran berasaskan permainan dalam alat pembelajaran Web 2.0 dapat menarik minat belajar murid. Cara terbaik memanfaatkan penggunaan alat Web 2.0 perlu diterokai untuk mengoptimumkan aktiviti pengajaran dan pembelajaran (Nazatul 2014). Pembelajaran berasaskan permainan boleh menarik perhatian kanak-kanak selama berjam-jam sehari, jadi tidak menghairankan bahawa ramai ibu bapa dan guru berminat dengan potensinya sebagai alat pendidikan dan motivasi (Ronimus et al. 2014). Pelajar boleh belajar bila-bila masa dan di mana sahaja dalam konteks pembelajaran dalam talian (Bicen et al. 2014). Namun, masih ramai pendidik yang tidak mempunyai peluang, pengalaman atau pemahaman untuk menggunakan permainan di dalam bilik darjah (Plump & LaRosa 2017). Guru yang mempunyai pengalaman mengajar kurang lima tahun mempunyai tahap pemahaman yang rendah tentang P&P berasaskan main dari aspek bahasa (Sharifah & Aliza 2012). Guru perlu biasakan diri dengan penggunaan alat e-pembelajaran hingga boleh melaksanakannya dalam aktiviti pembelajaran berasaskan teknologi (Eatherton 2014) seperti Kahoot!. Aplikasi Kahoot! adalah percuma, mudah digunakan pelajar dan senang dipelajari oleh pengajar (Plump & LaRosa 2017).

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Sikap murid yang tidak bermotivasi untuk belajar menjadikan pencapaian mereka merosot. Oleh itu, sokongan motivasi mungkin diperlukan (Filsecker & Hickey 2014). Pembelajaran berasaskan permainan dengan mengintegrasikan teknologi dapat meningkatkan motivasi belajar murid kerana Yang (2017) berpendapat permainan mempengaruhi pencapaian pembelajaran. Pendekatan berasaskan permainan jelas dilihat sebagai lebih menarik dan menyeronokkan (Wang et al. 2016). Malah, pembelajaran berasaskan permainan dalam pembelajaran kanak-kanak sangat ditekankan oleh ahli psikologi seperti Piaget (1951), Vygotsky (1978) dan Bruner (1966). Pengaruh persekitaran sosial kanak-kanak mempengaruhi perkembangan dan pembinaan pengetahuan melalui interaksi sosial (Vygotsky 1978). Laporan kajian lepas menunjukkan pembelajaran berasaskan permainan dapat meningkatkan motivasi, penglibatan, tumpuan dan keseronokan belajar (Wang et al. 2016; Abdul Jabbar & Patrick 2015) di dalam bilik darjah. Banyak kajian lepas membuktikan keberkesanan pembelajaran berasaskan permainan di peringkat universiti (Alyaz & Genc 2016; Bodnar & Clark 2014; Fotaris et al. 2016; Franciosi 2017; Lim 2015; Syamsul 2015; Wang et al. 2016), kajian di peringkat sekolah menengah (O'Donnell 2015), kajian sekolah rendah (Filsecker & Hickey 2014; Hung et al. 2015; Yang 2017) serta kajian peringkat prasekolah (Aliza & Zamri 2015; Sharifah & Aliza 2012).

Permainan berasaskan permainan dilihat mampu meningkatkan kecekapan berbahasa dan perkembangan literasi pelajar (Alyaz dan Genc 2016; Hung et al. 2015; O'Donnell 2015). Sungguhpun demikian, kajian berkaitan prestasi dan literasi bahasa hanya dilakukan di peringkat tinggi (Alyaz & Genc, 2016; Fotaris et al. 2016; O'Donnell 2015; Lim 2015) dan prasekolah (Aliza & Zamri 2015; Sharifah & Aliza 2012) sahaja. Kajian tentang kemahiran bahasa dan literasi masih kurang dilakukan di peringkat sekolah rendah. Tambahan itu, kebanyakan penyelidikan yang dilaksanakan hanya melihat kepada penggunaan permainan Kahoot! (Plump & LaRosa 2017; Wang et al. 2016; Wang 2015) di sekolah menengah atau di peringkat lebih tinggi seperti kolej dan universiti. Aplikasi pembelajaran berasaskan permainan seperti Kahoot sehingga kini masih kurang mendapat perhatian di peringkat sekolah rendah. Dalam kajian ini, pengajaran dan pembelajaran berasaskan permainan diaplikasikan dalam sesi pengajaran bagi menarik minat murid belajar di samping memberi peluang kepada murid meneroka pembelajaran secara kendiri. Bahagian seterusnya akan membincangkan tentang kajian lepas, dapatan kajian dan mengupas perbincangan dan implikasi hasil kajian pembelajaran berasaskan permainan Kahoot! terhadap pengajaran bahasa di sekolah rendah.

2. Tinjauan Literatur

Pembelajaran berasaskan permainan adalah satu kaedah pembelajaran dan pengajaran yang menggabungkan kesediaan untuk menggunakan permainan, sama ada pendidikan atau komersil di dalam kelas (Lim 2015). Permainan dan persekitaran permainan dapat memberikan peluang kepada pelajar untuk belajar (Liu et al. 2014) kerana pelajar mempunyai peluang untuk belajar melalui kesilapan mereka yang tidak selalu dicapai dalam persekitaran kelas tradisional (Bodnar & Clark 2014). Yang (2017) bersetuju bahawa permainan memberikan pelajar kawalan semangat dan keberkesanan diri serta menghasilkan tingkah laku berorientasikan pembelajaran untuk menggalakkan pencapaian pembelajaran. Permainan menjadi satu bentuk kandungan interaktif baru yang memainkan peranan akademik dalam pembelajaran kolaboratif (Hung et al 2015). Pembelajaran berasaskan permainan dapat meningkatkan pembelajaran dengan mempromosikan pembelajaran melalui aspek motivasi (Syamsul 2015) dan aktiviti yang meningkatkan tumpuan (Franciosi 2017).

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Pembelajaran berasaskan permainan juga merupakan aktiviti berdaya saing di mana pelajar ditetapkan matlamat pembelajaran yang bertujuan untuk mempromosikan pemerolehan pengetahuan (Erhel & Jamet, 2013). Permainan pembelajaran berbeza mengikut jenis arahan yang diberikan kepada pelajar. Kajian lepas menunjukkan apabila arahan umum diberikan semasa pembelajaran, pelajar dapat mengimbas semula segmen pembelajaran yang relevan dan mendapati ia lebih menarik. Permainan berasaskan permainan dilihat mampu meningkatkan kecekapan berbahasa dan perkembangan literasi pelajar (Alyaz dan Genc 2016; Hung et al. 2015; O'Donnell 2015). Ciri permainan berasaskan permainan boleh dianggap sebagai medium hiburan yang direka untuk membawa perubahan kognitif dalam pemainnya (Erhel & Jamet 2013). Melalui permainan, penguasaan kemahiran linguistik dan kosa kata pelajar juga dapat ditingkatkan (Alyaz dan Genc 2016). Pembelajaran berasaskan permainan membolehkan pelajar mencapai prestasi pembelajaran yang sama dengan kaedah pembelajaran konvensional (Yang 2017). Laporan kajian lepas membuktikan pembelajaran berasaskan permainan dapat meningkatkan motivasi, penglibatan, tumpuan dan keseronokan belajar (Abdul Jabbar & Patrick 2015; Wang et al. 2016) di dalam bilik darjah.

Persekitaran bermain yang diperkayakan dengan kemahiran literasi dapat meningkatkan pengetahuan dan kemahiran kanak-kanak. Permainan fizikal membantu kanak-kanak memahami konsep makna serta belajar tatabahasa secara langsung (Aliza & Zamri 2016) di samping meningkatkan perkembangan pemahaman bacaan dan kebolehan menulis. Kemahiran bahasa kanak-kanak berkembang dengan cepat dan dapat diasah melalui pelbagai aktiviti (Sharifah & Aliza 2012). Permainan dalam pembelajaran meningkatkan prestasi dan pembelajaran pelajar (Abdul Jabbar & Patrick 2015; Erhel & Jamet 2013; Filsecker & Hickey 2014; Hung et al. 2015; Hung et al. 2014; Lim 2015; Sung & Hwang 2013; Wang et al. 2016). Kebolehan kognitif dan sosial pelajar juga dapat dibangunkan seiring pembelajaran yang berlaku dalam persekitaran permainan. Menurut Hung et al. (2015), persekitaran permainan membantu pelajar menemukan peraturan baru dan idea untuk diri mereka sendiri daripada menghafal. Kajian yang dilakukan oleh beliau mendapati wujudnya pengalaman pembelajaran positif apabila melaksanakan pembelajaran berasaskan permainan. Analisis keberkesanan diri pelajar menunjukkan permainan yang mencabar adalah lebih baik dalam meningkatkan keberkesanan pembelajaran.

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Pembelajaran berasaskan permainan memberikan kesan dalam meningkatkan motivasi pelajar untuk belajar (Abdul Jabbar & Patrick 2015; Erhel & Jamet 2013; Hung et al. 2015; Hung et al. 2014; Sung & Hwang 2013; Wang et al. 2016; Wang 2015). Pertambahan objektif pengajaran dan bahan dalam persekitaran permainan akan meningkatkan motivasi pembelajaran pelajar kerana sifat yang mencabar dan menyeronokkan (Hung et al. 2014). Kajian yang dilakukan oleh Wang et al. (2016) berkaitan kesan pembelajaran berasaskan permainan yang berkaitan dengan peningkatan motivasi pelajar dalam pembelajaran menunjukkan impak motivasi pembelajaran menggunakan tiga variasi pengajaran menggunakan kertas kuiz, kuiz klik dan kuiz permainan Kahoot!. Dapatan kajian mendapati terdapat perbezaan yang signifikan dalam motivasi pelajar melakukan kuiz permainan Kahoot! berbanding apabila menggunakan kertas kuiz dan kuiz klik. Hal ini mendapati terdapat kecenderungan bahawa pelajar lebih bermotivasi dalam pembelajaran menggunakan kuiz berbentuk permainan. Kajian Hung et al. (2014) terhadap 68 orang pelajar sekolah menunjukkan penggunaan bahan pengajaran digital lebih berkesan berbanding model arahan tradisional. Hal ini menyokong pembelajaran berasaskan permainan dapat meningkatkan motivasi pelajar terhadap pembelajaran. Sungguhpun aktiviti permainan tidak memberikan ganjaran luaran, para pelajar yang bermain permainan menunjukkan tahap motivasi yang tinggi untuk menyelesaikan tugasan yang diberi (Hung et al. 2015).

Kajian lalu menunjukkan pembelajaran berasaskan permainan memberi kesan positif terhadap penglibatan pelajar dalam pembelajaran (Abdul Jabbar & Patrick 2015; Filsecker & Hickey 2014; Hamari et al. 2016; Ronimus et al. 2014; Wang et al. 2016; Wang 2015). Persekitaran pembelajaran berasaskan permainan dapat membina peluang interaksi kepada pelajar untuk meneroka dan memanipulasi benda secara fizikal (Hung et al. 2015). Pelajar memperlihat tahap penglibatan yang tinggi dalam proses pembelajaran melalui pengalaman bermain (Bodnar & Clark 2014; O'Donnell 2015). Laporan Bodnar dan Clark (2014) mengemukakan kesan pembelajaran berasaskan permainan terhadap persepsi pelajar kepada persekitaran bilik darjah dan penglibatan pelajar dalam pembelajaran. Dapatan menunjukkan pelajar di dalam kelas pembelajaran berasaskan permainan dapat membangunkan kemahiran profesional utama seperti komunikasi lisan, keupayaan untuk bekerja secara berkesan dengan orang lain dan untuk menyelesaikan masalah dunia yang kompleks atau nyata. Hal ini disokong oleh dapatan Alyaz & Genc (2016) dan Hung et al. (2015) yang melaporkan bahawa pembelajaran berasaskan permainan membawa pelajar untuk berinteraksi dengan lebih baik antara peringkat pelajar.

Kajian oleh Ronimus et al. (2014) terhadap kanak-kanak berumur 7 hingga 9 tahun dalam pembelajaran berasaskan permainan memberikan impak positif terhadap penglibatan semasa pembelajaran berlaku. Sistem ganjaran dan cabaran dalam permainan mempunyai kesan terhadap penglibatan kanak-kanak dalam permainan *GraphoGame*. Kajian Hamari et al. (2016) menyiasat kesan aliran, penglibatan dan tumpuan terhadap pembelajaran dalam persekitaran pembelajaran berasaskan permainan. Dalam kajian ini, penglibatan dikonsepsikan sebagai kejadian yang berlaku serentak antara tumpuan, minat, dan keseronokan yang meningkat dalam himpunan aliran pengalaman. Hasil kajian menunjukkan permainan dalam pembelajaran berkesan melibatkan pelajar dalam aktiviti pembelajaran. Pembelajaran juga lebih aktif dengan peningkatan tahap cabaran dan kemahiran dalam permainan. Tambahan itu, pembelajaran berasaskan permainan dapat meningkatkan denyut nadi pelajar (Wang et al. 2016) disebabkan penglibatan aktif pelajar dalam melakukan aktiviti dalam permainan.

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Perubahan tingkah laku dapat dilihat dalam pembelajaran berasaskan permainan (Yang 2017). Pelajar memperlihat tahap penglibatan yang tinggi dalam proses pembelajaran melalui pengalaman bermain (Bodnar & Clark 2014; O'Donnell 2015) dan merupakan pedagogi yang boleh membawa kepada persekitaran bilik darjah yang lebih positif (Bodnar & Clark 2014). Dapatan Hung et al. (2015) juga kajian Alyaz dan Genc (2016) melaporkan bahawa pembelajaran berasaskan permainan membawa pelajar untuk berinteraksi dengan lebih baik antara peringkat pelajar. Kesemua jurnal luar negara ini mengkaji tentang pembelajaran berasaskan permainan terhadap pelajar dalam semua peringkat umur di sekolah rendah (Hung et al. 2015; Yang 2017), sekolah menengah (O'Donnell 2015) dan universiti (Bodnar & Clark 2014). Berdasarkan jurnal ini, terdapat satu kajian berbeza yang dilakukan oleh Alyaz dan Genc (2016) yang melihat pembelajaran berasaskan permainan terhadap guru praperkhidmatan di universiti.

2.1 Pernyataan Masalah

Kajian berkaitan pembelajaran Bahasa Melayu berasaskan permainan yang berteraskan teknologi di dalam kelas yang kurang menjadi pilihan guru ekoran pelbagai kekangan yang dihadapi, khasnya sekolah-sekolah pedalaman. Oleh itu, pengkaji berpendapat bahawa suatu kajian berkaitan aplikasi permainan dalam sesi pengjaran guru perlu dilakukan agar dapat membuktikan bahawa pengajaran Bahasa Melayu berasaskan permainan dapat menghasilkan murid-murid yang interaktif dan cerdas.

3. Metodologi Kajian

3.1 Bahan Kajian

Kajian ini menggunakan peranti elektronik seperti *notebook, pad* dan telefon bimbit peribadi sebagai medium permainan yang disambungkan dengan modem jaringan internet sebagai akses rangkaian internet (wifi). Kelas yang dipilih oleh pengkaji untuk menjadi sampel kajian terdiri daripada murid aras sederhana dan lemah. Rasional pemilihan sampel ini ialah murid cemerlang sudah terdorong untuk mengikuti proses pembelajaran dengan mudah kerana sikap dan faktor persekitaran murid, sebaliknya murid sederhana dan lemah tidak sedemikian.

Sewaktu proses aplikasi permainan Kahoot! dilaksanakan dalam pengajaran guru, para murid akan dibekalkan dengan 1 peranti elektronik mengikut kesesuaian mereka. Proses ini berlangsung selama 2 masa (1 jam) dan dijalankan pada hari terakhir mata pelajaran Bahasa Melayu setiap minggu mengikut jadual waktu murid. Dalam satu-satu keadaan, guru akan menggunakan bilik teknologi maklumat (ICT) sebagai inisiatif agar pengaplikasian permainan Kahoot! tetap berjalan setiap minggu untuk dapatan kajian yang tepat.

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3.1.1 Sampel

Sampel merupakan murid aras sederhana dan lemah seramai 20 orang. Pemilihan sampel ini berdasarkan keputusan peperiksaan sampel yang lepas. Pecahan jantina sampel ialah 1:1. Pengumpulan data pula diambil sebelum dan selepas pengaplikasian Kahoot! setiap minggu. Pungutan data akan dianalisis melalui perbandingan keputusan ujian pra dan ujian pos murid.

Selain itu, kaedah temu bual juga digunapakai untuk mengkaji sejauh mana keberkesanan Kahoot! melalui beberapa soalan umum dan soalan khusus. Tujuannya agar sampel lebih mudah menjelmakan perasaan mereka terhadap impak penggunaan aplikasi ini dalam pengajaran guru. Melalui dua kaedah ini, pengkaji akan memperoleh dapatan kajian yang lebih tepat.

3.1.2 Lapangan Kajian

Kajian dijalankan di Sekolah Menengah Kebangsaan Pasir Gudang, Johor, Malaysia kerana pengkaji merupakan guru Bahasa Melayu di Sekolah berkenaan.

3.1.3 Prosedur Kajian

a. Reka bentuk Kajian

Reka bentuk eksperimental digunakan dalam kajian ini yang melibatkan satu kumpulan sampel iaitu kumpulan rawatan seramai 20 orang yang terdiri daripada murid sederhana dan lemah. Kumpulan ini diberikan ujian pra sebelum kajian dijalankan, manakala ujian pos pula diberikan pada akhir kajian. Jangka masa kajian selama empat minggu yang dikawal sepenuhnya oleh pengkaji sebagai guru mata pelajaran Bahasa Melayu.

Selain itu, kaedah kualitatif yang menggunakan temu bual juga digunakan bagi menilai sejauh mana keberkesanan aplikasi permainan Kahoot! dalam pengajaran guru dapat meningkatkan pengetahuan dan minat murid.

Jadual 1: Reka Bentuk Ujian Pra dan Pasca Kumpulan Rawatan

	Ujian Pra	Kaedah	Ujian Pos
Kumpulan Rawatan	U1	X1	U2

Dalam reka bentuk kajian di jadual 1, U1 merupakan pelaksaan ujian pra manakala U2 merupakan pelaksanaan ujian Pos. Sebaliknya X1 ialah kaedah pembelajaran yang diberikan kepada kumpulan rawatan. Ujian Pra dijalankan untuk menilai pengetahuan sedia ada sampel. Seterusnya, ujian pos dijalankan selepas sampel mengikuti kaedah pengajaran guru menggunakan aplikasi permainan Kahoot! selama empat minggu.

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b. Sampel kajian

Meskipun sampel kajian tidak menyeluruh tetapi sampel yang dipilih mengambarkan populasi kajian kerana pemilihan sampel berdasarkan keputusan peperiksaan terkini. Seramai 20 sampel daripada tingkatan 3 dipilih untuk kajian ini mengikut kreteria pengetahuan meraka yang terdiri daripada murid sederhana dan murid lemah berdasarkan keputusan peperiksaan yang lepas. Sampel dikelompokkan sebagai kumpulan rawatan. Oleh itu, dapatan kajian boleh digunapakai dan dijadikan sumber rujukan sebagai penambahbaikan kajian kes berkaitan pada masa akan datang.

c. Kesahan dan kebolehpercayaan

Kesahan dan kebolehpercayaan instrument sangat penting untuk mempertahankan instrumen dari terdedah kepada kecacatan kajian. Kesahan digunakan untuk mengukur ketepatan sesuatu ukuran yang digunakan dalam kajian. Kesahan bermaksud persetujuan antara dua percubaan untuk mengukur ciri yang sama secara maksimum dengan kaedah yang berlainan (Campbell & Fiske, 1959)

Pengkaji telah menjalankan kajian yang mempunyai kebolehpercayaan dan kesahan kerana kajian yang dilaksanakan melibatkan pemilihan murid secara rawak dan ujian yang digunakan merupakan soalan peperiksaan sebenar Penilaian Tingkatan Tiga tahun 2018 dan 2019.

3.2 Pengukuran

Instrumen yang digunakan dalam kajian ini berdasarkan rekabentuk eksperimental yang menggunakan kaedah kuantitatif dan kualitatif. Kajian menggunakan dua instrument atau alat kajian untuk memperoleh data iaitu ujian pencapaian pos dan ujian pencapaian pra, serta temu bual berstruktur. Instrument ujian pencapaian yang digunakan bertujuan untuk mendapatkan data manakala temu bual pula untuk mengukuhkan dapatan kajian.

3.3 Dapatan Kajian

Analisis data telah dilakukan bagi melihat hasil dapatan kajian aplikasi pembelajaran berasaskan permainan Kahoot! dalam pembelajaran bahasa Melayu terhadap pencapaian dan minat murid. Data dikutip dan dianalisis daripada instrumen kajian ujian pra, ujian pos dan data temu bual separa berstruktur bagi menjawab persoalan kajian berikut.

Objektif 1: Mengenal pasti pencapaian murid dalam aplikasi pembelajaran berasaskan permainan Kahoot! dalam pembelajaran Bahasa Melayu.

Persoalan kajian ini bagi melihat pencapaian murid dalam pembelajaran bahasa Melayu selepas aplikasi pembelajaran berasaskan permainan Kahoot! digunakan dalam sesi pengajaran.

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3.3.1 Dapatan Analisis

Analisis hasil dapatan daripada ujian pra dan ujian pos dilihat bagi menentukan perubahan prestasi murid dalam pembelajaran.

Murid	Peratus ujian pra (%)	Peratus ujian pos (%)	Peningkatan peratus
A	40	90	50
B	40	80	40
C	30	70	50
D	30	80	50
E	20	50	30
F	50	100	50
G	50	90	40
H	50	100	50
I	40	90	50
J	40	80	40
K	40	70	30
L	50	90	40
M	40	80	40
N	40	80	40
O	30	60	30
P	50	80	40
Q	60	100	40
R	40	80	40
S	50	70	30
T	30	80	50

Jadual 2: Perbandingan peratus ujian pra dan ujian pos

Jadual 2 menunjukkan perbandingan peratus ujian pra dan ujian pos dalam aplikasi pembelajaran berasaskan permainan Kahoot!. Peratus markah ujian pra adalah antara 30% hingga 60%. Murid yang mendapat peratus tertinggi dalam ujian pra adalah murid Q (60%) manakala murid yang mendapat peratus terendah adalah murid E sebanyak 20%. Peratus markah ujian pos adalah antara 50% hingga 100%. Peratus tertinggi dicapai oleh murid F, murid H dan murid Q iaitu sebanyak 100% dan peratus paling rendah dicapai oleh murid E sebanyak 50%. Perbezaan dapat dilihat antara peratus ujian pra dan ujian pos.

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	Ujian pra (%)	**Ujian pos (%)**	**Peningkatan (%)**
Min	41	81	40

Jadual 3: Perbandingan min ujian awal dan ujian akhir

Jadual 3 menunjukkan min peratus ujian pra, min peratus ujian pos dan min peratus peningkatan ujian selepas mengaplikasikan pembelajaran berasaskan permainan Kahoot!. Berdasarkan jadual, dapat diperhatikan bahawa ujian pos mempunyai min peratus yang lebih tinggi iaitu 81%. Ujian pra pula menunjukkan min peratus yang lebih rendah iaitu 41%. Perbandingan min peratus ujian pra dan ujian pos mendapati terdapat banyak peningkatan sebanyak 40%. Ini menunjukkan berlaku peningkatan dalam pencapaian murid dalam aplikasi pembelajaran berasaskan permainan Kahoot! dalam pembelajaran bahasa Melayu.

Objektif 2: Mengenal pasti minat murid terhadap pembelajaran berasaskan permainan Kahoot! dalam pembelajaran Bahasa Melayu.

Persoalan kajian ini bagi mengenal pasti kesan pembelajaran berasaskan permainan Kahoot! terhadap minat murid dalam pembelajaran bahasa Melayu. Bagi menjawab persoalan ini, analisis hasil dapatan daripada temu bual separa berstruktur dilakukan untuk menunjukkan wujud minat dalam pembelajaran murid.

Dapatan Analisis

Berdasarkan analisis data temu bual, dapatan kajian yang diperoleh daripada 20 orang murid menghasilkan tema seperti berikut:

Tema 1: Pembelajaran berasaskan permainan Kahoot! menyeronokkan murid.

Sebagai contoh responden (R) berikut:

R1: *"Seronok..."*
R4: *"Yaaaa..best cikgu.."*
R9: *"Best…."*
R10: *"Teruja belajar cikgu....saya rasa excited.."*
R14: *"Function cikgu…"*
R19: *"Seronok….esok ada lagi?..."*

Tema 2: Murid bermotivasi untuk belajar menggunakan permainan Kahoot!

Seramai empat orang responden memberikan penyataan berikut:

R3: *"Ya..saya terus bersemangat nak belajar cigu..!!"*
R6: *"Kelas cikgu hari ni seronok… saya bermotivasi nak belajar!"*
R7: *"Saya pun bersemangat nak belajar juga cikgu…!"*
R18: *"…. terus saya termotivasi nak belajar lepas main Kahoot! cikgu…"*

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4. Perbincangan

OBJEKTIF 1: Mengenal pasti pencapaian murid dalam aplikasi pembelajaran berasaskan permainan Kahoot! dalam pembelajaran bahasa Melayu.

Berdasarkan hasil dapatan, pembelajaran berasaskan permainan Kahoot! memberikan kesan kepada prestasi pembelajaran dan minat murid terhadap pembelajaran. Markah yang ditunjukkan dalam dapatan kajian menunjukkan bahawa murid berjaya meningkatkan prestasi dalam pembelajaran. Aplikasi permainan Kahoot! dalam sesi pengajaran bahasa Melayu membantu murid belajar dengan lebih baik. Permainan Kahoot! dapat meningkatkan minat dan motivasi murid terhadap pembelajaran. Murid juga terlibat secara aktif dalam aktiviti kelas dan menunjukkan rasa seronok untuk belajar.

Kajian ini selari dengan dapatan kajian Hung (2015) yang mengaplikasikan pembelajaran berasaskan permainan dalam pengajaran bahasa. Kajian tersebut mendapati persekitaran permainan dapat membina daya saing dalam pembelajaran dan membawa pelajar untuk berinteraksi dengan lebih baik. pembelajaran berasaskan permainan dilihat berkesan meningkatkan pencapaian pelajar. Hal ini menyokong dapatan bahawa pembelajaran berasaskan permainan membantu meningkatkan pencapaian murid dalam pembelajaran bahasa Melayu.

O'Donnell (2015) melaporkan kajian tentang aplikasi pembelajaran berasaskan permainan terhadap perkembangan sains dan literasi murid menunjukkan perbezaan statistik dalam kemampuan membaca. Pembelajaran berasaskan permainan dilihat mampu meningkatkan kemahiran sains dan literasi murid di dalam bilik darjah. Beliau mendapati tahap penglibatan dan inspirasi yang tinggi dapat ditimbulkan dalam diri murid ketika bermain. Secara tidak langsung, hal ini mendorong kepada perkembangan kemahiran sains dan kemahiran bahasa murid.

OBJEKTIF 2: Mengenal pasti minat murid terhadap pembelajaran berasaskan permainan Kahoot! dalam pembelajaran bahasa Melayu.

Secara keseluruhannya, responden bersetuju pembelajaran berasaskan permainan Kahoot! menyeronokkan. Soalan yang dikemukakan kepada murid dijawab dengan bahasa badan yang bersemangat. Tiga orang responden berasa teruja untuk bermain Kahoot! dalam pembelajaran. Dua orang responden tidak sabar untuk belajar menggunakan permainan Kahoot!. Enam responden mengatakan aplikasi Kahoot! mendatangkan keseronokan kepada murid untuk belajar. Murid lain hanya mengangguk dan mengiakan respon murid lain.

Apabila ditanya tentang motivasi dan semangat untuk belajar menggunakan permainan Kahoot!, respon pelajar positif. Dua orang responden menyatakan bersemangat untuk belajar perkara baru. Tiga lagi responden menyatakan gembira belajar menggunakan permainan Kahoot!. Berdasarkan data temu bual, pembelajaran berasaskan permainan Kahoot! meningkatkan minat murid terhadap pembelajaran.

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Kajian yang dijalankan ini sejajar dengan kajian yang dilakukan oleh Liu et al. (2014). Dalam kajian ini, beliau mendapati persekitaran pembelajaran berasaskan permainan dapat meningkatkan minat dan motivasi pelajar. Penemuan analisis dapatan menunjukkan bahawa reka bentuk persekitaran interaktif yang menarik menggunakan pendekatan berasaskan permainan dapat membantu pelajar berseronok semasa belajar. Hasilnya, minat dan motivasi murid dapat ditingkatkan dalam sesi pengajaran dan pembelajaran.

Kajian tentang pembelajaran berasaskan permainan terhadap prestasi dan motivasi pelajar dilakukan oleh Fotaris et al. (2016) menunjukkan kesan yang positif. Hasil kajian mendapati terdapat peningkatan dalam prestasi pembelajaran dan motivasi pelajar dalam sesi pembelajaran. Permainan di dalam kelas menjadikan pembelajaran menyeronokkan. Dapatan kajian beliau melaporkan pelajar turut bermotivasi untuk menghadiri kelas dan tiba tepat pada waktunya. Motivasi pelajar juga meningkat dan menghadiri kelas dengan lebih kerap.

Pembelajaran berasaskan permainan telah terbukti meningkatkan pencapaian murid dalam pembelajaran. Minat juga dapat ditingkatkan melalui persekitaran pembelajaran berasaskan permainan. Penglibatan dan motivasi juga dilihat dalam pembelajaran hasil daripada aplikasi pembelajaran berasaskan permainan. Peningkatan dalam minat, motivasi dan penglibatan murid dalam pembelajaran membantu murid memahami kandungan pelajaran seterusnya meningkatkan pencapaian mereka.

5. Penutup

Berdasarkan kajian yang dilakukan, pembelajaran berasaskan permainan Kahoot! berjaya meningkatkan pencapaian pelajar di dalam proses pengajaran dan pembelajaran. Di samping itu, murid menunjukkan minat terhadap pembelajaran melalui penglibatan di dalam bilik darjah serta temu bual yang dibuat. Dalam kajian ini, objektif kajian dapat dipenuhi.

6. Pengakuan

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ARTIFICIAL INTELLIGENCE FOR CRIMINAL PURPOSES AND THE REGULATORY CHALLENGES

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Abstract: *We are entering into a technological regime where an ever-increasing variety of tasks are performed by autonomous machines and artificial intelligence (hereinafter – AI). Although many advancements have been made, still AI is not capable of holding consciousness in the practice scenario. There is still scope for imposing liability to the creator and developer as Artificial General Intelligence (AGI) is still a fiction. Like many other technologies, AI will open new doors for criminals, and consequently, the prevention mechanism should be adaptive to new changes. At some point eventually, we have to strengthen the regulations for controlling, preventing, and punishing AI-based crimes. This article provided a structured literature analysis of AI-Crime by gradually shifting the focus from history, classification, application, criminalization, and regulation of AI or AI-based crimes. The paper has also recommended some principles for countering the regulatory challenges.*

Keywords: Artificial Intelligence, AI crimes, Criminalization of AI, AI Regulation.

1. Introduction

When technology is used to automate tasks that require human intelligence that could be referred to as Artificial Intelligence or AI (Russell & Norvig, 2010). AI is sometimes misunderstood as thinking machines by a number of people (Surden, 2014). Particular acts required intelligence for performance and AI is an art to create such machines, capable of performing that act (Kurzweil, 1990). In broader terms, AI has been described by McCarthy as "the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are highly biologically observable" (McCarthy, 2007). Another general misperception is that the system of AI produced outcomes by applying any kind of synthetic computer cognition mechanism similar to human-level thinking (Surden, 2014). The real picture is that firstly information and protocols are encoded by humans into forms that can be processed by the computer. Lastly, by analyzing the encodings, AI detects data patterns (Surden, 2014). A large amount of data is used by the AI now for experience gathering from previous analogical incidents. The application of AI for solving new problems by development is simultaneously driven by "Big Data" as data could be considered as the new oil (Arthur, 2013). Keeping in mind the recent development, an integrating approach of AI definition has been given by Kaplan and Haenlein as "a system's ability to correctly interpret external data, to learn from such data, and to use those learning's to achieve specific goals and tasks through flexible adaptation" (Kalpan et al., 2019). The entertainment industry has drawn a fictitious portrait of AI, that is capable of intellectual conversation about morality, philosophy, or similar abstract concept under the operation of an independent cognitive system (Ebiri, 2015). AI is not capable nor designed for performing the intellectual and higher-order human tasks such as abstract reasoning, concept comprehension, flexible understanding, etc. (Krupansky, 2017). Nowadays AI is capable of tasks

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with narrow or limited settings subjected to specific characteristics like providing correct or incorrect answers (Deshai, 2017).

2. Development of AI

Alan Turing argued that the concept of AI was started when the human thinking process was compared with the automatic manipulation of symbols by the ancient philosophers (Turing, 1950). The concept of an artificial entity behaving like an intelligent substance can be traced back to ancient Greek mythologies about robots or automatons created by the engineers of Egypt (Lewis, 2014). In 1956 a conference was held in Dartmouth titled the "Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI)", which was hosted by John McCarthy and Marvin Minsky (McCarthy et al., 1955). In this conference Allen Newell, Cliff Shaw, and Herbert Simon presented "The Logic Theorist" program which was designed to mimic the human problem-solving techniques and was funded by Research and Development (RAND) Corporation. The Logic Theorist is considered as the first program related to AI (Anyoha, 2017). American computer scientist John McCarthy was the first to coin the terms "Artificial Intelligence" (Moor, 2006) and considered as the father of artificial intelligence (Ray, 2018). The seed of modern AI was sowed by Alan Turing, a British cryptanalyst, by deciphering the Enigma codes of Germany during World War II (Copeland et al., 1999). A Computer program for the mathematical notation system was developed by John McCarthy in 1950 for solving mathematical problems (McCarthy, 1978) . One of the main challenges for the researchers of the middle 1970 to 1990 for creating AI was to enable machine learning and computer vision concepts as it required to process an extensive amount of data. This portion of time is termed as "AI Winter" in many cases (Buchanan, 2006). The world chess champion Garry Kasparov in May 1997 was defeated by "IBM's Deep Blue", which was an AI program. This was the first for an AI to defeat human intelligence (Schultebraucks, 2018). The development of computer hardware and machine learning resulted in government funding for a number of AI projects around the world, especially in the USA. As public and private entities started to store a thousand terabytes of data, the concept of "Big Data" evolved (Manyika, 2011). In 2009, for storing and processing an extensive amount of data, machine learning was leveraged by the tech giants like Google or Amazon (Lohr, 2013). The successful creating of AI was considered one of the biggest inventions in the history of mankind by Stephen Hawkings in 2014. In 2014 in the Royal Society in London, a chatbot named "Eugene Goostman" with a remarkable sense of humor had won an artificial intelligence competition in the "Turing test" (Sample, et ai., 2014). In 2018, IBM launched the "Project Debater" AI program which successfully debated against two master debaters on abstract topics. From 2015 to 2018, almost USD3.6 billion was raised globally for cybersecurity firms with AI focus (Chaturvedi, 2018). Gradually AI is engraving a mark in human's daily life and converting into the mainstream.

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3. Taxonomy of AI

The taxonomy of AI largely depends on their capability to replicate human functions as the primary aim is to convert machines into intellectual beings (Joshi, 2019). Taxonomy can be made from various spheres based on the performance, capability, and adaptability of AI in comparison to humans (Avitz, 2020). In terms of versatility and capability, AI can be classified into 7 categories:

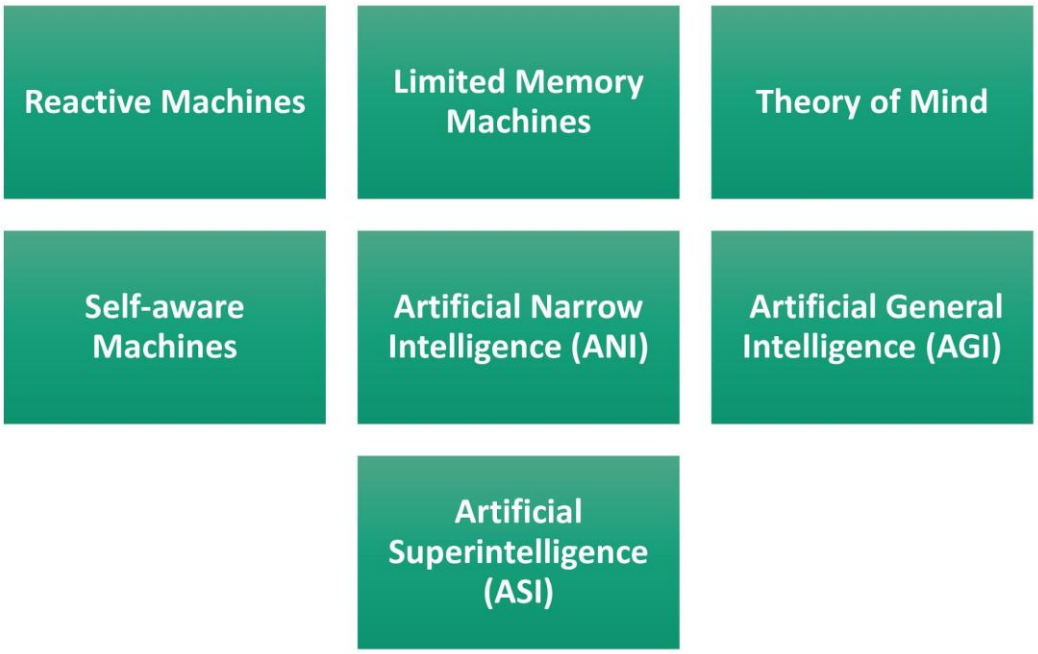

Figure 1: Taxonomy of AI

1. Reactive machines:

This is the oldest form of machine intelligence with very limited capabilities. It lacks the ability to learn or store memory. As a result, their future actions are not based on past experiences (Ray, 2018). IBM ® Deep Blue ® is an example of reactive machines which defeated Grandmaster Garry Kasparov in 1997.

2. Limited Memory Machines:

A machine that acquires knowledge from past information or data fed to them for building experience is called Limited Memory Machines (Reynoso, 2019). Autonomous vehicles are examples of using limited memory mechanisms as their performance is based on pre-programmed knowledge and observational patterns (University of Michigan, Center for Sustainable Systems, 2020).

3. Theory of mind:

Unlike machine learning, an AI with a theory of mind will interact with the entities by judging their necessities, emotions, and thought. Robotics Professor University of West England, Dr. Alan Winfield has compared the theory of mind with a secret sauce that will guide the AI to understand the needs of people and other machines or objects (Fan, 2018). Kismet, developed by Professor Cynthia Breazeal and Hanson Robotics' most advanced human-like robot, Sophia (Hanson Robotics, Robots) is capable of responding with consistent facial expressions.

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4. Self-aware AI:

This kind of AI doesn't exist now and is only a hypothesis because it suggests a machine with human consciousness (Chatila et al., 2018). Its performance would not be confined to replicate human actions but extends to be capable of having emotions, desires, and self-awareness. Some experts argued that self-aware AI will possess the idea of self-preservation which could be the end of humanity (Musser, 2017).

5. Artificial Narrow Intelligence (ANI):

From the most complex and capable machines to limited capabilities machines, all included in ANI, which is capable of performing one individual task autonomously at a time (Jajal, 2018). These machines hold a narrow competency range as their performance is limited to the sets of pre command or program.

6. Artificial General Intelligence (AGI):

Nowadays machines can process data faster than humans but humans are capable of thinking abstractly, creating new ideas, and making a reasoned decision by tapping into thoughts and memories (Goertzel, 2015). The AGI denotes a machine capable of solving problems by using reasons and judgment even when there is uncertainty. The idea is to create a creative and innovative human-like machine (Berruti, 2020).

7. Artificial Superintelligence (ASI):

AI which is superior to human intelligence both from creativity and problem solving is considered as ASI. According to Oxford philosopher Nick Bostrom, ASI is "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest" (Jajal, 2018).

4. Applications of AI

AI is capable of solving complex problems very effectively and can make our day to day life more comfortable with pace. As a result, we can find various applications of weak AI in multiple industries like, education, banking, healthcare, entertainment, cyber security, etc. Some major applications are as follows:

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1. Voice and Speech Recognition:

This subfield of AI is used to recognize the speaker by measuring the unique biological factor that produced the person's voice. This mechanism is the fusion of natural language, linguistics and acoustics (Russell & Norvig, 2003) . The advancement in this field has been influenced by the use of deep learning and big data. Voice and Speech Recognition industry is divided into three special fields:

(a) Speaker identification (voice biometrics used in criminal investigation or Immigration)
(b) Speaker verification (Google Home or Amazon Echo)
(c) Speech recognition systems (Microsoft Cortana or Apple's Siri)
(d) Text--to-speech (Google text to speech or Amazon's Ivona)

2. Computer Vision:

This subfield of AI gathered information from pictures and affiliated multi-dimensional data. Machines can actually identify and distinct objects by analyzing images from different sources and could respond to what they see. Other domains of computer vision include reconstructing scenes, detecting motion or recognizing objects (Morris, 2004). Nowadays computer vision is benefiting a number of disciplines such as automotive, health care, manufacturing, retail, financial services and agriculture etc. (Peregud & Zharovskikh, 2020). Among other tasks, the use of computer vision is steadily increasing in automated inspection, converting 2D images into 3D models and identifying animal species (Chen, 2015).

3. Extended Reality (XR):

For creating completely immersive experiences in live production environments, Augmented reality (AR), Virtual Reality (VR) and Mixed Reality (MR) are used to blend physical and virtual worlds by using Extended Reality (XR) technology. Utilizing XR, participants end up a portion of a virtual ecosystem and dismember information inside their real---world field of view (Culp, 2018). Apart from the virtual gaming and entertainment industry, in the future XR will be used widely in some other fields namely engineering or healthcare (Riva, 2004).

4. Game Playing:

Another important domain of AI is game playing. Among the primary programs composed in this range, were programs planned to play games like chess and checkers against human players. A game---playing program abuses the predominant computational speed of the framework to run a brute---force algorithm to create as numerous choices, moves, and results as conceivable (University of Toronto, Game Playing, 1999). The main aim of GGP or General Game Playing was to introduce a game playing mechanism which could be installed to various game interfaces (Genesereth et al., 2005). AI program also required game manuals in the form of primary description and that is called Game Definition Language (Love et al., 2005).

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5. Virtual Agent:

Automated customer service is provided by a virtual agent software by applying pre-determined protocols and using virtual characters. These characters are formed by AI, animation and computer generation (Adam & Gaudou, 2016). These agents can address customers' queries and assist them to desired contents. The brain of a virtual agent is nothing but centralized cloud storage including live agent behavior mimicking tools.

6. Natural Language Processing (NLP):

This field of AI allows the machines the capability for reading, understanding and obtaining information from human language. This field of study is basically a bridge between computer systems and human language as a set of programs capable of processing vast amounts of natural language data. As most of the human activities are connected to human languages, NLP is gaining popularity like machine learning (Expert System, 2017). Machine translation of different documents, answering questions and summarizing documents automatically are some examples of NLP mechanisms (Davydova, 2017).

5, Criminalization of AI

AI is playing a significant role in our social and daily life for technological development (West, 2018). The prevalent use of AI has consequently threatened the security of the society and individuals by misusing the system and causing harm. Nowadays AI is facilitating criminal conducts or committing offences through autonomous action (King et al., 2009). AI has the potential to act unpredictably (Yasseri, 2017). Machine learning based AI is primarily a human made computer program and without explicit programming it responds to data and independent development might be traced (Castelvecchi, 2016). This autonomous development in some cases resulted in AI activities which might not be intended by the creator nor foreseeable. Machine learning based big datasets create suitable victim profiles by analyzing online behavior patterns. Fraud and offence is committed by chatbots which deceived people engaging in lengthy conversation and by obtaining sensitive information (Miles & Avin, 2018). As AI is capable of functioning unexplainably, tracing any activity might be possible but understanding the intention is a big challenge. This challenge has coined such AI's as "Black box" systems. In case of autonomous action, AI might keep committing offences without the direction or control of any human. It is also possible that after setting the AI in motion, the creator will not be able to regain control of it due to the design (Falkon, 2017). Among a large number of AI based crimes, some of the most concerned are discussed briefly.

1. Impersonated audio and video:

In this era of technology, digital evidence is now given a lot of credence before judicial proceedings. Using deep learning and Generative Adversarial Networks fake contents are threatening the admissibility of digital evidence. Although few successes have been achieved in algorithmic detection of impersonation, still the challenge remains (Güera & Delp, 2018).

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2. Using automated vehicles as a weapon:

Firearms, explosives, or raw chemicals are not easily accessible around the world in comparison to the readily available electronic vehicles. As a result, "Lone actor" or "Individual actors" could use automated vehicles for terrorist attacks as these required low organizational overheads. Driver requirement is unnecessary for vehicle terrorism and it enables a single perpetrator to perform multiple terrorist attacks within a very short time and on a large scale. The Berlin lorry attack in 2016, Westminster attack in 2017 and Manhattan terror attack in 2017 are some terrific examples.

3. Highly-tailored phishing:

Personal and secured information is gathered using deceptive emails, websites, interfaces, or installing malware in the computer system via a message purporting to be from a trusted source which is called phishing. The trustworthy deceptive interfaces lured people to reveal their secured information (Boddy, 2018). Using AI, phishing attacks are made by generic messages based on popular trends or major brands which are relatively indiscriminate (Vergelis et al., 2019). Machine learning could be used to analyze the victim's response and to discover the process to maximize response (Bahnsen et al., 2018).

4. Learning-based cyber-attacks:

The common forms of cyber-attacks are either specific target-oriented with a sophisticated mechanism or unfiltered and massively automated like DDoS attack (Kushner, 2013). The rise of AI has created a hybrid form of a cyber-attack that is both massive and target-oriented. AI gathering patterns from reinforcement learning is now capable of identifying a systems' weakness as well as launching attacks at the same time.

5. Autonomous attack drones:

Pilot controlled drones using radiofrequency are used for smuggling drugs, small arms, and illegal objects throughout the border and into the prison. Non-autonomous radio-controlled drones are also being used for transport disruptions (Weaver et al., 2018). Driverless and autonomous drones could be used for committing various crimes allowing the perpetrator to roam freely as there is no need to stay inside the drone's transmission range (Peters, 2019).

6. Tricking face recognition:

Face recognition AI system is frequently used for identity proof on electronic devices and also used for suspect tracking or passenger checking in immigration services. "Morphing" attack is able to trick the AI system by using a single photographic ID to pass as multiple individuals and some other successful attacks are also demonstrated in the past (Andrews et al., 2019).

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7. Other medium and low categories of crime:

Apart from the discussed modes of AI criminalization, a number of criminal activities are now performed by or with the aid of the AI. Some of the emerging forms are:

(a) AI-authored fake news and false reviews
(b) Terrorism using military robots
(c) Snake oil cryptographic method
(d) Data poisoning
(e) Online eviction
(f) Burglar bots
(g) Adversarial perturbations or other methods for evading AI detection
(h) AI assisted stalking
(i) Forgery, etc.

6. Challenges for Regulating AI

With the development of technology, AI is becoming an omnipresent portion of society and our daily life (West, 2018). The autonomous and independent character of AI can potentially be used for committing or facilitating criminal acts with this technological development (King et al., 2019) . Hindering the development is not a solution and only advanced regulation and policy could mitigate these challenges). AI could either be used to facilitate a criminal act or in some cases mistake has resulted in a crime being committed. Ethical oversight of research and development, as the common mechanism of regulation, is not effective to mitigate the risks imposed by AI crimes. As a result, except for drone and self-driven vehicle regulations, all other fields lack effective legal safeguards. AI research and development requires small physical infrastructure, have different components of the AI system designed without conscious coordination, engage contributors from various locations around the world and be subject to secrecy in order to protect intellectual property interests, thus making its regulation difficult and problematic (Scherer, 2016). In this chapter, the crucial challenges will be outlined and possible solutions will be recommended for strengthening the regulatory framework.

(1) Addressing the criminal liability:

Without adopting the existing liability principles to the technology, the regulatory challenges could not be mitigated (Holder et al., 2016). The criminal jurisprudence declared that a person liable of committing any offence or under vicarious liability related to the offence must be compensated or penalized for their actions (Čerka et al., 2015). As the AI doesn't hold legal status under the domestic or international law, the criminal responsibility principles cannot be applied every time. As such, liability is likely to be transferred to the user of the AI or its creator (Hallevy, 2010). When any completely autonomous AI commits such an offence which wasn't foreseeable by the creator, it complicates the tasks for imposing liability. Gabriel Hallevy has suggested four criminal liability models for AI: direct liability; perpetration-by-another; command responsibility; and natural probable consequence.

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Under the direct liability model; Floridi (2016) proposes, the burden of liabilities may be shifted onto the humans—and corporate or other legal agents—who made a (criminally bad) difference to the system; such as the various engineers, users, vendors, and so forth, whereby "if the design is poor and the outcome faulty, then all the [human] agents involved are deemed responsible" (Floridi, 2016). Under the perpetration-by-another model; Ronald Arkin (2008) argues that, designers and programmers should be required to ensure that AIs refuse a criminal order (and that only the deployer can explicitly override it), which would remove ambiguity from the intent and therefore liability (Arkin & Ulam, 2012). The command responsibility model suggested using knowledge as the standard of mens rea if any superior failed to take adequate steps to prevent offences committed under his inferiors and that could include AI in the near future (McAllister, 2017). The natural probable consequence model suggested that the developers or users will be liable if the harm has resulted from the natural and probable consequences of their conduct. It is also necessary to prove that there was recklessness or negligence which exposed risks to others like market manipulation caused by AI (Wellman & Rajan, 2017).

(2) Balancing the Interests of Regulation and Innovation:

The continuous AI development could result in utilitarian innovation, as a result, a vital challenge is to balance between innovation and passing strict regulations. The creation process of software in many cases initiated bugs or glitches which are argued to be an inherent part of the process. If criminal negligence are actioned easily against programmers, it might deter them from further innovations. For securing the interest of the programmers, an unambiguous definition of "Liability" is crucial along with the clarification on foreseeability and causation (Scherer, 2016). Legislation for mandatory publication of code could make the research and development process more transparent and safer. Testing could also be strengthened so that the AI programs conform to safety standards.

(3) Determining the jurisdiction:

Nowadays a perpetrator can reside in Canada and could be launching a DDoS attack in a Japanese system. That's why it's not easy to locate the perpetrator as it's easy to mask identity online and that's why it imposed problems for determining jurisdiction in AI crime. The ITU toolkit is the first framework of AI jurisdiction which has divided all the common types of crimes into seven categories (Tafazzoli, 2018). A couple of principles has been applied by the ITU toolkit for creating a harmonized global legal framework which could be a guideline to harmonize international regulations are summarized below:

a. The territoriality principle: Allowing a country the right to exercise jurisdiction over crimes committed within the national territory.
b. The ubiquity doctrine: Allows a country to claim jurisdiction over offences for which the primary acts of the offence were committed within its border, even if the offense was completed outside the national border.
c. The effects doctrine: Enables the country to claim jurisdiction over offences based on the effect that the offense has within the domestic territory (including aid and abet).
d. The flag principle: It extends the territorial principle to ships and aircrafts flying under the flag of the country.

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7. Conclusion

This article provided a structured literature scrutinization of AI-Crime (AIC), by gradually shifting the focus from history, classification, application, criminalization and regulation of AI and AI based crimes. This article has attempted to sketch a rudimentary concept on the application of AI with a special focus on using AI by the criminal and criminal enterprises. Although many advancements have been made, still AI is not capable of holding consciousness in the practice scenario. There is still scope for imposing liability to the creator and developer as Artificial General Intelligence (AGI) is still a fiction. Like many other technologies, AI will open new doors for criminals, and consequently the prevention mechanism should be adaptive to new changes. We are entering into a technological regime where an ever-increasing variety of tasks are performed by autonomous machines with a self-learning capability. At some point eventually, we have to strengthen the regulations for controlling, preventing, and punishing AI based crimes. This suggests that we should examine the benefits and drawbacks of AI regulation sooner rather than later. The recommended principles and rules could be useful for determining the criminal liability of AI and for enacting effective countermeasures. The major findings of the paper, the stated facts, and the conclusive remarks are suggested to be undergone with the scientific communities' objective assessment and examination by the experts. We hope that the findings of this paper will allow some others to rethink their positions and dogmas on AI and while constituting a regulation for the control or prevention of AI-based crimes.

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FOURTH INDUSTRIAL REVOLUTION FROM THE PERSPECTIVE OF MANAFACTURING LEAD TIME

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Abstract: *This research examines the state-of-the-art technological growths and pinpoint real-world implications of fourth industrial revolution (IR 4.0) from leading-edge studies. Although published research is limited to IR 4.0, this research focuses on the ways to reduce manufacturing lead time through implementation of IR 4.0 nine advances' technologies. Specifically, in the manufacturing context, scholars apprehend that the triumph of IR 4.0 is not merely based on processes and data analytical measurement tools, but also includes wider perspectives. Hence, researchers have addressed the issue by discussing the advantages of the nine technological advances in IR 4.0 to improve manufacturing lead time and turn the business into competencies. It is crucial to conduct an inclusive research on the relationship between IR 4.0 and manufacturing lead time for future growth of the industries. Preceding researchers have emphasized the impact of nine technological advances in IR 4.0 on manufacturing lead time. Big data analytics, for instance, will significantly minimize the defective products and further improve the manufacturing lead time. The IR 4.0 mechanisms which improve the overall manufacturing lead time of the manufacturing industry were also scrutinized through the research. Hence, the research delivers practical thinking and strategic insights and that may serve as a managerial guide in enhancing organizational capabilities.*

Keywords: lead time, ir 4.0, strategy.

1. Introduction

The fourth industrial revolution (IR 4.0) has earned worldwide interest, dedicatedly from the manufacturing industries perspective. Ever since the first revolution in 1800, the manufacturing industries has continuously developed new approaches from steam power mechanization, mass manufacturing, digital revolution with the aid of information technology tools in automated production until the IR 4.0 intelligent value-added chains of production that penetrates the agent-similarly autonomous manufacturing production. Consequently, by valuing its promising benefits to sustain competitive advantages, numerous research ventures have been launched by global decisionmakers in transforming their manufacturing sectors into IR 4.0 (Bashir *et. al.*, 2020), for instances:

1. American manufacturers have launched a similar IR 4.0 effort known as smart manufacturing.
2. Germany has revealed IR 4.0 that pledged to create astounding benefits to the worldwide manufacturing industry.
3. Japan went far beyond IR 4.0 by the introduction of Society 5.0 in 2016, that emphasized on the digitalization in Japanese society for all life sectors.

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4. China has discovered a nationwide 10-years vision called “made in China 2025” in transforming the country into a world strong manufacturing power in 2014.
5. Saudi Arabia’s government has aligned the latest technological innovation by launching “Vision 2030” in upgrading the fast-moving consumer goods (FMCG), petrochemical, and refinery industries.
6. Malaysia established Industry4WRD national policy from the year of 2018 to 2025 that benefits the manufacturing sector and related services transformation.

1.1 Problem Statement

Contemporary manufacturing business is concerned with the growing aggressive, challenging and prominence of global market. Indeed, rapid development of manufacturing sector has been a key role in the economic growth of the developing countries (Attiah, 2019). For example, the Malaysia’s manufacturing sales contributed RM118.4 billion (MohdUzir, 2021) driven by the electrical and electronics (E&E) products 10.3%; followed by food, beverages and tobacco product 9.0%; transport equipment and other manufacturers products 8.2%. In reviewing the contribution of manufacturing sector in Malaysia economy, the manufacturing industries encountered significant challenges in adopting IR 4.0 and thus affecting the manufacturing lead time and development of new product in manufacturing sector (Sima *et. al.*, 2020). Besides, there is still a lack of adequate explanation in existing literature, and references as this is still an upcoming industry. The dynamic landscape of manufacturing industry has made it even more challenging to source for appropriate literature. This paper will attempt to review the existing literature, and then examine the feasibility in implementing IR 4.0 in reducing the manufacturing lead time in the manufacturing industry.

Furthermore, the COVID-19 pandemic outbreak has caused the disruption in global container shipping and ports (Yazir *et. al.*, 2020). Figure 1 demonstrated the rise of Freightos Baltic Global Container Index (FBX) near to USD2700 per forty-foot equivalent unit in November 2020 as compared to USD1300 per forty-foot equivalent unit. The sectorial implications of such disruptions to the manufacturing industry include the surged demand for durable goods, discretionary goods, and capital equipment. Supply shocks represent an unexpected sudden change in the availability of raw materials, parts, and manufacturing capabilities. It is not just that prices may surge, but the availability of essential components can vanish because of a lack of raw materials, parts, or lack of labor necessary for their procurement. The supply shock can take some time to be felt across a supply chain, depending on the existing buffer, such as stockpiles of energy, grain, parts, or raw materials. Hence, manufacturing industry requires to adopt the rapid changes in production, transportation, and supply to quickly react to changing market conditions to shorten the manufacturing lead time. Hence, in response to the problem statement, issues addressed above are crucial for manufacturing industry to be prepared for factory of future. Research findings on firm that can integrate relevant IR 4.0 approaches in shortening the manufacturing lead time to achieve better business performance with sustainable competitive advantages (Wei *et. al.*, 2017).

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Figure 1: Freightos Baltic Global Container Index (FBX)
Source: Schreiber (2020)

2. Literature Review

2.1 Lead Time

Supply chain composed of a series of stages, from the provision of intermediate goods to final goods consumption in consumer markets. Lead time is characterized by the time expended from order to deliver cycle (Nerea, 2020). Manufacturing organization requires shorter lead time, faster deliveries, lower costs, and higher customer service levels to survive in today's competitive business environment. Therefore, lead time measurement becomes crucially relevant in measuring the level of competitiveness on strategic manufacturing or service organizations' goals. It is important for the supply chain to know how long their own internal processes take with the tight Just-in-Time manufacturing constraints. Lead time is characterized by the time expended from order to deliver cycle. Figure 2 explained the simplified value stream mapping (VSM) from the lead time discussion perspective.

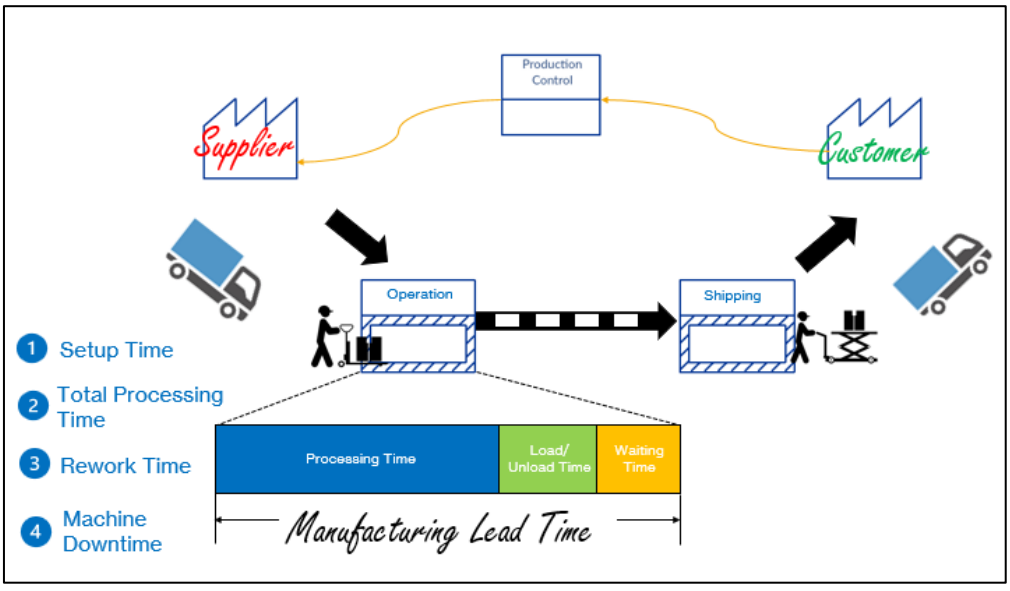

Figure 2: Simplified value stream mapping (VSM) illustration for lead time

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2.1.1 Manufacturing Lead Time

In specific, manufacturing lead time measures the lead time to manufacture components or final product (Orazio *et. al.* 2020). Manufacturing lead time consists of processing time (that encompasses of setup time, total operating time, rework time, and machine downtime), loading and unloading time, and waiting time. Setup time refers to the time needed of producing each device, machine, process, or system available regardless of the quantity ordered. Real operating time defined the status of performing the work in a process, where it increases roughly in proportion to order quantity. Waiting time or queue time refers to the status of the time when the work is allocated to each machine.

2.2 Implication of Fourth Wave Technological Advancement in Manufacturing Lead Time

There are nine technological advances that established the groundwork for IR 4.0 in reducing manufacturing lead time. As with introduction of IR 4.0, these nine pillars will evolve from an isolated production to become an entirely optimized, automated, and integrated manufacturing processes that led to better productivities and forms the strategic relationships with suppliers, manufacturers, and customers.

2.2.1 The Industrial Internet of Things

Based on Majstorovic and Mitrovic (2019), the internet of things development involves the connectivity of smart devices and these technologies, in manufacturing context, are often described as the industrial internet of things (IIoT). IIoT promises to revolutionize manufacturing organizations where sensors and machines are networked with embedded computing. Filed devices and smart sensors with automation controllers are typically feed and organized into a main vertical automation hierarchy production control system. More devices will be connected using standard technologies and developed with embedded computing with the introduction of the IIoT. Hence, field devices can interact and communicate both with the more centralized controllers and with one another when needed. Therefore, it promotes enabling real-time responses, faster decision making, and analytics, hence, reducing the manufacturing lead time. For instance, Bosch Rexroth supplied a valve control system production facility with a decentralized and semi-automated manufacturing process (Ray and Rao, 2019). Products are then categorized using radio frequency identification (RFID) codes so that the workstations can identify the production flows that must be performed for each product at the specific operations.

2.2.2 Additive Manufacture

Modern manufacturers have adopted additive 3D printer manufacturing in producing prototyped components. With the IR 4.0 implementation, the additive manufacturing systems would be extensively implemented to manufacture small batches, made-to-order, lightweight, and complex products that provide design advantages. High-performance and dispersed additive manufacturing systems would decrease inventory on hand and unnecessary material movements. As an illustration, aerospace companies widely applied additive manufacturing in innovative product designs that minimize material wastage and overall aircraft weight through introduction of materials such as titanium (*Ti6Al4V*), nickel 718, cobalt chrome molybdenum (*CoCrMo*), titanium aluminide (*TiAl*) and other high-performance alloys.

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2.2.3 Big Data Analysis

Analytics based on huge data sets or big data analysis has become evident in modern manufacturing context. As it improves equipment service, saves energy, and enhances production quality, big data are collected and comprehensively evaluated from numerous resources, such as manufacturing systems and equipment, in addition to enterprise and customer management systems that supports the instantaneous decision making. To further illustrate, Infineon Technologies as a semiconductor manufacturer, has minimized defective products by early symptoms detection by removal of the faulty chips during early production stage that could improve the overall production quality. This measure can be conducted by comparing the single data chip obtained at testing phase with data collected at wafer level across the manufacturing processes.

2.2.4 The Cloud

Manufacturing organizations use cloud-based software that act as a "data warehouse" in collecting huge amounts of data that involves careful management. More production-related undertakings are required to increase the data sharing across company boundaries and sites for certain analytics and enterprise applications. Concurrently, the cloud technologies performance will be improved, and data are processed in just few milliseconds. Consequently, functionality data and machine results would gradually be deployed into the cloud system and enable a more data-driven manufacturing system, such as cloud-based processes monitoring and control. Besides, most manufacturing execution systems (MES) software suppliers are kickstarting the cloud-based solutions for their customers.

2.2.5 Autonomous Systems

Jidoka, a Japanese term for autonomation, is one of the key concepts for lean Toyota production manufacturing system. Numerous manufacturing organizations have been integrating robots to handle multifaceted tasks as robots are growing for more utilization since contemporary business systems are growingly developed autonomous system with less human intervention to deliver more effective outcomes. Eventually, the whole more production system becomes autonomous, flexible, and cooperative through interaction of robotics system side by side with learning from humans in safe working environment. Generally, the robotic system will generate lesser cost and greater capabilities than the existing manufacturing system used. Kuka as a top European robotic equipment's manufacturer, for example, has offered autonomous robots that are able to interact and interconnect with labour resources to facilitate automatic adjustment on manufacturing executions that fitting the in-line work-in-progress (WIP) product (Ray and Rao, 2019). These usage of sophisticated controllers and sensor units have enabled automation with close human collaboration. Correspondingly, the industrial robotic system supplier, ABB has introduced a dual arm SCARA robot, YuMi that suits the consumer electronics assembly manufacturing organizations. The two padded arms and computer vision features in YuMi robot has enabled a more precise parts recognition and safer human interaction.

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2.2.6 Advanced Simulation

The simulation using computer aided three-dimensional (3D) design of production processes and materials are frequently being integrated in the engineering research and development stage. Nevertheless, in the nearest future, the advanced simulations would be expansively applied across manufacturing plants and operations, besides of empowering real-time data capturing that is able to reflect the human, product, and machine utilization in physical manufacturing condition to a simulated model. This would allow the workers to simulate and optimize the machine settings virtually before the physical changeover for subsequent production line, thus improve the product quality and minimize the machine setup duration. Siemens, a German machine, and tooling supplier for instance, have developed a prototyping machine that is able to simulate the machining process by inputting production data. This has significantly reduced the actual machining setup time and process by 80 percent.

2.2.7 Cybersecurity

Most organizations are still depending on the unconnected and isolated management and production systems. With the increased connectivity and use of standard communications protocols in modern manufacturing context, the requirement to secure critical production lines and industrial systems from cybersecurity threats increases intensely as data is easily obtained everywhere. As a result, a more reliable and protected communications and sophisticated identity and access management of machines and users are becoming essential. This has promoted strategic partnerships between several industrial equipment vendors with cybersecurity companies to obtain a more secure and safer cyber operations.

2.2.8 System Integration

Most of supply chain information technology systems are not fully integrated, where neither manufacturers, suppliers, and customers are rarely closely linked to internal operations such as engineering, production, and services. Cross functional teams from the corporate to the shop floor level are not fully integrated. Similarly, engineering operations from products to plants to automation are lacked complete integration. With the introduction of advances in IR 4.0, companies, departments, functions, and capabilities will become much more cohesive as a universal cross data-integration networks company that enable truly automated value chains. As an example, BoostAeroSpace and Dassault Systèmes have launched a collaboration platform for the European aerospace and defense industry. The platform, AirDesign, that served as a common workspace for design and manufacturing collaboration service on a private cloud system. This would ease in managing the complex manufacturing tasks such as product changeover and production data among multiple partners.

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2.2.9 Augmented Reality

Augmented reality (AR) systems offer a mixture of interactive and services enhancements, for instance, by permitting selection of parts in warehousing center and transmitting the rework instructions through digital devices. However, the systems are in embryonic stage and it requires wide implementation of augmented reality across the organizations that could improve real-time information for operators to have a proper work procedures and better decision making. Operators would obtain the rework instructions on replacing a specific component from the repair system database as an example. By wearing the AR devices such as augmented reality glasses, this rework instructions would be demonstrated right in operators' field of sight to ease the repair tasks. Besides, most leading organizations such as Amazon, DHL, and Samsung integrate AR glasses for their logistics activities (Silva and Liyanage, 2019). AR also assists virtual training applications. COMOS, a simulated plant engineering training module developed by Siemens, uses real time data driven three-dimensional simulation environment with AR glasses to train operators in handling ad hoc situations. Operators can learn to interact with machines through AR applications by clicking on a cyber representation. At the same time, operators are exposed to changing machine parameters, retrieving maintenance instructions and operational data.

3. Managerial Implications

The study promotes the issue of integrating IR 4.0 approaches to achieve manufacturing lead time reduction in order to sustain competitive advantages over the rivals. Business survival in post COVID requires shorter lead time, faster deliveries, lower costs, and higher customer service levels (Lim, 2020). The challenges of maintaining new product performance is further aroused when the product lifecycle becomes ever shorter, when new products substituting the existing one, and when meeting consumer needs get more demanding. Lead time measurement can sustain business' competitiveness and survival through the understanding of internal processes that should be aligned with Just-in-Time (JIT) manufacturing constraints. Therefore, by emphasizing on the nine advances of IR 4.0, it gives implication and clarification to achieve better reduction in manufacturing lead time. IR 4.0 implementation helps companies minimize the risk of disruption in times of stress. Investments in IR 4.0 can improve the overall plant productivity and output by 15% to 25% and boost the customer satisfaction by 20% to 30% (Nagy *et. al.*, 2018). Shortening the manufacturing lead time would enhance the time-to-market for introduction of new product to customer in post COVID-19 business survival context. The study has several implications for manufacturing organizations. For instance, it would practically assist practitioners to consider attaining IR 4.0 approaches in reducing their manufacturing lead time while focusing in development of new product. Pragmatic perspective of the study provides valuable in decision-making process when deciding the type of IR 4.0 nine advances be deployed to improve the organizational supply chain lead time. This would aid in offering far-reaching strategic business model policy making opportunities for government or specific organizations in maintaining and expanding company's competitive position to face fourth industry revolution. The research findings suggested several practical implications. This research may serve as a managerial guide in enhancing organizational capabilities in new product development. First, practitioners can attain flexibility in their manufacturing system when developing more products. This would enable managers to focus on the most significant predictors of performance while facilitating flexibility in manufacturing system to sustain competitive advantages. In other words, it remunerates the shareholders by recognizing the key features for a company's success in new product development. Hence, the research would enable the firm's decision makers to develop IR 4.0 strategy that able to sustain better performance over the rivals in this highly competitive and dynamic external business environment.

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4. Conclusion

The search for lead time reduction has always been the objective of manufacturing organizations in creating competitive edge of the company. Shortening manufacturing lead time would enhance the time-to-market for introduction of new product to customer in modern business survival context. Thus, nine technological advances in IR 4.0 are the important pillars to reduce the manufacturing lead time and creating competitive advantages.

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GREEN ACCOUNTING IN ACHIEVING HIGHER CORPORATE PROFITABILITY AND SUSTAINABILITY IN READY MADE GARMENT INDUSTRY IN BANGLADESH. A CONCEPTUAL ANALYSIS

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Abstract: *The purpose of this study is to reveal the conceptual analysis on how green accounting helps to improve the environmental performance, control cost, and invest in safe technologies in terms of product mix, product retention, and product pricing within the readymade industry in Bangladesh. This conceptual paper also reveals the importance of green accounting field which is to communicate actual or potential costs of a company or the national economy impact on the environment. In addition, it offers a base for future research in green accounting practice to help create awareness among people in the corporate sector for achieving long-term benefits for companies who are environmentally involved. Thus, this study attempted to link the gap between the Green accounting issues related to corporate profitability and sustainability and come up with the conceptual framework. On the other hand, it fosters social interest and establish the contribution of developing countries towards global environmental commitment and protection for sustaining green global environment.*

Keywords: Green Accounting, Sustainability, profitability.

1. Introduction

Green accounting is relatively new and a developing field. However, in Bangladesh the green accounting is considered new issues because, the implementation of green accounting in organization such as garments Industry been ignored. Not only that, the accelerating the task of green accounting and corporate sustainability in developing countries is not only a problem but also a challenge for South East Asia and other developing countries and is critical and limited (Hahn & Lülfs, 2013). The green accounting deals with accounting and management issues relating to environmental and social impacts, regulations and restrictions, safety, environmentally sound, and economically viable energy production and supply. The number of experts in this field and in financial subjects in these countries needs to be supported with a planned budget and good decisions of policy makers however the numbers of experts in green accounting are minimal in Bangladesh making it a concern to have adequate expert opinion on the subject matter (Hezri & Ghazali, 2011).

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2. Problems Statement

A survey of a group of polish companies taken 60 entities from 5 sector of industry which was reported before Management, Knowledge and Learning Conference in 2013, the practical problem was that organizations are prioritizing for profits leaving corporate responsibilities and social interest unattended (Sachs & Warner, 1995). This problem was similarly identified in Malaysia as the reporting of sustainability practices and steps are still not done. Whereas green GDP is a substantial factor not only in Malaysia but also in the whole World; which when related to sustainable development in current world environment focuses on a robust environment accounting system, which is a new concept that will take time to have active attention and participation in Malaysia and around the world (Wu, 2015). A related study introduced sustainability accounting, going beyond green accounting and its methods and procedures for practical application to achieve corporate sustainability (Bettina, et al., 2012). Consequently, the gap found here hopes to foster sustainability goals for green accounting and to create a career pathway for the next generation workforce. This study cannot ignore traditional accounting, hence the study intents to investigate how to combine traditional accounting and sustainable green accounting to match with corporate sustainability in developing countries for successful accomplishment of green environmental goals; which in turn requires modern research methods, evaluation, and overall research support.

3. Objective

1. To identify the dimensions of green accounting related to readymade garments industry.
2. To identify the conceptual framework of green accounting toward profitably and sustainability.

4. Review of Literature

To understand the importance of green accounting towards corporate responsibility and sustainability situation is equally significant. The critical literature reviews which drawn by several authors plays the vital in developing the conceptual framework.

4.1 Implementing Accounting Practices

There standards on accounting do not have absolute measures for cost which makes it difficult in assigning financial figures to some environmental activities making it a challenge. The problem with the quantification of cost is that it also prevents comparisons and analysis of cost allocated for different accounting years as the conditions and factors considered for each year's quantification may be different from the previous years or the years ahead (CEA, 2013). Companies whose operations are directly involved in the environments have greater challenge as they can be faced with natural disasters which directly affects their operations such as the natural resource mining companies. There is a massive investment involved in solving environmental pollutions caused by natural disasters which puts pressure on the company's resources (Peter, 2012). These types of risk must be considered as uncontrollable by the company therefore, in environmental responsibility accountability, it is necessary to define the pollution as either controllable or uncontrollable by the company involved (Roussey, 1992).

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4.2 Environmental Responsibility

The concept of environmental responsibility in accounting focuses ensuring that the accounting practice is conducted in a way that ensures sustainability and compliance to the standards of accounting as well as keeping the stakeholders aware and up to date on the operations of the company through environmental disclosures. Also, studies have supported the concept of designing the environment which become the integral part of preventing environmental degradation and pollution issues by the process of proactive environmental management which focuses on planning and designing products with upgradeability and recyclability which is a proactive approach to dealing with any disposal issues at the end of the product life cycle (Chowdhury, et al., 2016).

This approach focuses on cohesive and environmentally responsible product development which showcases proactive future developments yet to be dominant in these recent times The Bangladesh's government passed several laws on the disposal of discarded electronic consumer products as well as air borne chemicals emitted into the air by the manufacturing companies (Chowdhury, et al., 2016). These laws put pressure on the manufacturers and importers by holding them responsible when consumers discard their products. It can therefore be observed that most of the manufacturers in the RMG industry have recently considered reusing and recycling their products and there is less burning of waste products as there used to be some years ago. A researcher mentioned some time ago there is no air borne waste product in the Ready Made Garments Industry as the waste product of one process in the raw material for another process (McKinsey & Company, Inc, 2011). The relevance of this for accountants is that when the company abides by the environmental regulation and laws prescribed within the industry in which the business operates, they are not obliged to hide any activity by the company which might put them in a compromising position between the legal authorities and the management (Jabed & Rahman, 2013).

There is also less management interference with the corporate and environmental disclosures in regards to what must be published in the financial accounts to the stakeholders and shareholders or not as there is nothing to hide when the company comply with all the relevant rules regarding their business operations (McKinsey & Company, Inc, 2011). Environmental researchers have also recommended adopting clean technology in manufacturing industries as an approach to achieving environmental and corporate sustainability (Goyal, et al., 2013). This approach to sustainable environmental was initiated by Japan's Research Institute for Innovative Technology for the Earth (RITE) which is a consortium that financed and provided employees for the Japanese government and other companies. Their work was focused on a proactive development and commercialization of clean technologies for the developing world spanning a 100 year plan. They are known the next generation power and technology house which have worked over the years to neutralize and eliminate all greenhouse gas emissions and ensuring that there is zero or near zero effect of environmental pollution from manufacturing (Samuel-Quigley, et al., 2013; Pol & Lim, 2013). Several countries have attempted to copy and adopt from Japan, developing countries like Bangladesh have mentioned these intentions and challenges of adopting these technologies as being due to lack of financial stability.

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4.3 Green Alliances

Some researchers have recommended green alliance as a way forward for solving environmental degradation and green environmental responsibility (Butt, et al., 2015; Otutei, 2014). The green alliance approach focuses on making partnerships between businesses and environmental groups by integrating corporate environmental responsibility, aligning market goals and sharing cost involved in implementing environmental goals. This approach also focuses on encouraging business allies especially for companies dealing in similar products or dealing in the same industry. This facilitates allying in order to solve the ecological and environmental problems that might arrive due the business operations, and this has become an integral part of business and promotes eco-tactics. The dominant factor in this is the shared responsibility and sharing environmental liability associated with the operation. This approach has worked in Germany, Europe and other developed countries where the accountants and managements of those companies involved collaborated in the corporate disclosures (Vincent, 2012).

There has no proven case in developing countries therefore it is difficult to prove whether a developing country like Bangladesh can adopt and practice this approach. However, the green alliance for disposing environmental waste is a clear and visual and proactive approach to handling environmental pollution issues a part of fulfilling the environmental responsibility (Walker, et al., 2014). In practicing this, the management must also figure out a way to account for the shared responsibility in the corporate disclosures as this cannot be simply added to additional notes in the final account and the standards of accounting clearly do not describe an accounting procedure handling transactions involving sharing environmental loss by allying businesses. Some successful international companies that have undergone these green strategies include The Body Shop International and World Wildlife Fund, General Motors and McDonalds. This strategy is also recommended for companies who do not possess the expertise or public trust to handle their environmental problems adequately (Lion, et al., 2013). Bangladesh RMG has a questionable reputation for handling environmental degradation evidenced in the several cases of environmental pollution by the RMG companies well described in the problem statement.

Though the authorities in Bangladesh have admitted to the need of upgrading their commitment to ensuring there is maximum compliance to the environmental laws and regulation especially by the companies in manufacturing industry including the Ready-Made Garments Industry (Hahn & Lülfs, 2013). Other researchers added that the companies in the RMG hardly emits harmful substances into the air because their operations use moderate chemicals in the fabric design, however their major environmental problem in the lack of safety in the workplace thereby endangering the lives of the laborers operating in the factories (Chowdhury, et al., 2016). The major problem yet less considered by the management is the inadequate work and safety supplies for the workers in the factories. The green alliance can be adopted by the companies in the Bangladesh RMG industry and a next generation approach to handling environmental degradation through shared business cost (Khalifa & Hammad, 2014; Anupr & Kartik, 2013)

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4.4 Environmental Awareness

Environmental awareness has been identified as the ultimate goal for environmental education which creates awareness among citizens which was mentioned in the environmental education workshop held at Belgrade, Yugoslavia (Tanner, 1980). Sarker, et al.(2018) mentioned in their study investigating the environmental awareness among the industrial workers in Bangladesh 91% of the respondents including workers in the garments and textiles industry have ideas about environmental issues however most of these workers do not know the health impact associated with the environmental problems. The remaining percentage have no adequate knowlegde on the environmental issues and what their employers are supposed to do to ensure environmental safety. The present study focuses on the RMG industry which has been recorded to have contributed to several atmospheric pollutions and severe cases of global warming making Bangladesh one of the most vulnerable countries in the world (Banglapedia, 2008; Ullah, et al., 2018). Pillai (2012) reported that Bangladesh has all types of environmental disasters, some of which have been scientifically established to be irreversible, some of which results in unavoidable negative impacts and some are reported to be unmanageable.

The way forward has also been stated by several scholars as raising and increasing environmental awareness. Shobeiri, et al. (2017) added in their literature that no single government can achieve goals of environmental conservation on its own except if there is an involvement of the public participatory role in it. Therefore, is it crucial to protect and preserve the environment by increasing the level of awareness towards the environment. The study by Ullah, et al. (2018) also suggested that a large nummber of students (69% of the study sample) would like to volunteer for work in relation to preventing and preserving the environment. A percentage of the study sample (45.5%) who are not part of any environmental organization are willing to support environmental activities through donation and compliance through extra taxes (Talay, et al., 2004). This is a promising result for Bangladesh should this result be replicated in thee other parts of Bangladesh resulting to high environmental awareness.

Due to the several reported environmental hazards, most corporations turn to be part of environmental organizations which visually should imply their compliance to the environmental roles and responsibilies. However, the statistics show with the production industries show that most of these companies use their environmental organisations as a cover up to avoid enviromental compliance. The important implication of these behaviours in the weak governmental regulation on environmental issues. Therefore the most important contributory factor is the the governmetn of Bangladesh must ensure that it strenghens its laws and regulations on enviornmental issues and policies (Thapa, 2001). The improvement in the environental literacy of the Bangladeshi community especially in the Ready Made Garments industry will serve as a fundamental solution to a long standing problem whch will also help ensure mor safety and healthy environment to all human alive and alive. This will also help avoid several environmental sanctionsl suffered by the country due to environmetal issures (Shobeiri, et al., 2007).

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4.5 Environmental Involvement

The ecological values of various corporations involve engaging all members in environmental activities with the objective of building responsible and sustainable policy and practice within the corporate environmental. This is important as it also determines the level of determination or the motivation of stakeholders when processing information of environmental issues (Petty & Cacioppo, 1990). Schultz, et al. (2004) defined environmental involvement as the affection or the emotion associated with the beliefs about environmental protection. The concept of environmental involvement is not only applicable in green accounting but also on other fields and industries (Schultz, et al., 2004). Bang, et al (2000) discovered in their study that investigated how consumers who were emotionally involved with the issues within the environment were willing to pay higher prices for goods and services received provided the corporation have shown greater commitment to for renewable energy and practices that prevent or minimize environmental hazards or effects of their production activities. Kaman (2011) mentioned in his study that the individual's involvement in local environmental issues also motivates them to adopt green purchase behavior; this study also associated environmental involvements as part of a three stage process in the implementing green behavior of consumers. Environmental involvement is achieved when there is a positive environmental behavior of individuals who, groups or institutions who see the importance of adopting safe environmental practices for environmental safety (Kaman, 2011).

4.6 Corporate Profitability and Sustanability

Corporate strategy hopes to address the issues that impact a company's ability to achieve its objectives in order that the goods and services produced meets the needs of the market it is intended to serve for corporate profitability and sustainability of competitive advantage (Galbreath, 2009; Porter, 1980). In doing so, the report Lange (2003) recommended the company must revisit its commitment to green governance and green policy. Valentine & Savage (2010) categorized these commitments as deep and shallow; deep commitment indicating the company's determination to disclose quantitatively its environmental performance, system and structural changes to adopt green accounting, and any policy amendments adopted and implemented by the company. The shallow commitment of firms include company's providing vague information and lack of substance in the environmental disclosure in addition to the absence of environmental initiative or intentions to make any policy amendments to integrate green accounting and reporting.

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5. Conceptual Framework

Thus, by incorporating the framework ideas from the previous literature and discussions earlier, the study develops a new conceptual Framework that incorporates green accounting dimensions and its implications on the overall corporate organizational performance and sustainability with the focus on the Bangladesh RMG industry.

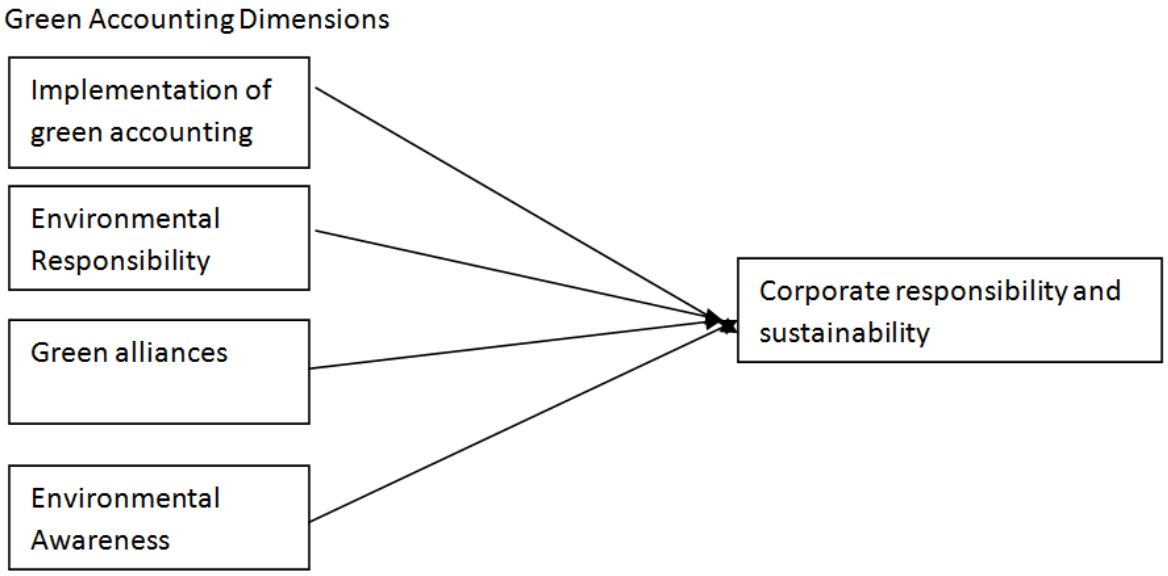

Figure 1: Conceptual Framework of Green Accounting

6. Conclusion

The present study attempts to develop the conceptual frame work based on the existing literature reviews of green accounting and corporate responsibility and sustainability. The model of this study is yet to be tested by using quantitative method and Smart-PLS analysis. The study therefore also aims to recommends the policy maker to practice good green accounting model in ensures the profitability and sustainability especially the garment industry.

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REVIEW OF IR4.0 READINESS AND ADOPTION IN MALAYSIAN MANUFACTURING SECTOR

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Abstract: *Technology has become an integral part in the manufacturing sector. Businesses have been changing dramatically over a short period of time and exposed to uncertainty, complexity and risks that influenced by technological innovation. Additionally, the fourth industrial revolution (IR4.0) which is rapidly approaching has created massive unprecedented change and barriers across the manufacturing sector. Employment disruptions, high implementation cost, organizational and process changes, security and privacy issues, regulatory compliance issues and lack of data management are few barriers that are required to cope up with the upcoming emerging technologies. The growing global competition especially adopting IR4.0 into the manufacturing sector has mounting challenges to the business world. Such a challenging environment should drive manufacturing sector particularly Electrical and Electronics (E&E) Small and Medium-sized Enterprises (SMEs) in Malaysia to adopt IR4.0 to ensure survival. However, the enthusiasm for the IR4.0 adoption among E&E SMEs appears to be low. With respect to Malaysia insufficient research on the winning formulae to overcome the IR4.0 adoption, this study reviews the IR4.0 readiness and IR4.0 adoption in Malaysian manufacturing sector.*

Keywords: E&E SMEs, fourth industrial revolution, IR4.0 adoption, IR4.0 readiness, Malaysia.

1. Introduction

There is no doubt that technology has indeed improved and changes the direction and dynamic of a business and the marketplace. For centuries, with the help of animals or by hand, goods such as foods, clothes, houses and many more were created. Eventually, though technology, we have seen previously unavailable products and opportunities are available and have driven businesses to new heights. The evolution of industrialization may change the way manufacturing processes are conducted as well as resulting in significant impact including creating more jobs opportunities.

The evolution of industrialization went through three (3) transitions before reaching the Fourth Industrial Revolution (IR4.0). In the past, the 1st industrial revolution started when the agrarian societies made the shift to industrial and urban societies started using steam and water powered machines that overtaken manual labor. By the beginning of the 18th to 19th century, steam engines and textiles industry outgrowth with the introduction of Industry 1.0. Britain was considered the birthplace of the 1st industrial revolution, where it was the world's leading colonial power. Manufacturing operations were rapidly developed.

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The 2nd Industrial Revolution commenced in the beginning of the 20th century with the discovery of electricity which allowed the mass production of products. Electricity became the primary source of power. Machines were designed with their own power and greatly contributed to expanding economies around the world. Introduction of assembly line manufacturing in automotive industry by Henry Ford increases the effectiveness and efficiency of manufacturing. Various concepts such as factory layout design, supply chain and mechanized operation have giving rise to manufacturing facilities (Schmidt, et al., 2015; Erol & Sihn, 2016).

Meanwhile, Industry 3.0 often referred as the Digital Revolution in last few decades of the 20th century. The use of micro-electronics and advancement of technology directly change the operations movement of organizations that contribute to higher optimization of production and automated machines. More fully automated machines were introduced since the invention of transistor and integrated circuit chips implanted in the machines that are used to control electric powered machines. A number of software application were developed by companies such as Systems, Applications, Products in Data Processing (SAP), Oracle and Microsoft that enable automation, inventory tracking, product design, supply management and quality analysis (Schmidt, et al., 2015). Apparently, it can be clearly seen the F-A-N-G effect namely Facebook, Amazon, Netflix and Google which began in the end of 3rd Industrial Revolution have accumulated data that contribute to Big Data technologies.

The 4th Industrial Revolution (IR4.0) is tie up several major technological innovations with amazing new capabilities in digital technology including big data, augmented reality and cyber physical systems (CPS) which are poised to transform the manufacturing sectors that will optimize the usage of energy resources (Lee, et al., 2014). The Boston Consulting Group (BCG) has identified and published nine (9) pillars of technology that could make up IR4.0 mainly Big Data and analytics, Autonomous Robots, 3D Simulation, Universal System Integration, Industrial Internet of Things (IoT), Cyber Security, Cloud Computing, Additive Manufacturing and Augmented Reality (Kusmin, 2012; Rüßmann, et al., 2015; Thoben, et al., 2017). Up to now, the industrial machines (robots) work separately from human. However, the advancement and current happening with the technology which surrounding the manufacturing industry leads to rapid changes on its' overall structure and operations.

2. Literature Review

Industry Revolution 4.0 (IR4.0)

Industry Revolution 4.0 defines as Industrie 4.0 - the technical integration that connect cyber-physical systems (CPS) together with embedded system production technologies that function in term of self-managing and self-control network in the production and industrial processes that produce intelligent products and production processes (Brettel, et al., 2014, Macdougall, 2014).

IR4.0 is a vision for the future industrial production that nine (9) pillars were identified to transform the manufacturing industrial's production: (1) Big Data and Analytics are based on collection of comprehensive evaluation of massive data that stored, analyse and will be used to support real-time decision-making processes to identify inefficiency and improve quality of production. Big Data and Analytics cover four important functions.

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The first function is real-time Overall Equipment Effectiveness (OEE) in which it enables direct connection between OEE and machines to eliminate problems associated with manual data collection, monitor status and throughput in real time.

The second function is to predict maintenance of machines where it determines the health condition of in-service equipment in order to predict next maintenance which saves cost over routine maintenance.

Third function is energy management system where it provides metering, sub metering and monitoring functions. Data is gathered to allow more informed decision about energy activities across sites which save energy and allow real-time decision making.

The last function is Manufacturing Operations Management. This function is to control labor tracking processes, managing production and quality, (2) Autonomous Robots are the combination of human world and robotic world where human with their superior creativity and cognitive abilities and the robot with its greater repeatability, autonomous, flexibility, strength, precision and cooperative. Robots become the third arm of the human operator for example “Kuka” able to interact and interconnected with one another to automatically adjust their actions to finish the unfinished production line systematically and “YuMi” two-armed robot that specialized designed to assemble products. Robots will able to learn from human. Computer Aided Manufacturing (CAM), Computer Aided Design (CAD) and Computer Aided Engineering (CAE) aid to analyse and optimize products before manufacturing, shortening design cycle and increase productivity, collect data digitally and eliminate human errors and finally ease to data analytics. This will form new collaboration and open up possibilities for the smart factory in future, (3) 3D Simulation leverage the time of product development, material development and production development reduced and operators able to optimize the function of machine setting for next scheduled production even before production starts. With this, the machine setting up time will be reduced and optimized the machines setup for next production line in the virtual world itself to increase quality, (4) Horizontal and Vertical System Integration is the entire organization (departments, functions and capabilities) will be interconnected and closely linked (organizations, suppliers and customers) to execute flexibility and efficiency of the firms acting within an integrated new system for digital manufacturing, (5) Industrial Internet of Things (IoT) is a network of physical objects such as vehicles, devices, buildings and other items fitted with electronic components, sensors and software that link together via the internet (standard protocol). With the IR4.0, smart factories will be part of the IoT. Radio Frequency Identification Codes (RFID) is embedded in products so that the products can be recognized by which allows decentralize analytics and decision making that enabling data collection from machine that allow real time response. For example, embedded computing will access unfinished products and workstations will know what step to perform next to convert to finished products, (6) Cyber Security is an important aspect that currently discussed as cybercrime and hackers’ threats are must not overlooked. The firm’s processes, business secrets, critical industrial systems and manufacturing lines are needed to be protected from cyber security threats which directly increase secure, reliable connectivity and use of standardized communications protocols. The implementation of sophisticated identity and machine access management system protect the firm from technology intruders in a competitive environment, (7) Cloud Computing in the context of IR4.0 is robot that will be able to access decentralized data in networks or in the cloud to react in just several milliseconds. The increase of data sharing across sites will improve the performance of cloud technologies. Therefore, boosting the performance of the production and increases the flexibility significantly. It also enabling robots learns from one another, (8) Additive Manufacturing is an intelligent and highly automated production addresses every customer’s individualized or customized requirement. Additive manufacturing solved the

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costing problem as previously the cost of individualized or customized production is the cost at the level of mass production. With IR4.0, organizations use 3D printing for prototyping to capture customer's requirement and unit production apply the new design to produce even in small batches. This system will allow high dynamism in the product range. The customer's desires for individualization or customization products are fulfilled; the efficiency in the industrial process achieved significantly and eventually lowering stock on hand and, (9) Augmented Reality is augmented- reality- based support systems that provide real-time information regarding the repair instructions over mobile devices. Workers will be using augmented-reality glasses to display real time information (operational data and maintenance instruction) from organization's network or in the cloud directly on the glasses to improve decision making and work procedure (Kusmin, 2012; Rüßmann, et al., 2015).

2.1 Global Status on IR4.0

Liao, et al. (2017) shared that from the government perspective United States, Germany, France, United Kingdom, Europe, South Korea, China, Japan and Singapore have invested billions of amounts for the development of cutting-edge technologies to lead the next generation of manufacturing. National level of discussions, future plans and projects, conferences, forum and exhibitions are held throughout the world to catalyst a new way of business conducted especially manufacturing. From the industrial perspective, few of the big organizations such as Siemens, Hitachi, Bosch, Panasonic, Honeywell and Emerson Electric actively invest in the IoT and CPS to establish full automation and digitalization processes.

2.2 Malaysia's Perspective

The foundation of the nation to achieve a fully developed country is by transforming itself into export-led growth. The importance of the export-led growth to Malaysia is directly linked to the development of its manufacturing industry. The innovation and creativity of the manufacturing industry in Malaysia to cater the demand of other countries open up external trades that heavily contribute to its economic growth (Abdullah, et al., 2007; Lee, et al., 2017). As other countries heavily depend on the export-led growth, the promotion and marketing of available products have intensified competition among the global players that sharpening the gaps between the winners and losers.

Given that export-led growth is way more important to Malaysia's economic growth which significantly increase the nation's gross domestic product (GDP) and employability, international trade immensely inevitable. Consequently, Malaysia is exposed to the international instability such as economic crisis, environmental problems, fierce technological development and sensitive global competition which as a result can lead to considerable of external shocks that can decline Malaysia's manufacturing production and exports.

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The finding from the study by Abdullah, et al. (2007) suggested that the core of the manufacturing industry to prosper lied within the human skills, knowledge and expertise of the workforce. The people of the workforce drive the manufacturing industry by implementing various strategies, principles and practices in order to achieve competitive advantage. Having to say that several empirical studies have done to prove that the development of Knowledge based economy (K-economy) was crucial (Sohail, et al., 2009). It plays a key contributing factor of the manufacturing rapid development. However, the recent development in the technological aspect sees much bigger exposure and risks which this trend is inevitable by the Malaysian manufacturing industry. The impact of this trend, called as Fourth Industrial Revolution (IR4.0) in nature comes with various setbacks that could hurt the manufacturing industry especially the electrical and electronics (E&E) sector.

E&E SMEs plays a crucial role in the development of Malaysia in term of economic, social and technical. It creates employment, infrastructure, business opportunities, new ideas and economic growth. In the context of this research, the focus of the study is on the electrical and electronics (E&E) sector for several reasons. First and foremost, E&E sector is important engine in the manufacturing industry consist of multinational companies and small and medium size enterprises (SMEs) and not paying attention to these employees in this sector will cost the performance of the productivity, employability percentage and economic growth will dangerously hurt (Abdul, et al., 2010; Hassan & Talib, 2011). Secondly, due to the important role, several strategies and systems are adopted such as Lean Management (LM), Total Quality Management (TQM) and so on to minimize wastage and defects that able to produce higher quality products that driving country's major export products and ensuring business excellence (Mrugalska, et al., 2017; Industry 4wrd: National Policy, 2018). Thirdly, the development of the IR4.0 is interconnected with electrical and electronics (E&E) sector as they are the producer for the tools for the automation and digitalization. Adding to that, the IR4.0 is not restricted on the automation of a single firm, but IR4.0 will be redefining and putting together overall E&E's chain network into one single digital ecosystem. With the significant contribution to the country's manufacturing output, exports, investments and employment, the adoption of IR4.0 by E&E is important in driving the economy. However, the current E&E sector in Malaysia is not adequately equip itself with IR4.0 technologies and the ability to use the IR4.0 technologies to enhance and ease their job responsibilities (IMP2, 2005; Ganzarain, & Errasti, 2016).

The IR4.0 will bring a tremendous efficiency within the organization that ensures agility, adaptability and alignment with other organization to gain competitive advantage. The Networked Readiness Index by World Economic Forum stated Malaysia was rank at 31st out of 139 countries in exploiting the opportunities offered by Information and Communications Technology (ICT). Like all revolutions, it is absolutely certain that digital transformation is acting as a force that separating E&E SMEs into winners or losers. The question is who is successfully navigating these changes and who will be left behind. Winners will be E&E SMEs who develop forward looking business models, invest in the right technologies on time and digitize and networking their production. Meanwhile, for losers are those who are sleeping on digitalization, bet on the wrong technologies and shy away from investment in Information Technology (IT) and expertise (Schröder, 2017).

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E&E SMEs are still struggling to make IR4.0 a reality. According to Mckinsey Industry 4.0 ASEAN Survey 2017, the percentage of IR4.0 awareness among companies still low with the implementation of IR4.0 related technologies in their business. The survey highlighted top five reasons that holding back the IR4.0 implementation. Firstly, problems to define clear business plan. Secondly, a very huge data is not integrated across business units. Thirdly, there is no digital talent that able to execute the IR4.0 roadmap. Fourthly, organizations are very concerns on cyber security risks. Lastly, there is no coordination across business units.

2.3 Challenges

Cyber risk is a major topic that discussed in any organization's IR4.0 readiness. Since cyber risk is triggered by online networks, online traffic and personal information storages in the internet, contingency plans need to be in place to mitigate the exposure of cyber-attacks such as hacker attacks, virus transmission, data breach and cyber extortion. Past events such as cyber- attack on Sony Online Entertainment and PlayStation Network caused around 77 million of credit and debit card information were stolen which is equivalent to $2 billion dollars losses set an example that all manufacturers want to avoid (Balkhi, 2013). For that, employing big data analyst and cyber security expert will secure the IR4.0 readiness (Davies, 2015).

Another issue is safety and security systems. Security breaches lead to unauthorized access that can cause technological failures during production, confidential data is collected and shared without permission and opportunity to change or modify the content of the production processes. This will jeopardize the productions of the organization, trust among customers, huge financial losses and damage the organizational reputation. It is necessary for organizations to have consistency or recovery backup plan to mitigate the misuse and unauthorized access risk (Balasingham, 2016).

3. Method

Quantitative approach was employed to study this research. The focus of the study, IR4.0 adoption regarded as a very important topic because IR4.0 adoption is required in order to effectively harness the power of technology for a long-term success and finding a technological fit in the E&E SMEs. Moreover, engaging to this field is highly uncertain and complex that require organization to deal with. For that reason, Technology Acceptance Model (TAM) theory and Technology Readiness Index (TRI) model would be adopted throughout this study as its capability to deal with IR4.0 adoption and IR4.0 readiness. With quantitative approach, questionnaires are sent to bigger sample size in which it will generalizes the findings to wider audience.

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3.1 Materials

Almost around 2000 unique articles published in the web of knowledge base between 2000 and 2015 which the period witnessed remarkable growth in number (Monostori, et al., 2016). The trend will continue to increase in the upcoming years. Research papers were downloaded using some queries or keywords such as Industry 4.0 (Sommer, 2015; Weyer, et al., 2015; Schumacher, et al., 2016; Pereira & Romero, 2017), Cyber-Physical Systems (CPS) (Khaitan, et al., 2015; Leitao, et al., 2016; Monostori, et al., 2016), Internet of Things (IoT) (Atzori, Iera & Morabito, 2010; Nagy, et al., 2018), Smart Factory (Wang, et al., 2016; Chu, et. al., 2016), Industrial Internet (Posada, et al., 2015; Sadeghi, et al., 2015), and cloud technologies (Zhan, et. al., 2015) give potential research direction and increases research attention. However limited studies are found with regard to IR4.0 in Malaysia. In order to test the questionnaire for the improvement and eliminating potential problems, this study conducted a face or content validity of the research instrument to improve the research instruments.

3.1.1 Samples

In order to conduct the content validity, a few of field experts or potential panels are chosen for their valuable observations and experiences. Their view over the wording, phrases and meaning imbedded in the item measurements are very crucial in the process of research (Onwuegbuzie & Johnson, 2006). Their in-depth knowledge on the subject matter will be valuable and their comments, suggestions and recommendation will help to guide the process of empirical research.

3.1.2 Site

Four (4) experts on the subject matter are identified and carried out the content validity of the questionnaires to validate and assert the item measurement before the pilot test commence. Three experts from E&E working background and one expert from the academic background were chosen to perform the content validity checking. The researcher had communicated with the potential experts via phone, email and personally administered to collect their feedback on the questionnaires content.

3.1.3 Procedures

Based on their comments and suggestions, necessary improvements were integrated in the process of restructuring the content to ensure all items in the questionnaire represent the idea for each variable. The improvements are indeed necessary in order to ensure a high response rate during the actual data collection period.

3.2 Measurement

A seven (7) point Likert scale was used to measure items in the questionnaire whereby the scale from “strongly disagree [1] to strongly agree [7] were used (Sekaran, 2003).

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4. Results and Discussion

In the meantime, the focus of the study, IR4.0 adoption and IR4.0 readiness regarded as very important topic. Having to said, Technology Acceptance Model (TAM) was used for prediction and explain the user's adoption and acceptance of emerging technology ((Davis, 1986). It is followed by TAM (Davis, 1989; Venkatesh, et al., 2003), Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980) and Theory of Planned Behaviour (TPB) (Ajzen, 1991) and few more have been seriously studied, empirically tested and used to support various application and validation for many years. TAM is one of theory in the field of social psychology specifically explains in modelling user's acceptance of information systems technologies (Gupta, et al., 2008). As such, providing an explanation on user behavior or the determinants of computer acceptance is the goal of TAM. Venkatesh and Davis (1996) came up with final version of TAM which serves perceived usefulness (PU) and perceived ease of use (PEOU) have direct influence on user's behavior intention.

Many studies have been conducted on TAM theory and it is the most widely used theory in information systems adoption research, for example computer technology (Davis, et al., 1989), Internet Banking (Wang et al., 2003), B2C E-Commerce (Lingyun & Li, 2008), ICT in a government organization (Gupta, et al., 2008), employee adoption on wireless technology and services (Chang & Kannan, 2006), e-HRM (Erdogmus & Esen, 2011) and B2B digital services in healthcare sector (Hallikainen & Laukkanen, 2016). Hence, this study aims to examine the IR4.0 adoption behavior by utilizing the TAM. However, there is lack of studies on the IR4.0 readiness towards IR4.0 adoption of E&E SMEs in Malaysia. It is very crucial to study the importance of IR4.0 readiness in understanding the IR4.0 adoption of E&E SMEs.

IR4.0 adoption is required in order to effectively harness the power of technology for a long-term success and finding a technological fit in the E&E SMEs. Nikolic, et. al. (2017) highlighted the manufacturing industry will face big challenge especially in how to integrate the intelligence system into the production to ensure the buoyancy of the manufacturing industry.

IR4.0 readiness is critical and offers opportunity to learn specific knowledge and expertise. Many E&E SMEs are facing several obstacles in getting ready for IR4.0. Achieving operational excellence is one of it. Lacking on the knowledge on the technical and IR4.0 ready workforce increases the vulnerability and risk of losing the IR4.0 readiness journey. Human factor is a main task and the current workforce is not tailored with skill sets and education requirements that drive IR4.0 at the moment (Buhulaiga, et. al., 2019). Hence, the E&E sector carries immerse pressure to adopt IR4.0 as its' pivotal role of technology transfer.

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5. Conclusion

Ministry of International Trade and Industry (Malaysia), MITI is responsible for positioning Malaysia as preferred investment destination. MITI has been practically positioning proactive measures to develop Industry 4wrd: National Policy on IR4.0. Two types of Industry4WRD related incentives were introduced such as grants and loans/guarantee. Under the grants category, Industry4WRD Intervention Fund, Industry4WRD Domestic Strategic Investment Fund (DISF) and Automation Capital Allowance, meanwhile for loans/guarantee category Soft Loan Automation and Modernisation (SLSAM), Industry Digital Transformation Fund and Business Loan Guarantee Scheme (SJPP) were dedicated to help Malaysian Manufacturing sector (ICP, 2019). With these incentives, the success and failure of a firm will be determined simply by how fast and flexible a firm reacts to the changes especially under the IR4.0. It is quite challenging and might be a nightmare for E&E SME managers to understand the cause and effect of these changes. These changes might be offer opportunity to the organization to succeed or will turn as threat that even great organizations fail. IR4.0 offered much more opportunities as well as risks for E&E SMEs. Currently, we are still in dark in figuring where our E&E SMEs sector stand in regard to the IR4.0 readiness. Ignoring the predicament would be fatal for E&E SMEs in Malaysia.

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THE EFFECT OF SOCIAL MEDIA USAGE, AND EWOM ON PURCHASE DECISION INVOLVEMENT, BRAND IMAGE, AND BRAND AWARENESS IN SUBSIDIZED HOUSING INDUSTRY

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Abstract: *Subsidized houses are houses made for low-income people in Indonesia, which later in the process of buying a house, the Indonesian government will provide assistance to low-income people. In 2020, there are 14 million low-income people in Indonesia who do not have livable houses. This indicates a large market segment of subsidized housing. With this large market segment, there are still many subsidized house business actors who complain about the lack of consumers in the subsidized house industry. This is due to a lack of marketing communication in the subsidized house industry. Social media can create EWOM and is also one of the communication tools that have a wide range. This study aims to analyze the effect of social media usage on purchase decision involvement, brand awareness, and brand image mediated by EWOM and trust in the subsidized house industry. This research uses quantitative methods by distributing questionnaires to 200 respondents. Data were analyzed using the Structural Equation Model (SEM) method or structural equation modeling. The study results show that social media usage has an influence on brand image and brand awareness mediated by EWOM and trust. In addition, the research results also indicate that social media usage does not affect purchase decision involvement either directly or mediated by EWOM and trust. This research contributes by discussing the subsidized house industry as a research object and developing previous research model by adding brand image, brand awareness, and the influence of social media usage on EWOM. In addition, this research also contributes as a decision-making tool on marketing communication in the subsidized house industry.*

Keywords: *Brand Awareness, Brand Image,* EWOM, *Purchase Decision Involvement, Social Media Usage, Trust*.

1. Introduction

Subsidized housing or subsidized housing loans (in Indonesia: KPR) is a financing system or housing loans provided by the government to low-income people. In this financing system, the government provides assistance in the form of subsidies to own a house and long-term, low-cost funds channeled by implementing banks using both sharia and conventional principles (Direktorat Jendral Pekerjaan Umum dan Perumahan, 2019). Therefore, to help low-income people, the government also sets the maximum price for subsidized housing units that can be applied by subsidized home businesses, or housing developers in this case (Menteri Pekerjaan Umum dan Perumahan Rakyat, 2020). In 2020, there are 14 million low-income people in Indonesia who do not have decent housing (Fadli, 2020). This shows the large segment of the subsidized housing market because many Indonesians still need houses that are suitable for habitation.

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With the large segment of the subsidized housing market, many subsidized home business actors complain about the lack of consumers in the subsidized housing industry due to the intense competition in the industry and the lack of communication about subsidized housing to the subsidized housing market segment. Pusat Pengelolaan Dana Pembiayaan Perumahaan (PPDPP) reveals 20 business associations in the subsidized housing sector plus one subsidized housing company owned by a State-Owned Enterprise, namely the Public Corporation PERUMNAS (Pusat Pengelolaan Dana Pembiayaan Perumahan, 2020). This presents the amount of competition in the subsidized home industry. Several provinces are noted to have less demand than available subsidized housing, including South Sumatra, Jambi, East Java, and Riau (Pusat Pengelolaan Dana Pembiayaan Perumahan, 2020). It confirms the lack of marketing communication from producers to the subsidized housing market segment, where a large number of people who do not own houses make the demand for subsidized housing increase. With so many business actors in the subsidized housing sector, the lack of demand for subsidized housing, and limited selling prices, business actors in the subsidized housing industry have to think about implementing the right marketing strategies and tools that they will apply. It is intended that the information related to the products they offer is expected to reache a broader target market for subsidized houses at the most efficient cost possible.

Social media is an inexpensive and interactive platform (Stankovska et al., 2016). With a low price, social media can streamline marketing costs. The subsidized housing price limit makes subsidized housing actors unable to determine their profit margins freely so that social media can save marketing costs. In addition, social media is a marketing tool in the form of an interactive platform where companies can offer their products and customers can interactively communicate about content created by the company with other people in the network (Kumar et al., 2016). The existence of limitation criteria for the community who can receive subsidized housing assistance makes businesses in the subsidized home industry use social media as their marketing tool. Social media offers an extensive network and can reach many consumers by allowing anyone and anywhere to access social media (Bernhardt et al., 2012). Through interactions on social media, consumers can give positive comments if they are satisfied with the goods they have purchased or negative comments when disappointed with the goods they have purchased. Prospective buyers will use these comments as additional information for consideration or comparison with other products. Therefore, EWOM has emerged to be an essential marketing tool (Prasad et al., 2017).

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Electronic Word of Mouth (EWOM) is a variety of informal communications aimed at consumers using internet-based technology about a product or item (Chen et al., 2015). Previous research conducted by Prasad et al. (2017) stated that social media usage and EWOM communication positively impacted or indirectly mediated trust on consumer purchase intentions or purchase decision involvement in general. According to Ramadan et al. (2019), purchase decision involvement is the level of interest consumers have when making decisions both before and after purchasing a product. In addition, EWOM also has a positive impact on trust, which can later positively impact brand image and brand awareness (Seo et al., 2020). This is also supported by previous research conducted by Godey et al. (2016), where the study concluded that social media usage has a direct positive effect on brand awareness and brand image. Stojanovic et al. (2018) found that social media usage directly impacts brand awareness positively.

This study contributes to test the model presented by Prasad et al (2017) by applying the research model to the context of subsidized housing industry in Indonesia. Prasad et al. (2017) explained, the impact of social media usage and EWOM on purchase decision involvement in general context. Meanwhile, the context of this study is more specific to the subsidized housing industry. Apart from this, this study also combines research conducted by Prasad et al. (2017) and Seo et al. (2020) where this study has three dependent variables, namely purchase decision involvement from research conducted by Prasad et al. (2017) and brand image and brand awareness from the research of Seo et al. (2020).

2. Literature Review

In their research, Prasad et al. (2017) stated that social media is an interactive marketing tool and can lead to EWOM. Zhou et al. (2019) supported it, stating that social media is a channel for EWOM posts. Previous research has stated that social media communication positively influences EWOM (Sagynbekova et al., 2020). It is supported by Seo et al. (2020) stated that social media usage characteristics have a positive impact on EWOM. Based on the findings above, the hypothesis proposed is as follows:

H1: Social media usage has had a positive impact on EWOM

Social media is a marketing tool in the form of an interactive platform where companies can offer their products and customers can communicate about content created by the company with other people in the network (Kumar et al., 2016). The ease of using social media allows customers to complain or praise a product on social media (Ma et al., 2015). Besides, social media also positively influences consumer purchase intentions (Kamal et al., 2013; Li et al., 2016). The research conducted by Prasad et al. (2017) also promotes these findings. This study concluded that social media usage in marketing would increase the direct and significant positive impact on purchase decision involvement. Based on these findings, the following hypothesis is proposed:

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H2: Social media usage has a significant direct positive impact on purchase decision involvement.

Several studies have proven that EWOM is an essential tool used by customers to find information on the products they want to buy (Chevalier & Mayzlin, 2006). Electronic word of mouth is a marketing communication instrument that can influence many consumer buying decisions (Lis, 2013). In addition, EWOM also has a positive influence on purchase intention (Erkan & Evans, 2016; Wang et al., 2018). It is supported by previous research conducted by Prasad et al. (2017). They concluded that the use of EWOM communication in marketing would affect purchase intention directly or indirectly. It leads to purchase decision involvement. Based on the findings above, the hypothesis proposed is as follows:

H3: EWOM has a significant direct positive impact on purchase decision involvement.

Overall, communication on social media can reduce differences in information, increase understanding, and help reach an understanding (Brennan & Croft, 2012). Previous research conducted by Prasad et al. (2017) said that social media significantly affects trust. Zhang and Li (2019) concluded that social media usage is positively related to trust. Based on these findings, the hypothesis proposed is as follows:

H4: Social media usage has had a significant positive impact on trust.

Information disseminated by WOM tends to be accepted by consumers (Mourali et al., 2005). According to Seo et al. (2020), EWOM may be more potent than WOM in some situations. Previous research states that positive EWOM has a significant effect on trust (Prasad et al., 2017). Seo et al. (2020) supported it and concluded that EWOM has a significant effect on airline customer trust. Based on the above findings, the hypothesis proposed is as follows:

H5: EWOM has a significant positive impact on trust.

In their research, Han et al. (2015) found that brand awareness positively affects trust. Fatma et al. (2015) found a significant influence between trust and brand equity in their study. These findings are supported by Seo et al. (2020) research, which stated that trust has a significant influence on brand awareness. According to these, the hypothesis proposed is as follows:

H6: Trust has a significant influence on brand awareness.

According to Rosannah (2014), trust has a relationship with the success of a business. Fatma et al. (2015) and Sharma & Jain (2019) found a significant influence between trust and brand equity in their study. Previous research conducted by Seo et al. (2020) provides information that trust has a significant influence on the brand image of airline customers. Based on the findings, the hypothesis proposed is as follows:

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H7: Trust has a significant influence on brand image.

Online trust is one of the determinants of website success (McKnight & Chervany, 2001). According to McKnight et al. (2002), trust can positively influence consumer purchase intentions. These statements are supported by research conducted by Tong & Su (2018) which explained that trust can influence purchase intentions. Furthermore, Prasad et al. (2017) found that trust positively affects purchase decision involvement. Based on the findings above, the hypothesis proposed is as follows:

H8: Trust has a significant positive impact on purchase decision involvement.

EWOM has a positive impact on trust (Prasad et al., 2017). Social media communication has a positive influence on EWOM (Sagynbekova et al., 2020). Previous research conducted by Seo et al. (2020) explained that EWOM mediates social media usage characteristics and trust. According to these, the hypothesis proposed is as follows:

H9: EWOM mediates the influence of social media usage on trust.

Social media is an interactive marketing tool that can lead to EWOM (Prasad et al., 2017). Previous research has said that social media communication positively influences EWOM (Sagynbekova et al., 2020). In the same study, Prasad et al. (2017) stated that EWOM has a positive effect on purchase decision involvement. Other studies suggest that EWOM influences purchase intention (Erkan & Evans, 2016; Wang et al., 2018). Based on the findings, the hypothesis proposed is as follows:

H10: EWOM mediates the effect of social media usage on purchase decision involvement.

Social media usage has an indirect effect by mediating materialism on consumer buying decisions (Kamal et al., 2013). Previous research conducted by Prasad et al. (2019) explained that social media usage has an indirect effect by mediating beliefs on consumer purchase intentions. This study is also supported by Prasad et al.'s (2017) research that social media usage chooses a positive effect on purchase decision involvement with trust mediation. Based on these findings, the hypothesis proposed is as follows:

H11: Trust mediates the effect of social media usage on purchase decision involvement.

EWOM has a positive impact on purchase intention mediated by perceived value (Wang et al., 2018). In addition, EWOM also has a positive influence on purchase intention mediated by belief (Prasad et al., 2019). Previous research conducted by Prasad et al. (2017) stated that EWOM has a significant positive effect on purchase decision involvement with trust mediation. Departing from the explanation above, the hypothesis that can be proposed is as follows:

H12: Trust mediates the effect of EWOM on purchase decision involvement.

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2.1 Problem Statement

Do social media usage and electronic word of mouth affect purchase decision involvement, brand image, and brand awareness in the subsidized home industry?

3. Method

The method section describes actions to be taken to investigate a research problem and the rationale for applying specific procedures or techniques to identify, select, process, and analyze information.

3.1 Materials

This section describes the materials used in this study, including samples, sites, and an explanation of material preparations.

3.1.1 Samples

The criteria for the research sample are Indonesians who have a maximum salary of eight million per month in the last six months, have reviewed or seen reviews on social media about subsidized housing in the last six months, and do not work at subsidized housing agencies.

3.1.2 Site

Data were collected using online questionnaires on Google Form. The population of this study is all Indonesians. Therefore, online questionnaires that can be widely distributed to the targeted population were needed. Google Form is also one of the online questionnaire websites, which is quite popular, and its appearance is easily recognized by the Indonesian people so that it would be easier for respondents to fill out the questionnaires.

3.1.3 Procedures

The sample collection method was carried out by nonprobability convenience sampling method. As for the sample collection technique, the snowball sampling technique is used where the respondents will later distribute the questionnaire given by the author to other people who are considered to have similar characteristics with themselves. After the data was collected, the purposive sampling technique with judgment sampling type was applied so that the data taken was following the sample criteria.

Design: Exploratory and descriptive research designs were carried out in this study. Exploratory research is used in finding data in identifying problems and generating initial hypotheses. Exploratory data were obtained from secondary data in journals, books, and official websites of the Indonesian government. After exploratory research was carried out, the following conceptual model was formed:

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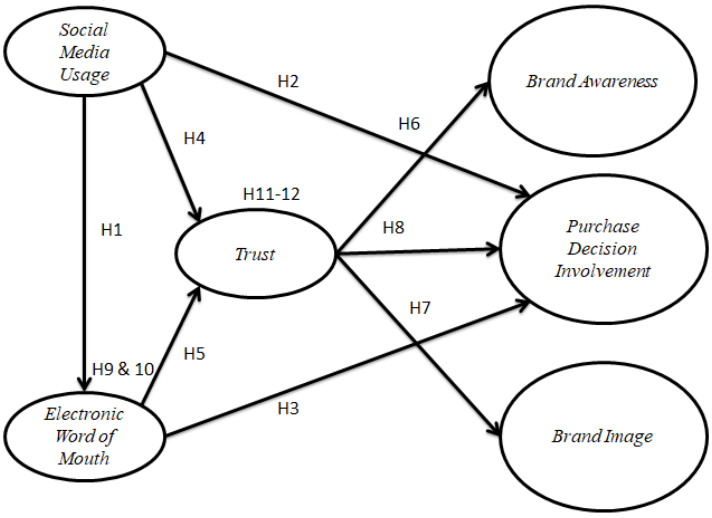

Figure 1: Research Conceptual Model
Sources: (Prasad et al., 2017), (Seo et al., 2020), & (Processed Data, 2021)

Descriptive research was used to find the relationship between fixed variables, dependent variables, and mediating variables. It aims to find the relationship between social media and electronic word of mouth on purchase decision involvement and brand image and brand awareness with the mediating variable in the form of trust.

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Variables: This study has one independent variable, namely social media usage. The dependent variables in this study are purchase decision involvement, brand image, and brand awareness. There are also two mediating variables, namely trust and electronic word of mouth. In measuring the variables, the respondents were given a statement that represents the variable itself. Later, the respondent responded to the statement using numbers 1 to 7 on the ratio scale. The table of questionnaire items in this study is as follows:

Table 1: Questionnaire Items

Variables	Items	Sources
Social media Usage	1. I use social media to participate in sales promotions (subsidized house) 2. I use social media to communicate with developers (subsidized housing)	(Prasad et al., 2017).
Electronic Word of Mouth	1. I talk positive things online about (my preferred subsidized housing) 2. When I bought a subsidized home, people's reviews gave me confidence when buying it.	(Prasad et al., 2017).
Trust	1. Social media is safe and reliable 2. It is easy for me to trust someone or information through online media	(Prasad et al., 2017).
Purchase Decision Involvement	1. I need to choose the right subsidized house 2. In determining the choice of subsidized housing, I am very concerned about the outcome of my choice	(Prasad et al., 2017).
Brand Image	1. I have an impressive experience about (my preferred subsidized housing) 2. (The subsidized housing I chose) is customer care housing	(Seo et al., 2020).
Brand Awareness	1. I know the characteristics of (subsidized housing that I choose) 2. The brand of (the subsidized housing I chose) is attractive	1 (Seo et al., 2020). 2(Iglesias et al., 2019)

Sources: (Prasad et al., 2017), (Seo et al., 2020), & (Iglesias et al., 2019)

Power and sample size: In obtaining research samples, the maximum number of indicators multiplied by ten was used (Hair Jr et al., 2014). With this formula and 20 statements as the question indicators, the number of samples in this study was 200.

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3.2 Measurement

Measurement is carried out using nominal, ordinal, and ratio scales. Nominal and ordinal scales are used to ask the respondent's profile, while the ratio scale is used to measure the respondents' answers to the statements in the research questionnaire. The ratio scale used is the ratio scale 1-7. Respondents responses from the research statement are used to see the relationship between the variables which include: social media usage, brand awareness, brand image, EWOM, purchase decision involvement, and trust. Social media is an online service. With the help of social media, users are empowered and given access to create and share different content. Social media can also function as market intelligence in the world of marketing (Prasad et al., 2017).

EWOM can be interpreted as both negative and positive statements made by potential customers and former customers regarding goods sold by the company and the company itself, which are available to the general public or institutions via the internet network (Prasad et al., 2017). Trust is an event where a party believes in the integrity and reliability of partners in trading activity (Rosannah, 2014). Purchase decision involvement is the level of interest that consumers have when making decisions both before and after purchasing a product (Ramadan et al., 2019). Brand Image is a set of perceptions about a brand that is influenced by a collection of its customers (Chen et al., 2018). Brand awareness is a concept that represents the degree to which consumers perceive a brand differently from other brands (Seo, Park, & Choi, 2020).

3.3 Data Analysis

In this study, the validity and reliability of the research instrument were measured by distributing 30 questionnaires as the initial sample, then tested using the SPSS 22 application. After being declared valid and reliable, 170 questionnaires were distributed to obtain core research data. After obtaining the core research data, the data was then analyzed using the Structural Equation Model (SEM) method or structural equation modeling. Data processing using the SEM method was carried out using the AMOS 24 application.

3.3.1 Validity and Reliability

The validity test in this study used the Kaiser-Meyer-Olkin (KMO), Measure of Sampling Adequacy (MSA), Bartlett’s Test of Sphericity, and Component Matrix (factor loading) value. When the KMO number is more significant than 0.5, the instrument is considered valid (Malhotra & Dash, 2016, p. 602). Instrument is considered valid when Measure of Sampling Adequacy (MSA) value more than 0,5 (Hair Jr et al., 2014, p.103). For the value of the Bartlett’s Test of Sphericity, the instrument is valid if the Bartlett’s Test of Sphericity value is less than 0,05 (Hair Jr et al., 2014, p.103). In addition, research indicators are also considered valid if the component matrix value is greater than 0,5 (Cecilia,2017). Meanwhile, the reliability test of this study used the Cronbach's Alpha test. This is because the Cronbach's Alpha test can measure the relationships between different items. In addition, the instrument's consistency, the reliability coefficient will be accepted if the number is above 0.6 (Prasad et al., 2017). The results show that all data are valid and reliable since each variable has a minimum KMO, MSA, component matrix value of 0.5, Bartlett’s Test of Sphericity less than 0,05 and Cronbach's Alpha minimum of 0.6.

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Table 2: Validity and Reliability Test

Variable	Measurement indicators	KMO	MSA	Bartlett's Test of Sphericity	Component Matrix	Cronbach's Alpha
Social Media Usage	SMU1 SMU2 SMU3 SMU4	0,659	0,642 0,644 0,647 0,720	0,000	0,552 0,855 0,848 0,684	0,702
EWOM	EWOM1 EWOM2 EWOM3 EWOM4	0,828	0,845 0,883 0,791 0,814	0,000	0,862 0,800 0,919 0,907	0,890
Trust	T1 T2 T3	0,590	0,569 0,558 0,775	0,000	0,866 0,901 0,648	0,699
Purchase Decision Involvement	PDI1 PDI2 PDI3	0,706	0,927 0,648 0,648	0,000	0,876 0,957 0,957	0,919
Brand Image	BI1 BI2 BI3	0,710	0,706 0,785 0,663	0,000	0,880 0,843 0,908	0,846
Brand Awareness	BA1 BA2 BA3	0,740	0,777 0,732 0,715	0,000	0,882 0,900 0,907	0,878

Sources: Results of SPSS Processing, 2021

4. Results and Discussion

The following are the data collected whereas most of respondents live in Jakarta, Bogor, Depok, Tangerang, and Bekasi with a total of 63%. The largest number of respondents were male, with a total of 73%. Most respondents were 20-30 years old (71%). The most recent education is undergraduate level with 51%. The social media that respondents often use is Instagram (70%). Unmarried respondents are 79%. Of the 21% of respondents who were married, 50% have been married for below five years. 79% of married respondents already have children. 69% of respondents think subsidized housing is cheap. As many as 65% of respondents bought subsidized houses because they were affordable. The subsidized housing that the respondents knew about is the Public Company PERUMNAS (68%).

Regarding the validity and reliability, confirmatory factor analysis was carried out with the following results: all standardized regression weight values were above 0.5, which means the data is valid (Ghozali, 2011). Furthermore, the AVE value is calculated, where all AVE values are above 0.5, which means the data has good validity (Ghozali, 2011). All construct reliability values are also above 0.6, which means that the data is reliable (Ghozali, 2011). Lastly, we also saw the value of discriminant validity, where the value of discriminant validity showed unfavorable results because some AVE root values were smaller than the correlation between variables. It happened because the standardized regression weight value was above 0.5 but still less than 0.7. After confirmatory factor analysis is carried out, the goodness of fit test is carried out to see the suitability between the data and the research model. From the results of the goodness of fit test, the following results were obtained, CMIN / DF = 1.905, GFI = 0.935, RMSEA = 0.067, AGFI = 0.067, TLI = 0.942, NFI = 0.922, PNFI = 0.629, and PGFI = 0.539. The result of the goodness of fit from this research is a good fit.

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After conducting a confirmatory factor analysis and goodness of fit test, hypothesis testing was carried out to see whether the hypotheses that have been made are accepted or rejected. The CR value and the P-value are used for the direct hypotheses and the t value for the mediating hypotheses to see if they are rejected or accepted. The hypothesis is accepted if the CR value is higher than 1.96 and the P-value is less than 0.05 (Dwirianti, 2018). The mediation hypothesis is accepted if the t value is greater than 1.96 (Ghozali, 2011). Hypothesis test results show H1 has a P-value <0.001 and a CR value of 7.636, which means that H1 is accepted. H2 has a P value of 0.363 and a CR value of -0.910, so that H2 is rejected. H3 is rejected because it has a P-value of 0.205 and CR of 1.267. H4 is rejected because it has a P-value of 0.927 and CR -0.092.Meanwhile, H5 has a P value of 0.001 and a CR value of 3.181, which means that H5 is accepted. H6 has a P-value <0.001 and a CR value of 6.472, so that H6 is accepted. H7 is accepted because it has a P-value <0.001 and CR 6.377. H8 is rejected because it has a P-value of 0.205 and CR of 1.269. H9 has a t value of 2.92 which means that H9 is accepted. H10 has a t-value of 1.24, so that H10 is rejected. H11 is rejected because it has a t-value of -0.07. H12 is rejected because it has a t value of 1.13. from the hypothesis testing, the output of the hypothesis testing model is as follows:

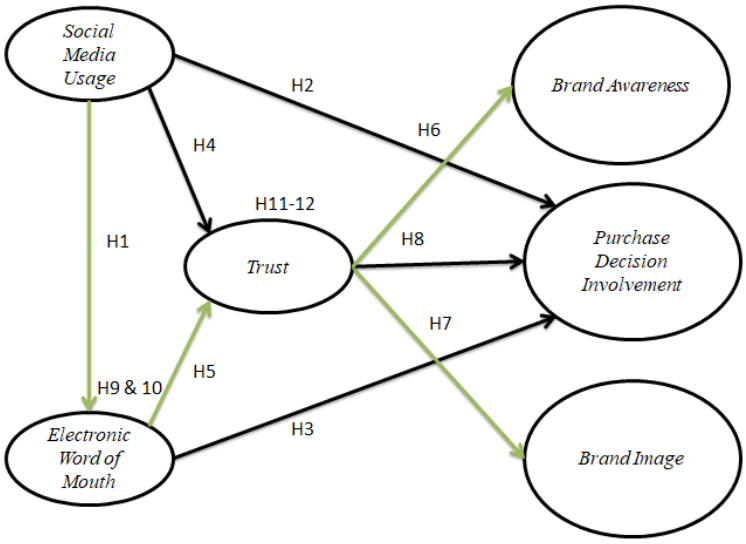

Figure 2. The Relationship Between Variables
Sources: Results of Processed AMOS 2021 Data

Has influence: →
Has no influence: →

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Trust positively influences brand awareness and brand image. It can occur due to high consumer confidence in a brand, thereby increasing its equity (Ruan et al., 2020). Any variables did not influence purchase decision involvement in this study because social media, the occurrence of EWOM, and trust did not have a sufficient effect on purchase decision involvement. Previous research states that trust does not directly affect purchase decision involvement but is mediated by the continued interaction variable (Ramadan et al., 2019). The results of the hypothesis analysis show that trust does not directly mediate social media usage for brand image, brand awareness, or purchase decision involvement. This happens because social media usage is not sufficient to increase trust in subsidized household consumers, so that trust cannot mediate the influence between social media usage on brand image, brand awareness, and purchase decision involvement. Therefore, the results of the hypothesis analysis show that trust positively mediates the influence of EWOM on brand image and brand awareness. Positive EWOM on social media will form trust and, in the end, can increase brand awareness and the image of a brand (Seo et al., 2020). This study also found that trust does not mediate EWOM on purchase decision involvement because other variables influence purchase decision involvement. Previous research conducted by Ramadan et al. (2019) showed that the continued interaction variable further mediates the relationship between trust and purchase decision involvement.

Based on the results of the hypothesis analysis, it can be concluded that EWOM influences trust. Many people commented favorably on subsidized housing, so that these comments sparked a sense of trust in consumers. This result is in line with previous research conducted by Prasad et al. (2017), which states that EWOM positively influences trust. This study also found that EWOM does not affect purchase decision involvement because comments on social media are not sufficient to influence the level of interest that subsidized household consumers have when making decisions. Social media does not have a direct positive influence on trust but has an indirect positive influence on trust mediated by EWOM. This occurs because the EWOM generated from positive comments on social media makes consumers more confident in the subsidized house they choose. Therefore, EWOM mediates the influence of social media usage on trust.

5. Conclusion

Based on the findings, it is concluded that social media usage has no direct influence on trust, but influences trust if EWOM mediates it. Social media usage does not affect the purchase decision involvement either directly or indirectly. EWOM directly influences trust, while social media usage does not influence brand image and brand awareness by mediating trust. EWOM influences brand image and awareness by mediating trust. Trust directly influences brand image and awareness but has no direct influence on purchase decision involvement.

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The following are some suggestions to business actors in the subsidized houses industry:

a. Trust has a significant influence on brand awareness and brand image. Therefore, it is recommended that business actors in the houses industry subsidize: make useful information about subsidized houses that are sold through online media, Making social media feel safe and reliable for consumers, provide information that consumers can trust.
b. EWOM has a significant positive impact on trust. Based on this, it is suggested to business actors in the subsidized houses industry to encourage positive EWOM from consumers in order to increase trust in potential consumers. To increase the positive EWOM, the authors suggest to: encourage consumers to share positive content and statements on social media, Encourage consumers to recommend subsidized houses that is sold to others through online media, and shows past customer review to potential consumers of subsidized houses.
c. Social media usage has had a positive impact on EWOM. Based on this, it is recommended for business actors at houses subsidies to increase social media usage by: Improve relations with subsidized houses consumers through social media, create a comunity of consumers from subsidized houses sold on social media platforms, Announcing a sales promotion on houses social media, and providing facilities to communicate between consumers and developers through social media.

The following are some suggestions for further research include:

a. Future studies can examine other factors that are thought to have a significant effect on purchase decision involvement whare other factors include need for popularity (Chengiz, 2017) and continued interaction (Ramadhan et al., 2019)
b. Future researchcan replace indicators that have a standardized regression weight velue below 0,7 with other indicators to get more good discriminant validity value.
c. Further research can exmine the same thing with the EWOM level specified for each respondent, this can be done by asking respondents on a screening question about how often they see other people’s comments on social media about subsidized houses.

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THE IMPORTANCE OF INTEGRITY PRACTICES ON TASK PERFORMANCE ROYAL MALAYSIA POLICE: THE MEDIATING ROLE OF ORGANIZATIONAL COMMITMENT AND JOB SATISFACTION

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Abstract: *The research aims to investigate the integrity as a determinant for police officer's performance in Royal Malaysia Police (RMP) in Malaysia. Recently, the public felt unsafety and dissatisfaction police officer such as poor performance, abuse power, corruption, and issues of integrity. Thus, this research what to find out the integrity in RMP still effectives to manage police office in their duties. This study is using the survey research design. The population of the study was 289 police officers who current working in Royal Malaysia Police (RMP) in Kuala Lumpur, Selangor, and Johor. Total of the responses were collected directly using structured questionnaire. Data were analyzed by using the SmartPLS 3.2.9 software. The findings revealed that the integrity have a positive direct relationship between police officer performance. Also, the indirect relationship between task performance and integrity with performance, which through organizational commitment and job satisfaction. Therefore, the study contributes to the integrity literature by providing a reasonable explanation of mediating role of the organizational commitment and job satisfaction in connecting police officers behavior in the context of performance.*

Keywords: integrity, organizational commitment, job satisfaction, performance.

1. Introduction

Integrity is one of an important issue that ensures service quality and excellence in an organization's system (Arifin & Ahmad, 2017). The government realizes the importance of the public sector as an agency for public administration and management. Malaysia aims to achieve a developed country status by year 2030. The public sector in Malaysia is a matter of civilian concern because of the constant cases of inefficacy, fraud, and corruption (Johari et al., 2020; Nafi & Kamaluddin, 2020; Sajari et al., 2019). The integrity can lead the failures in governance, fraud, inefficacy, and corruption particularly in the public sector (Abdullah, Daud, & Hanapiyah, 2020; Johari et al., 2020; Khan et al., 2021; Nafi & Kamaluddin, 2020). Additionally, the civilians have the right to monitor the public sector management's transparency and effectiveness.

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Brown (2005) argued that integrity involves the development of individual awareness of the other individuals, including the social and physical environment to respond to the other, and development of moral and life meaning through these relationships. This situation makes people and organizations to develop learning as a whole, providing transparency, consistency, coherence, and commitment (Brown, 2005). Integrity is an essential characteristic of human beings. Khan et al. (2021) mentioned that none of these aspects of integrity can be fully realized in the individual or in an organization. Integrity is also known as a term of a continual learning process with the person discovering more about the different aspects of the self and others and how these two connect (Robinson & Dowson, 2011).

The word "integrity" has been introduced in the public sector in Malaysia since 2004 and is known as National Integrity Plan (NIP). The specific objectives are to raise awareness, commitment, and cooperation from various sectors and levels of society towards integrity (National Integrity Plan, 2004). This agenda aims at integrity as a culture of society, strengthening the moral foundation of society and nation while improving national competitiveness and resilience in addressing the challenges of this globalization era (National Integrity Plan, 2004).

In line with NIP's goals in all public sectors, RMP has established an integrity plan for RMP citizens or also known as Integriti Pelan PDRM (Integriti Pelan RMP, 2016). The integrity plan of RMP is the continuation of the Integrity Plan of RMP 2007-2010 and 2010-2015 (Pelan Integriti PDRM, 2016). The three main objectives of plan integrity RMP are namely: (a) forming RMP citizen with integrity towards modern politics, (b) preventing the opportunity of misconducts among RMP citizens with police ethics compliance as well as standard compliance, and finally, (c) enhancing the image, policing services, and professionalism of RMP citizens (Pelan Integriti PDRM, 2016). The main focus is on enhancing the integrity of the standard of service of RMP services and prospering the family institution in providing modern policing services to the community (Pelan Integriti PDRM, 2016).

Service delivery is very important because it reflects a country image (Selvanathan, 2015). In an era of globalization, society is very much focused on the importance of the service provision system, and they want to enjoy the benefits. It has also been noted that the service delivery system in government agencies such as the Royal Malaysia Police (RMP) is of paramount importance (Selvanathan, 2015). In order to keep the safety of the country, the service of the police force is very important and undeniable (Yahaya et al., 2012). Moreover, it is no easy to task for RMP in keeping the security of the country and deal news types of crimes such as cyber-crimes, human trafficking, white-collar crimes in the same time provide good service to civilians (Yahaya et al., 2012).

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2. Literature Review

Integrity

Piazolo and Forster (2019) mentioned that integrity can be a good valuable predictor of job performance with self-managed workgroups. They determined that both true leadership and leader behavioral integrity are connected to the job role performance by the follower's affective organizational obligations (Ko et al., 2018; Ko & Hah, 2020; Zeng et al., 2020). Leroy, Palanski, and Simons (2011) agreed that these can help to monitor ethical organizational cultures. Abdullah et al. (2020) reported that the existence of a relationship in good service, quality, performance, as well as customer satisfaction, can lead in improving performance and integrity in the Malaysian public service. Many authors defined integrity only in the area of ethics (Brown, 2005; Kaiser & Hogan, 2010; Robbins & Judge, 2014) and in fields such as HRM, organizational behavior, psychology as well as leadership (Codreanu, 2019; Mitchell et al., 2017; Tasoulis, Krepapa, & Stewart, 2019).

In public sector, integrity is a necessary component in establishing transparency and accountability (Alam et al., 2018; Johari et al., 2020)**.** Hoekstra and Kaptein (2021) concluded that the management has an important role in establishing the integrity of an organization. Thus, integrity is expected to have a direct influence on organization's actions and decisions (Trevinyo-Rodríguez, 2007). Many studies have found that integrity is important in order to provide good service to the customers or stockholders (Alam et al., 2018; Robinson & Dowson, 2011). Based on the above justification, the following hypothesis is formulated:

H1: There is a positive relationship between integrity and task performance.

Organizational Commitment as a mediator between integrity and task performance

Allen and Meyer (1996) defined organizational commitment as a combination of 3 components that corresponds to different mindsets employee commitment in the organization. The 3 components of organizational commitment are affective commitment, continuance commitment, and normative commitment. By the end of 1990, the management of many organizations has understood the value of the degree of commitment that employees have towards the organization and its effect on organizational performance.

Organizational commitment is a variable has been used to predict job performance among employees (Allen & Meyer, 1996; Kaplan & Kaplan, 2018; Loan, 2020; Uraon & Gupta, 2020). There are a lot of factors that were found to influence commitment of employees, however, a majority of those factors only focused on work experience (Meyer & Allen, 1997). According to Muoghalu and Tantua (2021), integrity have a direct effect on organizational commitment. In a study among 698 employees in a variety organizations in the USA. Fritz et al. (2013) reported that behavioral integrity has a significant positive impact on organizational commitment. Thus, the following hypothesis is postulated:

H2: Integrity will be positively associated with organizational commitment.

H3: Organizational commitment mediates the relationship between integrity and task performance.

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Job Satisfaction as a mediator between integrity and task performance

Warr et al. (1979) defined job satisfaction is the degree to which a person reports satisfaction with extrinsic and intrinsic factors. The extrinsic factor involved such as remuneration, responsibility and autonomy, management structures, and team relationships (Warr et al., 1979). The intrinsic factor such as internalized reactions to integral features of the work. Job satisfaction is important for individuals, organizations, and economies as an indicator of emotional well-being and psychological health (Hünefeld et al., 2020). Job satisfaction considered as the key for organizations, in terms to understand workplace well-being, commitment and productivity, and performance (Abdullah et al., 2020; DiPietro et al., 2020).

Vitell and Davis (1990) revealed that the unethical behavior of the supervisors will cause the employees to feel less satisfied with their organization. This is supported by Craig and Gustafson (1998) in their study among employees of the College of Arts and Sciences, Southeastern University, US who claimed that supervisors' integrity is essential and can influence subordinates' job satisfaction. However, the results of this study are not consistent with the results of the studies by Palanski and Yammarino (2011) who reported that a leader's behavioral integrity does not directly influence employee satisfaction. Palanski and Yammarino (2011) also argued that behavioral integrity is not directly related to job performance but is indirectly related through job satisfaction and trust in a leader. In Malaysia, findings from a research done among policemen in district police departments in Shah Alam and Johor Bahru revealed that integrity has a direct influence on job satisfaction (Kappagoda, Othman, Zainul, & Alwis, 2014). The results show that almost all police officers agreed that integrity and code of ethics are important in the police force. This has strongly reinforced the previous studies on integrity in the RMP (Othman et al., 2014). Thus, in this study, the following hypothesis is proposed:

H4: Integrity will be positively associated with job satisfaction.

H5: Job satisfaction mediates the relationship between integrity and task performance.

2.1 Problem Statement

Empirical studies on performance among police officers have carried out by local scholars (Subramaniam et al., 2015; Zin, Ibrahim, & Noor, 2017) are a testament that performance police officer is recognized as a problem in Malaysia. Recently, the performances of police officers in RMP organizations are rather daunting. According to a survey conducted by Merdeka Centre on behalf of Transparency International Malaysia, the civilians perceived the RMP as most corrupted organization among all government agencies (Kadir & Jusoff, 2009). The public have been dissatisfied with the conduct and performance of police personnel which has resulted in high incidences of crime, corruption, and abuse power in RMP since 2005 (Kadir & Jusoff, 2009; Malaymail, 2019; Rahman & Lee, 2019; Royal Commission Police Report, 2005). The level of confidence of the society towards PDRM in preventing crimes was only 53% and the Safety Perception Index survey also decreased from 47.5% in 2011 to 39% in 2014 (Rashid et al., 2017). Weak delivery of services in RMP has created gaps in terms of accountability, inefficient, and inequality in the planning of policies RMP.

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Given the importance of RMP play a critical role as a law enforcement agency in Malaysia as well as their contribution to the nation's security and development, the task performance of police officers as well as their commitment and job satisfaction are always the concern of the nation. Police officers are one important career that is very significant to the growth of national economic and social development (Tengpongsthorn, 2017). If the police officers are performing better at their job, they are satisfied and commit to RMP, it would positively affect the RMP as well as the nation's security and development. In other words, poor attitudes and behaviors of police officers would have an adverse impact on the RMP and the nation's security and development. Therefore, the present research suggests looking at ways to enhance police's task performance, their level of commitment and job satisfaction as it would positively affect RMP and the development of the national economic and social system.

3. Method

The data was collected through surveys of 289 samples which disturbed a police officer who currently working in the Kuala Lumpur, Selangor, and Johor. The position police officer-involved started from constables until Sergeant Major. This group is the frontline that dealing with the civilian. We were disturbed 200 questionnaires for each state. After the incomplete survey forms were discarded, 289 completed from were received, response rate of 48.16%. The demographic data were as follows: 67.1% were male, 32.9% were female; the average age was 30.44 years (SD= 1.586), ranging from 20 to 60 years; the average organizational tenure was 8.15 years (SD=1.552), ranging from 1 to 30 years.

Measures Model

Integrity

Integrity will be measured using an adapted 13-items developed by Alam et al. (2018). The integrity will be measured using a five-point Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The 13-items of integrity are adapted from the original items.

Organizational Commitment

Organizational commitment questionnaire (OCQ) developed by Mowday et al. (1982) will be employed in the present study. The measurement will be measured with a five-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The 15-items are adapted from the original items.

Job Satisfaction

Measurement item of Job Satisfaction Scale (JSS) developed by Warr et al. (1979). JSS is a widely used measure of job satisfaction in industrial or organizational research and practice. Some changes were made. The measurement will be measured using a seven-point Likert scale, ranging from 1 ("Strongly Dissatisfied") to 7 ("Strongly Satisfied").

Performance

In the present study, task performance is measured using seven-items of performance developed by Williams and Anderson, (1991). The measurement will be measured by a seven-point Likert scale, ranging from 1 ("Strongly Disagree") to 7 ("Strongly Agree").

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Data Analysis

The data will be screened before analysis. The "Statistical Package for Social Science" version 26 software was used to screen and obtains the descriptive statistics of respondents. After the process screened the data, the Partial Least Squares – Structural Equation Modeling version 3.0 software (PLS-SEM) is utilized to analysis every item and real variables.

4. Results and Discussion

For the assessment of reliability and validity, the convergent validity, average variance estimate, and indicator loading were the basis. Table 1 shown the outer loading were between 0.673 to 0.934. Only the items loaded below 0.70, the items of construct in organizational commitment. According to Sarstedt et al., (2017), the loading of the variables was loading 0.7 above and acceptable. Composite reliability estimated varied also loading between 0.873 to 0.906 than higher that 0.7 as a standard level. The average variance estimates (AVE) also reach the minimum standard above 0.5, loading between 0.601 to 0.678. The VIF is loaded between 1.184 to 1.267 and acceptable. If the VIF values is 5 or higher, it indicates a potential collinearity problem (Hair et al., 2019). This assessment measurement is important to link the significance of path coefficients, coefficient of determination, *t*-value, mediation effect, and effect sizes (Sarstedt et al., 2017).

Table 1: Cronbach Alpha (CA), Composite Reliability (CR), Average Estimates Variance (AVE) Correlation, Variance Inflation Factor (VIF)

Constructs	Item	Loading	CA		CR	AVE	VIF	Q^2
INT	INT 1	0.673	0.954		0.960	0.652	1.204	0.352
	INT 2	0.829						
	INT 3	0.927						
	INT 4	0.848						
	INT 5	0.745						
	INT 6	0.800						
	INT 7	0.722						
	INT 8	0.836						
	INT 9	0.934						
	INT 10	0.868						
	INT 11	0.774						
	INT 12	0.793						
	INT 13	0.697						
COM	OC 1	0.071	0.948		09.56	0.608	1.184	0.274
	OC 2	0.837						
	OC 3	0.830						
	OC 4	0.733						
	OC 5	0.735						
	OC 6	0.720						
	OC 7	0.803						
	OC 8	0.926						
	OC 9	0.843						
	OC 10	0.804						
	OC 11	0.860						
	OC 12	0.713						
	OC 13	0.777						
	OC 14	0.930						
	OC 15	0.744						
JS	JS 1	0760	0.949		0.955	0.601	1.267	0.245

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	JS 2	0.795						
	JS 3	0.705						
	JS 4	0.816						
	JS 5	0.759						
	JS 6	0.743						
	JS 7	0.697						
	JS 8	0.783						
	JS 9	0.816						
	JS 10	0.853						
	JS 11	0.732						
	JS 12	0.782						
	JS 13	0.795						
	JS 14	0.802						
TP	TP 1	0.764	0.920		0.936	0.678		0.211
	TP 2	0.810						
	TP 3	0.758						
	TP 4	0.899						
	TP 5	0.886						
	TP 6	0.819						
	TP 7	0.819						

Respone rate (n= 289)
Integrity= INT; Organizational Commitment= OC; Job Satisfaction Job= JS; Task Performance= TP

Discriminant validity refers to construct or measurement that should have no relationship by examining the correlations between the measures of the potentially overlapping. Discriminant validity is achieved when average variance extracted (AVE) higher than squared correlations between constructs (Chin, 1998; Fornell & Larcker, 1981). When the AVE's square roots are greater than the correlations between the constructs, the discriminant validity will be achieved (Hair et al., 2017).

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Table 2 shown all bolded diagonal loadings being higher than their vertical counterparts. All the correlations between the construct and the values of the square root of the AVE loaded above 0.50, which significant all the diagonal vales are significant than the correlation among the variables (Fornell & Larcker, 1981; Hair et al., 2016). Furthermore, Heterotrait-Monotrait (HTMT) technique is also another method to assess the discriminant validity, which is developed by Henseler et al. (2015). The discriminant validity issue is considered appear when HTMT value is larger than $HTMT._{85}$ value of 0.85 (Kline, 2011) or $HTMT._{90}$ value of 0.90 (Gold et al., 2001). Additionally, heterotrait-momotrait ratio correlation (HTMT) is employed to assess discriminant validity, which able to create blocks of model evaluation (Henseler et al., 2015). As shown in Table 3, the maximum value of HTMT is 0.338 below 0.296, which certainly that hypothesized structural path are real and discriminant validity are established (Kline, 2011).

Table 2: Discriminant Validity of Constructs

Constructs	INT	COM	JS	TP
Integrity	0.807	-		
Organizational Commitment	0.288	0.780	-	
Job Satisfaction	0.377	0.358	0.775	-
Task Performance	0.297	0.298	0.286	0.824

Cronbach alpha= CA; Organizational Commitment= OC; Job Satisfaction Job= JS; Task Performance= TP.

Table 3: Discriminant Validity Result Based on Heterotrait-monotrait (HTMT) Ratio of Correlations

Constructs	Int	COM	JS	TP
Integrity	-			
Organizational Commitment	0.296	-		
Job Satisfaction	0.376	0.338	-	
Task Performance	0.318	0.318	0.297	-

Figure 1 Path analysis and hypothesis testing

In this study, we also did the bootstrapping to test the direct effect and indirect effect on hypothesis. The graphical findings of bootstrapping testing in Figure 1. We performed bootstrapping which involved 5000 samples whilst our actual sample of the study stand at 289. First, we examined the relationship between the independent variables and dependent variable performance (X to Y). Second, we will test the relationship between the multilevel relationship between the independent variables the independent and the dependent variable, including the organizational commitment and job satisfaction (mediator) in the model (X to M to Y). Third, we also tested the coefficient of determination (R^2) through bootstrapping and predictive relevance (Q^2) through blindfolding procedure in the Smart PLS software.

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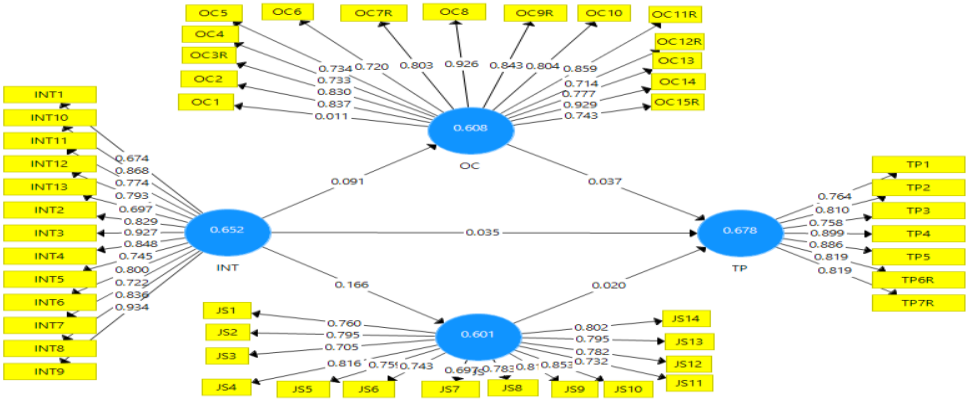

Figure 1: Results from the PLS-SEM (5000) bootstrapping

The results as displayed in table 4 show that integrity direct effect on performance police officers. First, Hypothesis 1 shows integrity direct effect performance is positive and significant (β=0.188, SE=0.067, p<.001) and *t* value is 2.800 is significant effect to performance. Hypothesis 1 is supported. Second, the direct effect on integrity to organizational commitment (β=0.288, SE=0.056, p<0.01) and *t* value is 5.185. Hypothesis 2 is supported. Third, integrity direct effect on job satisfaction (β=0.377, SE=0.053, p<0.01) and *t* value is 7.086. Hypothesis 4 also supported.

In the Table 5 also shows the results coefficient of determination (R^2) and predictive relevance (Q^2). The effect size of dependent variable performance R^2 is 0.247 with Q^2 values is 0.201, which consider is medium. Meanwhile, effect size of organizational commitment R^2 is 0.240 with Q^2 values is 0.148, which also consider is medium. The effect size of job satisfaction R^2 is 0.247 with Q^2 is 0.183. Cohen, (1988) noted that rule of thumb, R^2 of 2% is considered small, R^2 of 13% is considered medium, and R^2 of 26% is considered large. Although, the finding for R^2 is medium in this study but value in the model is significantly above zero, which support the model's predictive relevance for endogenous construct (Hair et al., 2016).

Table 4: Path analysis structural model results

Path	Beta	SE	*t* value	P value	F2		LLCI 5%	ULLI 95%	R^2	Q^2	Result
INT->TP	0.188	0.067	2.800**	0.005	0.135		0.057	0.318	0.247	0.201	Accepted
INT->OC	0.288	0.056	5.185**	0.000	0.191		0.187	0.406	0.240	0.148	Accepted
INT->JS	0.377	0.053	7.086**	0.000	0.160		0.282	0.490	0.183	0.183	Accepted
OC–>TP	0.191	0.079	2.426**	0.015	0.137		0.037	0.344			Accepted
JS->TP	0.147	0.066	2.220**	0.026	0.120		0.017	0.278			Accepted

Note: **P<0.01, * P,0.05
Note: Predictive relevance (Q^2) effect sizes are namely level of 0.02 is small, 0.015 is medium, and 0.35 is large.

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Table 5 is shown a positive significantly indirect effect relationship of organizational commitment between integrity and task performance (β=0.058, p<0.01, LLCI= 0.011, ULCI= 0.109). Thus, hypothesis 3 is mediator. For indirect effect of job satisfaction between integrity and performance (β=0.041, p<0.01, LLCI= 0.004, ULCI= 0.116) also indicate a positive significant indirect relationship. Therefore, hypothesis 5 also accepted as a mediator.

Table 5: Coefficients for Mediating Effect (Indirect Effect)

Consturct	Beta		SE	*t* Value	P Value	LLCI 5%	ULCI 95%	Decison
INT–OC-TP	0.058		0.002	2.382**	0.009	0.011	0.109	Mediation
INT– JS -TP	0.041		0.014	1.941*	0.052	0.004	0.116	Mediation

Note: **P<0.01, * P,0.05

In this study, we find out that OC and JS have a significant positive relationship with performance among police officers in Kuala Lumpur, Selangor, and Johor. Police officers who have a high level of job satisfaction able to performance well compare that police officer have same high level of organizational commitment. This leads that police officers have high level of job satisfaction and commitment willing tend to adapt the organizational changes and challenging duties of police.

The study also found that integrity can influence police officer's behavior to perform. The findings one of the most critical issues faced in Royal Malaysia Police (RMP). Even though many researches carried out on integrity with performance in public sector in Malaysia (Alam et al., 2018; Johari et al., 2020; Sajari et al., 2019), in RMP, this subject is smallest. The results have pointed out the significance of further research on integrity on police performance.

5. Conclusion

The results revealed that the integrity is direct certainly link to performance, which mediates job satisfaction and organizational commitment. Besides, this study has revealed that is an essential requirement to enhance the levels of job satisfaction and organizational commitment is worthy. The current result highlighted to top management of RMP to focus on planning and adapting new strategies to improve integrity for police office.

This given clear image to top management of RMP to investigate the performance police officers through questionnaire survey. It is important to policy makers and top management to obtain the data regarding performance of police officers at various times. Through the implementation survey at different locations maybe discover consistent link connecting the OC, JS, and performance. Those police officers were believes connected with lower commitment and satisfaction, top management able plan strategies to approach them to increase their performance. The strategies plan such as increase salary, reward, career, and welfare. Through adapt strategies, police officers able be more motivation in daily duties.

According to Karim and Nadeem (2019), integrity has been found to have a relationship with organizational commitment and job satisfaction. However, in this study, it is important to note that integrity have a medium effect size on task performance through OC and JS. The reason why integrity is important is probably because police officers believe that relationships are built on trust, moral values, and mutual respect among themselves. Other than that, integrity is seen as an inner characteristic that manifests in behaviors such as fairness, power-sharing, and ethical guidance on areas such as organizational objectives.

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Besides, the top management can always take proper steps to optimum task performance among the police officers. For example, when police officers are committed to their duty, they will spend their whole career with the organization. As a result, it will further improve their performance towards the achievement of goals. In fact, organizational commitment also influences the motivation on task performance. This may explain why high organizational committed police officers are expected to deliver a qualitative service performance to the public.

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VAK LEARNING STYLE IN FOUR ARABIC LANGUAGE SKILLS IN INTERNATIONAL ISLAMIC UNIVERSITY COLLEGE SELANGOR (IIUCS)

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Abstract: *Learning style is an important element and have a big impact in the world of education. Hence, this study emphasizes the aspects of Visual, Auditory, and Kinesthetic (VAK) learning styles on 4 Arabic Language Skills (ALS). This research is a pilot study conducted at the Selangor International Islamic University College (KUIS). Researchers used the questionnaire adapted from the questionnaire in visual, auditory, and kinesthetic learning styles (VAK). A total of 39 Bachelor of Arabic as a Second Language students comprising two classes involved as respondents in this study. Descriptive statistics were used to obtain information in frequency and percentages of student profile variables and student background. Frequency statistics are used for visual learning styles, auditory learning styles, and Kinesthetic learning styles. The results showed that students were more likely to use Kinesthetic learning styles rather than using Visual and Auditory learning styles.*

Keywords: tendency, VAK learning style, Arabic language.

1. Introduction

Language skills play an important role in enhancing the mastery of the students. In Arabic, there are four essential skills that students need to master, namely speaking skills, listening, reading and writing skills. The language skills in a language curriculum has been seen as a very important skill in the learning and mastery of a language. An important conclusion made by Luoma (2004) which states that language skills are an important component of the language curriculum. It supports the earlier view of Tiedt, Bruemmer, Lane, Stelwagon, Watanabe, and William (1983) which concludes that in language teaching and learning, a child who is able to master good language skills has a tendency to become good readers and writers in a language. The mastery of this skill is an important aspect that determines the success of teaching and learning a second language or foreign language (Nunan, 1991). Brown (2001) describes language skills as a *benchmark* for the mastery of a language.

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There are several reasons why students are weak in learning language skills, the lack of mastering the students in vocabulary and less skill in constructing grammatical sentences, less practicing speaking practices in their target language, the use of learning styles according to the student's tendency and less effective teaching methods. Ashinida (2012). This can be clearly seen in learning Arabic language skills because the language is considered to be more difficult to master than other languages while its use in the community is also seen as not widely available. Zawawi (2001).

In order to overcome this problem, some researchers tried to highlight Visual Learning Style, Auditory, Kinesthetic (VAK) in language learning as it was seen to have a very close relationship with the excellent language (Rubin 1975; Stern 1975). They are consistently practicing certain learning styles. In fact, it is the appropriate language learning are often found to have a significant correlation with performance excellence languages (Green & Oxford 1995). Additionally, one of the factors that distinguishes excellence between the two students is as clever and learned by the same teacher is the use of g are learning the correct, appropriate and effective. In other words, those who carry out effective and effective learning styles are often more successful in mastering the target language.

2. Research Methodology

This study is a quantitative study using questionnaire instruments in data collection. The 4 level Likert scale was used in this questionnaire. Student population A total of 39 Arabic Bachelor Degree students as Second Language, Selangor International Islamic University College (KUIS) were selected in this study. The study was conducted on 39 students to look at the VAK Learning Style used in learning Arabic language skills. Random sampling techniques are used in distributing questionnaires. After data is obtained, a descriptive test is performed to see intrinsic and extrinsic perceptions min. For the purpose of interpreting descriptive data, this study also divides min to three levels, as in Table 1:

Table 1: Categories Likert scale rating level 4

Min Range	Min Level
1.00 to 2.00	Low
2.01-3.00	Simple
3.01-4.00	Height

Source: Abdull Sukor (2008)

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2.1 Population

The study was conducted on 39 Bachelor Arabic as a Second Language students, in International Islamic University College Selangor (KUIS).

3. Data Analysis

Analysis of data g are learning this language is divided into Visual learning style, learning style Auditory, Kinesthetic learning styles an d. Likert scale questionnaire is distributed to 39 Arab Bachelor Degree students as Second Language.

SCALE	SCORE
Strongly Agree	4
Agreed	3
Do not agree	2
Strongly disagree	1

Figure 1: The Likert Scale form used in the questionnaire

4. Findings

This study was conducted to determine the learning style of VAK among Arabic language specialists at the International Islamic University College (KUIS). The findings were analyzed using SPSS 21.0 software. Descriptive analysis is carried out by involving frequency, mean and standard deviation.

Table 1 shows the gender of respondents. A total of 12 people (30.8%) were boys and 27 (69.2%) were female students.

Table 1: Sex

Sex	Frequency	Percentage
Man	12	30.8%
Women	27	69. 2 %

Table 2 shows the semester of respondents' study. A total of 16 (2.6%) respondents are the students of the first semester, 7 (18.4%) is the second semester students and 5 (13.2%) is the third semester student and 25 (65.8) among the four semester students.

Table 2: Semester of Study

IPT	Frequency	Percentage
Semester 1	1	2.6%
Semester 2	7	18.4%
Semester 3	5	13.2%
Semester 4	25	65. 8 %

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Table 3 shows the Arab learning experience by respondents. A total of 34 patients (87.2%) do not have the experience of studying in Arab countries, 2 (5.1%) people learn in between 1-11 months, one (2.6%) between 1-2 years of study and 2 patients (5.1%) learn in between 3 years and above.

Table 3: Learning Experience in Arab States

IPT	Frequency	Percentage
None	34	87.2 %
1-11 months	2	5 .1%
1-2 years	1	2.6 %
3 years and above	2	5. 1 %

4.1 Descriptive Analysis

In order to see the learning trends of Arab learning styles among students, descriptive analysis was used to interpret the collected data. The results of this descriptive analysis are presented in the form of tables that contain mean values and. The mean of each construct will be categorized into three scores as shown below.

Table 4: Min Score

Min Range	Min Level
1.00 to 2.00	Low
2.01-3.00	Simple
3.01-4.00	Height

a. Visual Learning Style

No.	Questions Questionnaire	Strongly disagree	Do not agree	Agreed	Strongly Agree	Min Scale Hose
S1.	If I meet Arab tourists who want to go to an area in the university, I'll give you a map or show a picture of it.	**1**	**8**	**24**	**6**	Min =2.90
S2.	If I'm not sure if the following words are spelled "السمك"Or" السماء", I would imagine the word and choose according to the seemingly appropriate look.	**1**	**8**	**19**	**11**	Min =3.03
S3.	If the lecturer told me to make a surprise presentation in the classroom, I would refer the reference book to find a picture-based idea.		**8**	**21**	**10**	Min = 3.05
S4.	In the selection of books, pricing and design will be more interesting to me.		**2**	**13**	**23**	Min = 3.51
S5.	When I learned something i'rab, I studied it by looking at the demonstration (diagram) demonstrations and mind maps.		**6**	**22**	**11**	Min = 3.13

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S6.	If I have trouble understanding Arabic learning, I prefer lecturers to show a mind map that illustrates the problem.	**1**	**5**	**16**	**17**	Min = 3.26
S7.	I love surfing Arab websites that have attractive design and visual features.		**2**	**20**	**17**	Min = 3.38
S8.	I like lecturers using diagrams, charts, or graphs during teaching.		**2**	**16**	**21**	Min = 3 .49
	Overall Min					**3. 21**

Figure 2: The results of the distributed questionnaire are related Visual Learning Style

Figure 2 shows that every mean value of visual learning style for each item are at high and simple levels. The highest mean value is achieved on item S4 (In book selection, price and design are more attractive to me) with min = 3.9. Next followed by item S 1 (If I meet Arab tourists who want to go to an area in the university, I will give a map at au show the picture to him) with min = 3. 89. The lowest mean value is achieved by item S7 (I love to browse Arab web site which has attractive design and visual features.) With mean value = 3.6. Overall, the visual learning style is at the gg level with min = 3. 18.

b. Auditory Learning Style

No.	Questions Questionnaire	Strongly disagree	Do not agree	Agreed	Strongly Agree	Min Scale Hose
S 1.	If I meet Arab tourists who want to go to an area in the university, I will give oral directions to the place.	**1**	**5**	**23**	**9**	Min =3.03
S 2.	If I'm not sure if the following words are spelled "السماء", I will mention the word in your mind and choose one. "السمك"Or	**1**	**8**	**19**	**11**	Min =3.03
S 3.	If the lecturer told me to make a surprise presentation in the classroom, I wouldask for suggestions from classmates.		**8**	**21**	**10**	Min =3.13
S 4.	In the purchase of books, besides the price, I will be affected when the salesperson describes the features of the book to me.		**2**	**13**	**23**	Min =3.08
S 5.	When I learned something i'rab, I learned it by listening to someone explaining and asking questions.		**6**	**22**	**11**	Min =3.49
S 6.	If I had trouble understanding Arabic learning, I would prefer lecturers to show a mind map that would parse the problem.	**1**	**5**	**16**	**17**	Min =3.33
S 7.	I love surfing Arab websites that have an interesting design of audio and video for me to hear and understand.		**2**	**20**	**17**	Min =3.31

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S 8.	I like a speaker or lecturer using question and answer techniques when giving a talk.		**2**	**16**	**21**	Min =3.36
	Overall Min		**3. 22**			

Figure 3: The results of the questionnaire distributed
Auditory Learning Style

Figure 3 shows that every mean value of auditory learning style for each item are at high and simple levels. The highest mean value is achieved on item S4 (In book selection, price and design are more attractive to me) with min = 3. 9. Next followed by item S 1 (If I meet Arab tourists who want to go to an area in the university, I will give a map at au show the picture to him) with min = 3. 89. The lowest mean value is achieved by item S7 (I love to browse Arab web site which has attractive design and visual features.) With mean value = 3.6. Overall, the visual learning style is at the gg level with min = 3.18.

c. Kinesthetic Learning Style

No.	Questions Questionnaire	Strongly disagree	Do not agree	Agreed	Strongly Agree	Min Scale Hose
S 1.	If I meet Arab tourists who want to go to an area in the university, ***I will take him to the place.***		**5**	**7**	**8**	Min =2.97
S 2.	If I'm not sure if the following words are spelled "السماء", "Or" السمك", I would refer to the dictionary.	**1**	**8**	**19**	**11**	Min =3.26
S 3.	If a lecturer told me to make a surprise presentation in the classroom, I would refer to the reference book.		**8**	**21**	**10**	Min =2.87
S 4.	During book selection, besides price, I would be affected if I read the information about the synopsis of the book.		**2**	**13**	**23**	Min =3.21
S 5.	When I learned something i'rab, I learned it well by rewriting it while studying it.		**6**	**22**	**11**	Min =3. 57
S 6.	If I have trouble understanding Arabic learning, I would prefer lecturers to provide web site or related reading materials.	**1**	**5**	**16**	**17**	Min =3.23
S 7.	I love surfing Arab websites that have an interesting design.		**2**	**20**	**17**	Min =3.46
S 8.	I like a speaker or lecturer using demonstrations, models or practical sessions, circular notes, books or reading materials during lectures.		**2**	**16**	**21**	Min =3.46
		Overall Min		**3. 25**		

Figure 4: The results of the distributed questionnaire of Kinesthetic Learning Style.

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Figure 4 shows that every mean value of a kinesthetic learning style for each item are at high and simple levels. The highest mean value is achieved on item S4 (In book selection, price and design are more attractive to me) with min = 3. 9. Next followed by item S 1 (If I meet Arab tourists who want to go to an area in the university, I will give a map at au show the picture to him) with min = 3.89. The lowest mean value is achieved by item S7 (I love to browse Arab web site which has attractive design and visual features.) With mean value = 3.6.

Overall, the visual learning style is at the gg level with min = 3. 18.

5. Conclusion

Based on the interval scale min obtained through questionnaires distributed to students in connection g are learning language skills, the study found the likelihood of a student of Arabic using learning styles VAK of Arabic language skills are more in the direction of kinesthetic, followed by auditory learning style, and visual learning styles.

Hence, activities in teaching and learning among students need to be enhanced using more focused activity of visual elements and audits like listening to audio and using visual aids teaching aids. Students also need to use learning styles in self-learning activities according to their individual tendencies. The Arabic language lecturer provides guidance to students on how to use appropriate learning styles as individuals in mastering Arabic language proficiency in his or her speaking skills.

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