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An Analysis of Individual Entrepreneurial Orientations in Predicting Malaysian Engineers' Intention to Quit the Jobs using PLS-SEM Approach

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Abstract
The objective of this study is to investigate the influence of individual entrepreneurial orientation (IEO) on the engineers' ITQ based on entrepreneurial orientation theory. The data were analysed using the Partial Least Squares-Structural Equation Modelling (PLS-SEM) to validate the research model and hypotheses. The findings reveal that the more IEO an organisation practices, the less likely its engineers' ITQ current jobs. Theoretically, this study extends the value of IEO components in predicting engineers' ITQ. Additional knowledge is required to incorporate the roles of IEO and engineers' behavioural expectations in order to address engineering talent shortages in a competitive labour market.

Keywords: individual entrepreneurial orientation; intention to quit; engineers; entrepreneurial orientation theory

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1.0 Introduction

Intention to quit (ITQ) has become a symptom of poor work quality, performance, retention, profitability, productivity, and personnel cost among trained professionals, particularly engineers (Rathi & Lee, 2017; van der Bank & Siwela, 2021; Yu, 2022). In today's fight for talent, the engineering sector is suffering severe shortages of skilled workers, with over one million positions lost at the cost of 200 to 300 per cent of yearly income (Doh, Smith, Stumpf, & Tymon, 2011; Rengamani, 2018). Replacement of new engineers accounts for at least 10 per cent to 30 per cent of an organisation's operating costs (e.g., recruiting, selecting, and training), with more than 60 per cent of engineering talents are expected to leave their positions over the next decade (Singh, Fouad, Fitzpatrick, Liu, Cappaert, & Figuereido, 2013). According to several studies, the typical job tenure of an engineer is less than two years, significantly lower than that of other professions, including information technology professionals, nurses, teachers, and social workers (Choi & Kim, 2015; Harhara et al., 2015; McInerney, Ganotice, King, Marsh & Morin, 2015; Rudman, Gustavsson & Hultell, 2014). A diminishing supply of engineering talent hinders the expansion of internal talent rivalry for a nation, yet reputation, competitiveness, and excellence have a substantial influence on an organisation's long-term survival (Tremblay, Wils & Proulx, 2002; Williamson, Lounsbury & Han, 2013). Therefore, it is critical to assess and improve the engineers' ITQ (Lejdeby & Östman, 2019).

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A high ITQ makes engineers more likely to participate in distracting behaviours throughout their engineering careers, such as creativity and innovation. They are also more inclined to take risks and engage in problem-solving, critical thinking, and flexibility throughout their engineering careers. For engineers, this meant taking on a new role as an entrepreneur, someone who has talents, was willing to risk and grasp chances, was dedicated to given responsibilities, self-motivated, inventive and aggressively created new ideas (Williamson et al., 2013). Mora, Monsalve and Maldonado (2019), and Menzel, Aaltio, and Ulijn (2007) claimed in their commentary on the behaviours of engineers-entrepreneurs that training engineers as entrepreneurs typically focuses on business and market expertise, which are essential engineering environment needs. With the addition of technology entrepreneurship to engineering practice, engineers will have more opportunities for self-determination on engineering paths, more freedom to make task-related decisions, and the ability to impose their own will on the organisation to complete major projects. Engineers' personalities and qualities are interpreted in many ways, which is one reason why they are considered entrepreneurs. For engineers to succeed in their new responsibilities in technological innovation and product creation, they must cultivate important personality qualities such as introversion, intrinsic drive, flexibility, and creativity. These traits will enhance engineers' individual entrepreneurial intention (IEO) for invention and their ability to respond swiftly to rapidly changing technical requirements (Williamson et al., 2013).

By associating engineers with IEO, this current study addresses a critical question regarding engineers' ITQ: Do IEO behaviours truly have an effect on the reasons for individual engineers' ITQ a job? According to Yi, Sheu, and Zhi (2009), evading EO efforts within organisations would motivate an increasing percentage of people to resign. This is because IEO is indeed associated with critical talent behaviours that enable them to make difficult judgments, and they value working independently and developing new ideas (Sangar & Rangnekar, 2014). Engineers' essential technical ability, management competence, and entrepreneurial creativity are retained through IEO behaviours, and these traits are proven to be major drivers of engineers' ITQ (Alavi et al., 2012; Igbaria, and Siegel, 1992; Igbaria, Kassicieh, & Silver, 1999). According to Kharbanda and Stallworthy (1990); Williamson et al. (2013); and Yang, Ma and Hu (2011), the higher the degree of professional achievement, the stronger the IEO of engineers for future career pathways, which indicates the ITQ decision-making for existing jobs. Currently, experimental research has looked at how IEO characteristics affect individual work performance and entrepreneurial ambitions and found strong links between traits including proactiveness, risk-taking, creativity, and autonomy. Prior, Bolton, and Lane (2012); Corr^ea, Queiroz, and Shigaki (2021); Elenurm (2012); Krishnakumar, Devi, and Rao (2013), and Taatila and Down (2012) examined the role of EO from an individual perspective and discovered that IEO had a positive and significant effect on future job performance. In their studies, when compared to students who were not exposed to IEO, those who were more engaged and creative in their thinking. In addition, students got more out of IEO when their entrepreneurial objectives and abilities were honed via activities like invention, risk-taking, and networking (Taatila & Down, 2012). Meanwhile, Bolton (2012) and Elenurm (2012) looked at the IEO levels of entrepreneurs and found that innovativeness, proactiveness, and risk-taking were responsible for entrepreneurial behaviour and affected individual job performance.

Despite the fact that IEO is extensively utilised to determine students' and entrepreneurs' entrepreneurial intentions, entrepreneurial abilities, and job performance, few research have examined the link between IEO and engineers' ITQ their jobs. Based on identified gaps, therefore, the main objective of present study to investigate the influence of IEO on engineers' ITQ their current jobs. Specifically, this current study aims to investigate the influence of innovativeness, proactivensss, risk-taking and competitive aggressiveness on engineers' ITQ. This current study uses the EO theory to explain the IEO components of innovativeness, proactiveness, risk-taking, and competitive aggressiveness in an organisational environment. Bolton and Lane (2012) discovered that competitive aggressiveness was removed as a result of a lack of internal consistency. The role of competitive aggressiveness in forecasting an individual's entrepreneurial intention has received little attention. Previous authors, on the other hand, have been unable to give adequate evidence that competitive aggressiveness may be utilised to assess individual behaviour (Bolton & Lane, 2012; Igbaria, M. & Siegel, 1992; Kollman, Christofor & Kuckertz, 2007). Individual competitive aggressiveness and individual behaviour are linked to entrepreneurial ambition and performance, although there is currently less evidence to support this link at this moment. These findings contribute to our expanding understanding of how this dimension may be utilised to predict engineers' ITQ. The following parts include the present study's theoretical foundations, hypothesis development, research methodology, findings, and conclusions. Finally, this study also analyses the implications, limitations, and recommendations for future research.

2.0 Literature Review

ITQ can be used to determine the most critical and powerful predictor of actual voluntary turnover (Rathi & Lee, 2015). As Tuzun (2007) notes, ITQ refers to an individual's behavioural intents to leave their current organisation, where the individual's quitting intentions result in the individual's decision to leave his or her current work and seeks new employment alternatives. Therefore, examining the factors that influence ITQ is a useful alternative to examining turnover patterns (van der Bank & Siwela, 2021). As with other skilled professionals, ITQ is overlooked among engineers. Bigliardi, Petroni, and Dormio (2005) and Singh et al. (2013) discovered that engineers' ITQ was negatively and significantly related to career aspirations, organisational socialisation, career satisfaction, job involvement, job satisfaction, role conflict, role ambiguity, task characteristics, organisational commitment, and organisational support. In those studies, it was also found that the ITQ of engineers was negatively and significantly linked to career aspirations and organisational socialisation, career satisfaction, job involvement and job satisfaction, role conflict and role ambiguity, task characteristics, organisational commitment and organisational support (Bigliardi et al., 2005; Igbaria & Siegel, 1992; Singh et al., 2013). To better understand the rising demand of ITQ forces among engineers, Tremblay et al. (2002) and Williamson et al. (2013) challenged IEO to combine engineers with the essential values of entrepreneurial behaviours to adapt with technological innovation.

The influence of technology has provided engineers with new technical capabilities, skills, knowledge and job experience, all of which have expanded the number of engineering specialists. Engineers' IEO behaviours can be explained theoretically using the EO theory, which applies to workplace processes, practises, and decision-making (Lumpkin & Dess, 1996; Mora et al., 2019). According to this idea, the major components of EO are autonomy, inventiveness, risk-taking, proactiveness, and competitive aggressiveness (Covin & Slevin, 1986; Lumpkin & Dess, 1996). Often new entrants have the most influence because of the entrepreneurial inclination of entrepreneurs to act independently, be inventive, and take risks. They are also more aggressive in their competition and aggressively seek out market possibilities (Lumpkin & Dess, 1996). In order to execute large-scale projects and construction, these traits are essential for developing organisational innovation, encouraging risk taking, and encouraging proactive behaviour in capitalising on economic opportunities (Covin & Slevin, 1986; Lumpkin & Dess, 1996). Engineers have good behavioural intentions toward opportunity detection, proactiveness, the urge for achievement and a risk-taking proclivity as a result of their EO behaviours. The increasing number of turnovers within an organisation is a contributing factor to decreasing EO activities. The nature of EO continues to be linked by influencing key talents' behaviour when it comes to task-related decisions, working autonomously, and creating new ideas. A thorough clarification of the primary responsibilities and skills of engineers-entrepreneurs increases engineers' autonomy, entrepreneurial creativity, and innovation. It also increases engineers' interest in pure challenges and engineers' proactivity.

2.1 Entrepreneurial Orientation Theory

The EO theory can be used to describe and generate entrepreneurial behaviours within organisations. The strategic orientation of a firm is defined by entrepreneurial factors such as decision-making styles, methods, practises, and tactics (Lumpkin & Dess, 1996). Covin and Slevin (1986) claimed in an early research that entrepreneurship has become an essential component of a high-performance organisation. The three important traits are risk-taking, innovation, and proactiveness, and each is connected to an organization's propensity to take on high-risk initiatives, be brave and aggressive in seizing chances, and initiate activities that rivals respond to. Lumpkin et al. (1996) propose that additional EO components, such as autonomy and competitive aggressiveness, be added to the EO for a new firm's entry in order to function efficiently in a dynamic corporate environment and to dominate in the competitive marketplace. The approach will be effective as long as a new entry combines these behaviours with components of the environment (e.g. dynamic), organisation (e.g. munificence, complexity, and industry traits), risk-taking, and competitive aggression (e.g., size, structure, strategy, strategy-making process, firm resources, culture, and top management team characteristics).

In the EO analyses, Davis, Bell, Payne, and Kreiser (2010), Entebang, Harrison, and Run (2010), Jia, Wang, and Yu (2014), Khalili, Nejadhussein, and Fazel (2013), and Kropp, Lindsay, and Shoham (2006) found a positive and significant relationship between innovativeness, proactiveness, autonomy, risk-taking, and competitive aggressiveness and organisational performance, growth, and productivity. Others, like Bolton and Lane (2012), Elenurm (2012), Kollman et al. (2007), and Wu (2012), utilised a flexible EO function to predict an individual's entrepreneurial ambition and job performance. Preliminary work on EO was done based on an individual analysis (Kollman et al., 2007). Individual analysis was used to conduct preliminary work on EO (Kollman et al., 2007). They demonstrated how to use EO constructs to evaluate individual performance. In order to develop an entrepreneur in an organisation, discussions about EO from a person’s perspective must take into consideration the cultural, political, and legal settings, as well as macro and microeconomic elements. According to a few academics, EO theory will influence the expected outcomes of individual entrepreneurial goals, job performance, and career happiness in in-house EO (Bolton & Lane, 2012; Kollman et al., 2007; Williamson et al., 2013). Hence, the current study postulates that incorporating EO into engineers' entrepreneurial behaviours will improve retention and career happiness at their current job.

The EO theory, which outlines the methods, techniques, and decision-making activities employed by entrepreneurs, may be applied to engineers' EO behaviours. Five major components of EO, including innovativeness, proactiveness, risk-taking, and autonomy, and competitive aggressiveness, can affect the effectiveness of EO activities and practises from inside. These characteristics are important in encouraging organisations to accept innovative development, as well as willingness to take risks (e.g., big projects and constructions) and proactive behaviours in pursuing business prospects. EO behaviours are used by businesses to maintain present and future corporate performance, growth, and productivity. EO has assisted new entrants in developing strong entrepreneurial aspirations as well as identifying business problems. EO, as a mature organisation, seeks additional possibilities to enhance goods and services via innovation and creativity. Improving and sustaining present and future performance requires aspects of creativity, risk-taking, and proactivity to promote entrepreneurial experiences. EO behaviours shape an employee's good behavioural intents toward opportunity awareness, proactiveness, the drive for accomplishment, and risk-taking proclivity. Engineers have been impacted by technology in terms of acquiring new technical skills and knowledge. Engineers will benefit from the addition of new skills, knowledge, and expertise, as well as specialised specialists in the engineering area and capabilities. Simultaneously, via EO, engineers will acquire entrepreneurial aspirations in order to seize professional possibilities. The components and definitions of IEO are summarised in Table 1.

Table 1. IEO components

IEO Components	Definitions
Innovativeness	Support new ideas, novelty, experimentation for new products and services
Proactiveness	Act in anticipation of future problems, needs or changes
Risk-taking	Proclivity to engage in risky projects and prefer bold actions for achieving firms’ objectives
Competitive Aggressiveness	Intensively challenges its competitors for improving position in the marketplace

2.2 IEO and Engineers’ ITQ

Empirical research has found positive and substantial links between innovation, proactiveness, risk-taking, creativity, and autonomy, as well as an individual's work performance and entrepreneurial ambitions. Empirical research has demonstrated that engineers regularly engage in creative and proactive working behaviours (Alavi, Moteabbed & Arasti, 2012; Igbaria & Siegel, 1992; Kharbanda & Stallworthy, 1990, Menzel et al., 2007; Tremblay et al., 2002). Engineers with a high degree of technical proficiency inspire managerial competence, work consistency, pure challenge, and entrepreneurial innovation in order to respond to technological needs (Alavi et al., 2012). It is expected of the engineers to come up with new concepts and methods of thinking intellectually, to show inventiveness in solving technological problems, and to plan and undertake hazardous projects and tough tasks (Campbell, Gluesing, & Perelli 2012; Igbaria et al., 1992; Kaewsri & Tongthong, 2013; Kharbanda & Stallworthy, 1990; Menzel et al., 2007). The development of entrepreneurial knowledge, entrepreneurial mentality, and entrepreneurial abilities has been described in the context of engineering learning (Miranda, Goñi, Berhane & Carberry, 2020).

Grip and Smits (2012) emphasised the need of engineers incorporating innovation into daily regular tasks in order to build human capital and match it with the organization's competitive strategy. Williamson et al. (2013) concluded that a higher level of innovativeness results in engineers having positive behavioural intentions toward employment, as this behaviour is consistent with the nature of engineers' jobs involving innovation processes and product development. This study offers a strong case for the existence of a link between inventive behaviours and employment intentions. Retaining engineers as high performers encourages organisations to promote creative work practises. Agarwal, Datta, Beard, and Bhargava (2012), for example, discovered that an individual employee's capacity to develop, propose, and execute new ideas at work is currently influenced by their inventive behaviour. They emphasised that creative behaviour has repercussions in other areas of work, such as leadership, decision-making, and workgroup interactions. This study revealed an empirically significant negative connection between innovative work behaviour and turnover intentions (*ß=-20.23; p<0.01*). Although engineers have a variety of personalities, their innovative behaviours enabled them to gain knowledge and skills and to adapt to the changing demands of engineering professions (Williamson et al., 2013). Engineers may serve as agents for innovation, and innovative culture plays a vital role in enhancing the circumstances for innovation (Wipulanusat, Panuwatwanich, Stewart,Sunkpho, &, Thamsatitdej, 2021). Thus, it is anticipated that: *H1: Engineers' innovativeness is negatively connected to ITQ the jobs.*

Proactive behaviours motivate skilled employees to seek out better job possibilities and chart their future career paths (Yang et al., 2011). In general, proactivity influences individuals' good on-the-job behaviours and attitudes. The more proactive a person is, the more likely he or she is to inspire others to do the same. As a result, increasing proactive behaviours for sharing information and building trust has a negative impact on the ITQ (*ß=20.20; p<0.01*). When proactive behaviours help organisations promote workplace wellness and decrease employee ITQ, it is a useful lesson learned. Crant (2000) conducted a thorough examination of the benefits of proactive behaviours, concluding that the entrepreneurial process prepares engineers to be proactive employees. If proactive behaviours are not modelled in the workplace, engineers will be hesitant to seek criticism, information, and chances to improve engineering task performance. Engineers can discover and assess any technical difficulties in the context of a proactive environment and they can build and develop EO accordingly. Engineers who participate in the entrepreneurial process are more likely to be proactive in their jobs. As a result, generating ideas for recognising and analysing technical challenges would become impossible, and entrepreneurial development will progressively fade away. The decreased effect of engineers' expectations toward proactive behaviour will have a major impact on a significant motivator factor for engineers to stay in the same job at this time. Engineers' strong motivation to remain in their current professions and avoid ITQ will be demonstrated by sufficient proactive behaviours (Singh et al., 2013). As a result, we postulated the following hypothesis: *H2: Engineers' proactiveness and ITQ are negatively correlated.*

A person's tendency to take calculated risks in connection to their duties and commitments, as well as throughout the decision-making process, is known as risk-taking behaviour. Risk-taking individuals, according to experts, have a proclivity for embarking on risky ventures and preferring aggressive actions to accomplish corporate objectives (Bolton & Lane, 2012; Covin & Slevin, 1991; Lumpkin & Dess, 1996). They coordinate projects in a manner similar to engineers' risk-taking behaviours, adapting to changes and thriving in every environment, including delays and uncertainties (Matteson, 2021). When engineers develop their interests (e.g. working on hazardous jobs and projects that present work challenges), they are more prepared for the dangers and technical issues they will face as engineers in the future (Wipulanusat et al., 2021). It is considerably easier, quicker, and cheaper to cope with the majority of task-related issues once these interests are well-developed. Tremblay et al. (2002) found a strong link between engineers' willingness to take risks and their ability to hold onto their jobs. Working in the engineering field means you're always dealing with high-risk activities and technological difficulties you don't understand. Ingenuity piques the interest of engineers when it is possible to provide cost-effective solutions to job-related difficulties. Other research, such as Campbell et al. (2012), found that 110 engineers exposed to risky projects most likely experienced a dominating effect on their daily activities. Finally, the integration of ability, skills, and competences encourages engineers to take calculated risks in order to avoid the ITQ. As a result, the following hypothesis is advanced: *H3: Engineers' ITQ is negatively associated with risk-taking.*

Competitive aggressiveness is defined as the strength of a firm's effort to compete in the marketplace from an organisational viewpoint (Covin & Slevin, 1991; Lumpkin & Dess, 1996). It is a critical component for businesses to outperform their competition and achieve greater performance. Competitive aggressiveness, from an organisational standpoint, refers to the vigour of a firm's attempt to compete in the marketplace. Limited competitive aggressiveness would have a detrimental effect on the innovation process, resulting in decreased organisational performance, growth, and productivity. Individuals can be tested on their entrepreneurial ambitions and work outcomes using this component. Previous research has used competitive aggressiveness to predict students' entrepreneurial intents and abilities, while some studies have questioned the benefits of competitive aggressiveness toward individuals due to a lack of internal consistency (Bolton & Lane, 2012; Elenurm, 2012). Lumpkin and Dess (2001) stated that individuals' need for accomplishments and extraversion for future job performance are influenced by competition aggressiveness. Individual's competitive aggressiveness has been studied in a limited number of studies and this component has received minimal empirical validation (Bolton & Lane, 2012). Much doubt exists regarding the ability of competitive aggressiveness behaviours to predict engineers' ITQ; so, we postulated the following hypothesis: *H4: Engineers' competitive aggressiveness is negatively associated with ITQ.*

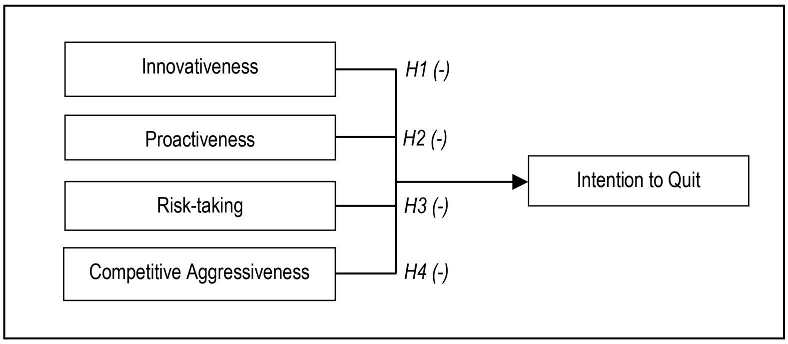

Fig. 1: Research Framework

3.0 Methodology

This section explains the methodology used to perform the research for this study involving the sample and technique, the data analysis, and the variables and measurements used in the data analysis.

3.1 Sample and Data Collection Procedures

Engineers employed at manufacturing enterprises in Malaysia's Southern Region, including Melaka and Johor, provided the data needed for the present study. All respondents were registered with the Malaysian Board of Engineers (BEM). Purposive sampling was utilised in this study as a non-probability sampling strategy. According to Bernard (2002), this method is referred to as judgmental or expert sampling and it involves the selection of an informant based on his or her characteristics. For the data collection, firstly, a formal letter was addressed to all human resource (HR) officials based on the Federation of Malaysian Manufacturers (FMM) directory of the manufacturing enterprises. This study categorised manufacturing enterprises with more than 500 employees, and identified and contacted 69 manufacturers. Secondly, appointed coordinators were contacted via phone to obtain approval.

Accounting, finance and banking, arts, media, and communication, building and construction, computer, information technology, electric and electronics, oil and gas, and sciences were all represented. Thirdly, each company received between ten and twenty copies of the questionnaires, the research summary and the consent letter. Lastly, we distributed the questionnaires via self-administered platforms and the process took two and a half months, from October to December 2019. This study used a quantitative research approach with multiple-item questionnaires based on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A seven-point scale maximises variance, which is an efficient technique to minimise response bias, increases power and minimises errors (Eutsler & Lang, 2015). Expanding beyond a seven-point Likert scale, according to Allen and Seaman (2007), and Cummins and Gullone (2000), may improve the sensitivity of variables impacting reliability. A total of 450 surveys were distributed to the respondents representing 30 manufacturing organisations that agreed to participate in the study. Overall, 51.1 percent of surveys were returned, and 46.4 percent of returned surveys were usable for additional data processing.

3.2 Data Analysis

The present study employed a Partial Least Square Structural Equation Modelling (PLS-SEM) approach with SmartPLS 3.2.8 to test the developed hypotheses. PLS-SEM is a method for estimating composites to represent latent variables in route models (Hair, Hult, Ringle, & Sarstedt, 2017). Additionally, there are reasons for non-normal data, limited sample numbers, and formative measured components (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). On a full sample of 209 respondents, a two-step PLS-SEM approach was used to validate the outer (measurement) and inner (structural) models. Model validation, in general, guarantees that the quality of empirical work is attained through the use of both measurement and structural models (Urbach & Ahlemann, 2010). Validation of the measurement model can be accomplished in this study by evaluating its internal consistency, indicator reliability, convergent validity, discriminant validity, and multicollinearity. Explanatory and predictive power were determined for the PLS-SEM structural model. Explanatory power was determined using two criteria: the coefficient of determination and the magnitude of the effect, whereas predictive power was determined using the path coefficient, predictive relevance, and relative impact.

3.3 Variables and Measurement

According to Covin and Slevin (1991), Lumpkin and Dess (1996), and Miller (1983), the operational definition of innovativeness is an individual's support for unique ideas, innovation, and experimentation with new products and services. Proactiveness is defined as acting in anticipation of future issues, needs or changes and for the present study, we utilised seven items to assess this characteristic. Risk-taking is defined as the inclination to engage in risky initiatives and favour bold actions to accomplish business objectives, whereas competitive aggressiveness is defined as an organization's intense competition to improve its market position. Innovativeness and proactiveness were assessed using seven items, while risk-taking and competitive aggressiveness were assessed using six items. All items were adopted from Covin and Slevin (1986), and Lumpkin and Dess (1996). The items have been modified to fit the current study's aims. ITQ was defined in this study using Haque's (2018) operational definition as an individual's behavioural intention to leave their current organisation. The items were chosen using the Govaerts, KyndtDochy, and Baert's (2011) three items. All measurements were developed using a seven-point Likert scale with anchors ranging from one (strongly disagree) to seven (strongly agree).

4.0 Results and Discussion

The questionnaire included eight demographic items on designation status, gender, age, marital status, race, education level, duration of service, and sector. The sample consisted of 180 male respondents (86.1 percent) and 13.9 percent of female respondents, with the majority of them were graduate engineers (n=170, 81.3 percent) and professional engineers (n=39, 18.7 percent). The average age of the respondents (n=116, 55.5 percent) was between 26 and 35 years, and a majority of them had been in the service for less than five years (n=103, 49.3 percent). A number of 198 (94.74 percent) of the 209 respondents held a bachelor's degree, with electrical and electronics providing the largest sample for this study (n=80, 38.3 percent). Table 2 reports the demographic information of the respondents.

Table 2: Demographic profiles

Demographics	Frequency	Percentage
Status of Engineers		
Graduate Engineers	170	81.3
Professional Engineers	39	18.7
Gender		
Male	180	86.1
Female	29	13.9
Age		
<25 years old	18	8.6
26-35 years old	116	55.5
36-45 years old	52	24.9
46-55 years old	18	8.6
>56 years old	5	2.4
Marital Status		
Single	86	41.2
Married	120	57.4
Divorced	3	1.0
Race		
Malay	158	75.6
Chinese	429	20.1
Indian	9	4.31
Education Level		
Bachelor Degree	198	94.74
Master Degree	9	4.31
PhD	2	0.96
Length of Service		
1-5 years	103	49.3
6-10 years	65	31.1
11-15 years	31	14.8
>16 years	10	4.8
Sector		
Accounting/Finance/Banking	18	8.6
Arts/Media/Communication	12	5.7
Building/Constructions	24	11.5
Computer/IT	11	5.3
Electrical & Electronics	80	38.3
Oil & Gas	35	16.7
Sciences	12	5.7
Others	17	8.1

4.1 Assessments of the Measurement Model

To check if the confirmatory factor analysis (CFA) worked, the items' reliability, convergent validity, and discriminant validity were assessed. Loading, composite reliability (CR), and average variance extracted (AVE) were presented as methods for determining convergent validity (Hair, Black, Babin, Anderson, & Tatham, 2010). The loadings of all items were substantially higher than the suggested threshold of 0.5 (Hair et al., 2010), as seen in Table 3. The CRs of all structures ranged from 0.831 to 0.929, significantly over the previously established cut-off of 0.70 (Nunnally, 1978; Gefen, Straub & Boudreau, 2000). The AVE values were claimed to be 0.5 and greater, in accordance with Bagozzi and Yi's (1988) recommending value of 0.5, suggesting that on average, more over half of the variance in their observable measurement items was explained by all latent factors (Fornell & Larcker, 1981).

Table 3: Convergent validity of the reflective items in the measurement model

Construct/Items	Loading	CR[a]	AVE[b]
Innovativeness (INNO)			
INNO1	0.644	0.929	0.688
INNO2	0.805		
INNO3	0.902		

INNO4	0.930		
INNO5	0.841		
INNO7	0.825		
Proactiveness (PROAC)			
PROAC1	0.814	0.927	0.648
PROAC2	0.773		
PROAC3	0.792		
PROAC4	0.605		
PROAC5	0.893		
PROAC6	0.853		
PROAC7	0.870		
Risk-taking (RISK)			
RISK1	0.770	0.872	0.534
RISK2	0.651		
RISK3	0.837		
RISK4	0.702		
RISK5	0.728		
RISK6	0.683		
Competitive Aggressiveness (COMPT)			
COMPT1	0.702	0.831	0.500
COMPT2	0.703		
COMPT3	0.612		
COMPT4	0.634		
COMPT5	0.858		
Intention to Quit (ITQ)			
ITQ1	0.883	0.899	0.748
ITQ2	0.900		
ITQ3	0.809		

Notes: Item INNO 6 was deleted due to low loading; [a] CR = (square of the summation of the factor loadings)/ {(square of the summation of the factor loadings) + (summation of error variances)}; [b] AVE = (summation of the square of the factor loadings)/ {summation of the square of the factor loadings} + (summation of error variances)}.

The heterotrait-monotrait correlations (HTMT) criterion was used in this study to determine the discriminant validity of the components. Henseler, Ringle, and Sarstedt (2015) asserted that the often used Fornell-Larcker criterion has a low sensitivity, implying that it is generally incapable of detecting discriminant validity issues in comparison to the HTMT criterion. According to the HTMT results in Table 4, none of the inter-construct correlations was more than 0.90, indicating that none of the correlations met the HTMT.90 requirement. Thus, the HTMT results proved that there is a lack of discriminant validity.

Table 4: Discriminant validity: Heterotrait-Monotrait (HTMT) results

Variables	COMPT	INNO	ITQ	PROAC	RISK
COMPT					
INNO	0.589				
ITQ	0.366	0.198			
PROAC	0.587	0.883	0.216		
RISK	0.822	0.641	0.319	0.560	

4.1 Assessments of the Structural Model

The R^2 results indicate that innovativeness, proactiveness, risk-taking, and competitive aggressiveness account for 38.8 percent of ITQ. The path coefficients and their accompanying t-values were created using Hair, Ringle, and Sarstedt (2011) bootstrapping technique with 500 re-samples. It is revealed that four proposed hypotheses were found to be significantly related to the ITQ by engineers. The results indicate that innovativeness is negatively associated with ITQ *(=-0.164, t-value=1.679*), which is also supported at the 0.05 level of significance, implying that H1 is supported. The findings revealed that proactiveness is negatively connected to ITQ *(=-0.315, t-value=3.452*) at the p<0.01 level of significance, supporting H2. Additionally, the data established a negative relationship between risk-taking and ITQ *(=-0.359, t-value=5.012*) at the p<0.01 significant level, indicating that H3 is supported. Finally, competitive aggressiveness is found to be negatively associated with ITQ *(=-0.319, t-value=4.505*) at the p<0.01 level of significance. Thus, H4 is defended. Table 5 and Figure 2 summarise the findings.

Table 5: Path coefficient and hypothesis testing

Hypotheses	Beta	Std. Errors	t-Value	p-Value	Results
INNO → ITQ	-0.164	0.097	0.679	0.047	Supported
PROAC → ITQ	-0.315	0.091	3.452	0.000	Supported
RISK → ITQ	-0.359	0.072	5.012	0.000	Supported
COMPT → ITQ	-0.319	0.071	4.505	0.000	Supported

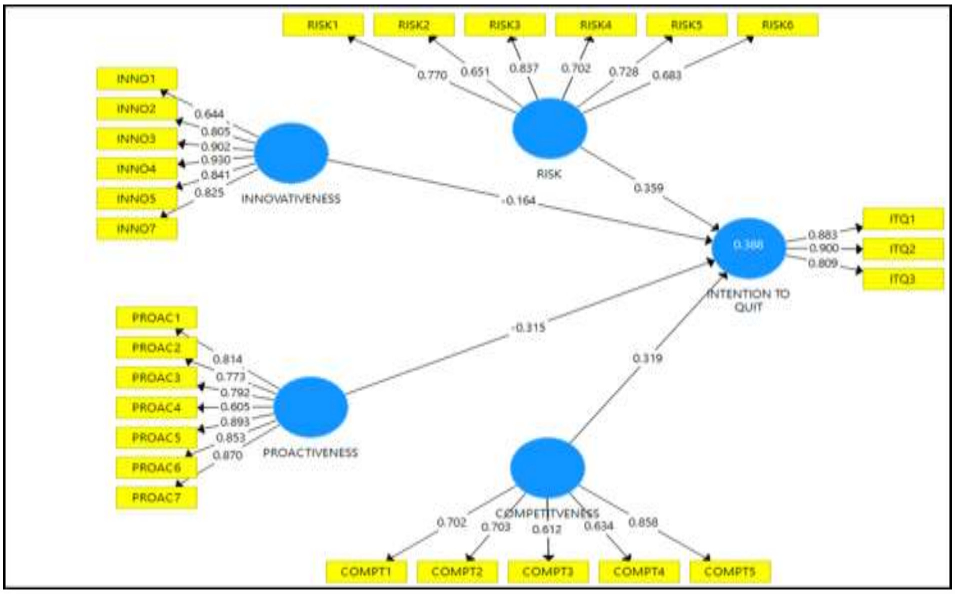

Figure 2: Structural Model (Full Estimation Model)

5.0 Discussion

Based on the assumption that engineers-entrepreneurs plays an essential role within an organisation, the current study explored the connections between IEO and ITQ among engineers (Alam, Nasir & Abdul Rehman, 2020; Buekens, 2014; Williamson et al., 2013). According to the data analysis, 39.0 percent of the study model's explanations, namely innovativeness, proactiveness, risk-taking, and competitive aggressiveness behaviours, had a significant effect on engineers' ITQ jobs. Organisations recognise keeping engineering skills as a major human resource planning strategy to preserve talent competitiveness by recognising the factors associated with ITQ. To begin, the direct relationship between innovativeness and ITQ can be described by the inherent behaviours and personalities of engineers who engage in the process of transforming ideas and creativity into real objects. Attempts to align engineers with innovative behaviours enhance their proclivity to invent, develop, and generate new technological solutions, in conjunction with the presence of other supportive elements, such as organisational and supervisory support, and a sense of workplace fairness. Social elements contribute to meaningful task completion and provide direction for work retention.

ITQ is an on-going process hence, individuals with dissimilar behavioural intentions react heavily on the internal and external employment determinants and strategies of current organisations to fulfil the employment expectations. To lower the ITQ among engineers, innovative behaviours must be ingrained in the personality, allowing for the use of specific behaviours (e.g., extrovert, creative, flexible, and conceptual thinking). As a result, organisations must provide engineers with unwavering support for innovation in order to maintain a high level of creativity and human capital values at work. Second, proactiveness considers engineers' internal potentials when they anticipate experiences, changes, and issues that will require them to progress. Proactivity has evolved in response to technology advancements, as this behaviour enables engineers to think conceptually in order to address future business demands and technical expertise. As an industrial actor, proactive engineers will only be visible if organisations first determine their business's strategic objectives and then allow engineers to produce new ideas to satisfy those objectives in order to compete against competitors in the market (Andree & Hansson, 2015).

Thirdly, risk-taking had a significant effect on engineers' ITQ, and we believe that this behaviour should continue to be emphasised in engineering job descriptions. Engineers' job descriptions involved huge risks (Campbell et al., 2012; Kaewsri & Tongthong, 2013). Thus, on-the-job training supports engineers in resolving daily technical and non-technical problems and conducting product and service-related investigations (Campbell et al., 2012). Engineers work in organisations in a variety of technical jobs where risk-taking can have far-reaching consequences (Alam et al., 2020). For the current study, we hypothesise that engineers require risk-taking behaviour as a primary motivator for avoiding ITQ, especially when task difficulties lack clear fixes (Igbaria & Siegel, 1992). The changes in job design raised engineers' required level of job control and involvement in engineering decision-making processes. Engineers require a high degree of autonomy, task challenges, inventiveness, and the ability to transform ideas into real objects, as well as the ability to react to competitive engineering needs. Another issue relating to ITQ is the demographics' risk tolerance and capacity. If the risk cannot ensure the ITQ, we hypothesized that engineers' risk acceptance, also known as uncertainty avoidance, is insufficient due to their shorter engineering experiences.

According to Hofstede (1980), lesser uncertainty avoidance occurs when individuals are unwilling to accept conditions that are uncertain or ambiguous. However, engineers' gender and age can have an effect on their risk tolerance. The degree to which engineers are capable of managing risky technical tasks broadens the scope of their experience, allowing for more effective promotion and succession planning. These approaches provide engineers with a high probability of controlling undesirable ITQ jobs. Finally, competitive aggressiveness and engineers' ITQ may have been related when organisations recognised that engineers' work quality, competencies, ability, knowledge, and expertise contribute to their businesses' competitiveness against late movers. Attempts to compete with rivals necessitated a significant amount of engineering innovation, which engineers identify, appraise, and translate into actual results. In summary, engineers develop their greater level of achievement spirit and extraversion behaviours in order to attain extraordinary job performance and success on an individual and organisational level (Lumkin & Dess, 2011).

6.0 Conclusion

The purpose of this study was to investigate the influence of IEO components (innovativeness, proactivensss, risk-taking and competitive aggressiveness) on engineers' ITQ. Theoretically, this study contributes addressing gaps in the human resource management and ITQ literatures regarding the relationship between IEO and ITQ among engineers. The IEO components have been expanded further in this study to allow for individual analysis. Additionally, understanding of how IEO affected engineers' ITQ was acquired. As indicated previously, the key focus was on the observed roles of engineers as entrepreneurs and the relationship between the main IEO and engineers' workplace behaviours (Menzel et al., 2007; Tremblay et al., 2002). According to entrepreneurial orientation theory, entrepreneurs act autonomously, are inventive and take risks, are more aggressive toward competitors, and are proactive in their market research (Lumpkin & Dess, 1996). Engineers' capacity to gain elite knowledge and abilities, attain a high degree of autonomy, be well-versed in managing uncertainty circumstances, leadership skills, be inventive, and progress in their educational levels of education has all been agreed upon. Engineers with strong individual entrepreneurial (IEO) behaviours, on the other hand, combine inventiveness, risk-taking, proactiveness, and competitive aggressiveness with the knowledge, skills, and competencies required to boost entrepreneurial values within an organisation (Covin & Slevin, 1986; Grip & Smits, 2012; Lumpkin & Dess, 1996; Williamson et al., 2013). The function of engineers in organisations, the significance of motivation in intrapreneurial activities, risk-taking analyses of entrepreneurial behaviour, the function of engineers in innovation, and the environment and culture as a precursor to IEO (Alam et al., 2020).

Equally important, this study adds to the body of knowledge by conceptualising and empirically demonstrating the relevance of competitive aggressiveness behaviours in predicting engineers' ITQ. Competitive aggressiveness was added as a crucial component since there is a dearth of supporting research, scale measurements, and argumentation regarding how this factor affected engineers' ITQ. We contribute to the conceptual framework through the EO theory, and our findings demonstrated that IEO leads to ITQ jobs for engineers. When a new entrant enters a competitive market, the EO theory frequently explains the processes, practises, and decision-making activities (Lumpkin & Dess, 1996). For practical implications, this current study provides meaningful lessons for the employers and industries to evaluate the extend to which IEO components can benefit the talent investment and engineers' retention outcome. Therefore, HR department is critical in human talent planning and ITQ policies, ensuring that newly hired engineers meet the demands of the organization's business. Engineers can attain employment by matching them with entrepreneur behaviours such as strong initiative, knowledgeable, flexible problem solving, autonomy, risk-taking, agent of change, and innovativeness. Last but not least, the findings had an impact on how society and policymakers understood the idea of ITQ, particularly in relation to the modifications in the behaviours, attitudes, and characteristics of Malaysian engineers. Engineers exhibit complicated and adaptable behaviours. Superior performance, motivation, and ITQ are produced when engineers' behaviours and job expectations are integrated.

Despite the aforementioned contributions, the current study has suffered from several limitations. To begin, this study's major findings clarified IEO and ITQ among engineers. Tett and Mayer (1993) suggested that the variables employed to assess ITQ are unlikely to be relevant in terms of increasing desire to stay (ITS). Second, the current study's sample consisted entirely of Malaysian engineers and was restricted to manufacturing enterprises based in the states of Melaka and Johor in Malaysia. As a result, its conclusions cannot be generalised to other engineering regions. It is proposed that future researchers and industry experts investigate engineers from various regions (e.g., the Northern Region, the Central Region, the East Coast Region, and Sabah, Sarawak, and Labuan), as well as from other sectors and industries in Malaysia as well as conducting comparative studies among professions could help expanding IEO and ITQ positions. Future research may investigate gender and age as moderating variables in the framework contributions, whereas perceived organisational support, extra-role behaviours, trust, leader-member exchange, and organisational citizenship behaviours may serve as the mediating variables (Yu, 2022). Lastly, since this study recruitment engineers samples, future research should examine the IEO components to other professionals such as accountants, architects, medical doctors, and lawyers.

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