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The role of senior managers' positive self-image in supporting MIS implementation

Abstract

Purpose

Researchers have long been interested in how the psychology of senior managers affects their behaviours. This paper presents the results of a questionnaire into how positive self-image influences how well senior managers in UK manufacturing organisations support the implementation of Management Information System (MIS). This study developed two scales, one to measure senior managers' attitude and the other to measure support of MIS implementation. It also sought to investigate the impact of senior managers' positive self-image on their support of MIS implementation in UK manufacturing organizations.

Design/methodology/approach

We tested our hypotheses on a data set of 400 senior managers from UK manufacturing organisations. Two unidimensional scales to measure senior managers' attitude and support level toward MIS implementation were developed. Exploratory factor analysis (EFA) was used to validate the scales. The study also examined the impact of senior managers' positive self-image on their attitude and support from the perspective of UK manufacturing organisations by using structural equation modelling.

Findings

The study found that senior managers' positive self-image is a significant contributing factor to their attitude. Also, senior managers' attitude has a strong positive impact on their support in the MIS implementation process. A strong mediating relationship was found to exist between senior managers' positive self-image and support through their attitude toward MIS implementation.

Originality/value

Although past literature has examined the importance of senior managers' attitude and support in successful MIS implementation, there has been no specific scale around management support and attitude toward MIS implementation developed to date. Thus, a contribution of this study is its development of two new scales based on a survey of senior managers of UK manufacturing organisations. The scales can be used to evaluate senior managers' perception toward MIS implementation and the support they are willing to give while implementing MIS. Another contribution of this study is analysis of positive self-image via item-parcelling which improves model efficiency and provides more stable estimates of the construct.

Keywords- Information systems, top managers, executives, MIS implementation, psychological attributes, positive self-concept

Paper type- Research paper

Introduction

An information system (IS) is 'a set of components that collect, process, store and distribute information' to enable decision-making and control in an organisation (Laudon and Laudon, 2020, p. 48) or supply chain (Grant, 2016). Management, organisations and information technology are the three components of IS (Laudon and Laudon, 2020). Information technology (IT) is the hardware and software an organisation needs to use in order to achieve its business objectives (Bessen, 2017). The first emergence of management information system (MIS) dates back to the 1960s through the teaching and writing of researchers (Wagner and Newell, 2011). Laudon and Laudon (2020) defined MIS as the field of IS which deals with both behavioural and technological issues surrounding using IS (its development, use and impact) by managers and employees. MIS play a role in different aspects of an organisation such as operations, finance, decision making, project management, competitive advantage, human resources, etc (Galliers and Currie, 2011). MIS is designed to help managers and employees by processing very large quantities of information so managers can make better decisions (Vieru and Rivard, 2014), which can help organisations keep their profitability up.

Significant numbers of organisations are not able to operate successfully and adequately without the availability of MIS. This is due to a growing interdependence between an organisations' ability to implement their strategies and achieve their goals and their ability to use MIS (Saunders and Brynjolfsson, 2016). Organisations use MIS applications to improve their performance and decision making. These applications include enterprise systems, customer relationship management (CRM), knowledge management, e-commerce applications, etc (Chatterjee, Ghosh and Chaudhuri, 2020). Enterprise systems, also known as enterprise resource planning (ERP), are a set of software modules and a central database through which different functional areas of an organisation (i.e., finance, human resources, sales and marketing, manufacturing and production) can share data (Mullins and Cronan, 2021). SAP and Oracle are examples of ERP software that are used commercially. The process of MIS implementation can involve changes in hardware, software, telecommunications and databases (Laudon and Laudon, 2020). It is predicted that global investment in IS will grow to $6.2 trillion in 2020 (IDC, 2018). This shows that more companies will invest in IS and if companies to implement IS, they can lose their competitive advantage. The term 'MIS' will be used solely referring to ERP, CRM and SRM because they are the most commonly used systems in organisations (Cruz-Jesus, Pinheiro and Oliveira, 2019; Guerola-Navarro *et al.*, 2021; Mullins and Cronan, 2021).

Although in the past manufacturing organisations have adopted various methodologies to improve their operations management such as ERP, CRM, SRM, etc and more recently industry 4.0, many manufacturing organisations are still at relatively early stages of implementing such technologies (Buer *et al.*, 2020). Therefore, there is a need for further investigation of MIS implementation in

manufacturing organisations. Many IS projects are considered a failure if they do not achieve organisation goals and finish on time within approved budget (Amid, Moalagh and Zare Ravasan, 2012). This shows that organisations are struggling to implement MIS successfully. Studies (Somers and Nelson, 2001; Ehie and Madsen, 2005; Kappelman, McKeeman and Zhang, 2006; Iacovou and Nakatsu, 2008; Agarwal and Garg, 2012; Almajali, Masa'deh and Tarhini, 2016; Ali and Miller, 2017) show that senior managers are one of the most important factors in successful MIS implementation as they can assist in providing essential resources such as IT, facility, human resources, and capital (Young and Jordan, 2008).

Extensive research has been done over the last 40 years on senior managers. Researchers (Hambrick and Mason, 1984; Hambrick, 2007; Finkelstein, Hambrick and Cannella, 2009; Wang *et al.*, 2016) have long tried hard to understand how senior managers' characteristics influence their strategic choices. Finkelstein, Hambrick and Cannella (2009) argued that senior managers' characteristics (i.e., tenure, experience, education and personality) form their values and beliefs, which influence their decision making and behaviours. The detailed study by Wang *et al.* (2016) investigated the role of senior managers in firm performance based on Upper Echelon Theory (UET) and found that senior managers' characteristics such as formal education, career experience and positive self-image have significant impact on their strategic actions, which may have an impact on senior managers' actions toward MIS implementation. This suggests that senior managers' decision-making is influenced by positive self-image because positive self-image impacts their perception of available strategic actions. Consequently, senior managers will allocate essential resources for a successful MIS implementation.

The study by Hiller and Hambrick (2005) identified the lack of understanding of the implications of senior managers' personality in relation to their decision-making (Hiller and Hambrick, 2005). Understanding how senior managers' make decisions provides insights on the reasons they might not be supportive of MIS implementation, which can lead to a failure of the implementation. In addition, there was a lack of a grounded theory to measure the concept of positive self-image until Judge et al. (2003), in their influential study, proposed core self-evaluation construct (CSE) as a valid construct to measure positive self-image. Different authors use different terms referring to the concept of 'positive self-image' including 'positive self-regards'(Finkelstein, Hambrick and Cannella, 2009); 'positive self-concept' (Seo, Shen and Benner, 2019); 'personality traits' (Wang *et al.*, 2016). In this paper, we are going to use the term 'positive self-image', which refers to the extent that senior managers positively assess themselves and their ability to influence their organisations. Studies related to positive self-image show that positive self-image is positively related to the strategic actions of a firm (Wang et al. 2016), job satisfaction (Judge et al. 2003), job performance (Judge et al. 2003), life satisfaction (Judge et al. 2003), speed of a firm's strategic decision-making (Hiller and Hambrick,

2005), centralisation of a firm's strategic decision-making (Hiller and Hambrick, 2005), task motivation and performance of a firm (Erez & Judge, 2001) and firm's performance (Hiller and Hambrick, 2005). These findings highlight the importance of positive self-image in the upper echelon field and show that senior managers' positive self-image impact their choices (Hambrick, 2007). Therefore, the significance of these findings is that they highlight that senior managers who have high positive self-image will engage more in high-risk strategic choices but have not directly investigated the impact of self-image on MIS implementation.

Although the concept of CSE was introduced, some researchers only use single elements of the construct (i.e., self-esteem, generalised self-efficacy, emotional stability and locus of control (Judge *et al.*, 2002)). These elements are four aspects of the broader concept of positive self-image. A study by Ndofirepi (2020) makes no attempt to investigate the relationship between senior managers' self-image and their entrepreneurial intentions. But it was found that internal locus of control has a significant impact on entrepreneurial intentions. Lam et al. (2007) found that self-efficacy has a positive impact on behavioural intention. Xu et al. (2020) showed that internal locus of control impacts innovative behaviour both directly and indirectly. Boone and Hendriks (2009) found that senior management team (SMT) locus of control diversity has no significant impact on SMT's collaborative behaviour and information exchange. These findings show that senior managers' behavioural intention is influenced by their positive self-image. The single elements of self-efficacy and locus of control impact senior managers' behaviour, but they only show a narrow glimpse of the broader concept of positive self-image. Positive self-image provides more potent predictions of senior managers' behaviours than the individual elements (Judge *et al.*, 2002). It is therefore important to investigate positive self-image to get more information on senior managers' behaviours toward MIS implementation.

A central theoretical model on the influence of senior managers on firm behaviour perceived to be of value to this research is Upper Echelon Theory (Hambrick, 2007; Hambrick & Mason, 1984). The basic logic of UET is that senior managers make their choices based on their experiences, values, and positive self-image (Hambrick, 2007) and these choices impact firms' performance (Hambrick & Mason, 1984). Mainly, this research focuses on senior managers' positive self-image, which influences how senior managers process information about the environment and their capabilities. Senior managers' comprehension and interpretation of the information impact their decisions (Finkelstein, Hambrick and Cannella, 2009). This construct gives a comprehensive picture of how senior managers perceive their surrounding and their corresponding behaviour (Finkelstein, Hambrick and Cannella, 2009). This picture shows the reasons behind senior managers' choices to either support MIS

implementation or not. When a senior manager has a favourable attitude toward MIS implementation because of his perceptions, he will manifest his favourable attitude by supporting it.

A meta-analysis of this growing area of literature expands the understanding of the relationship between positive self-image and their support. Senior managers' attitude and support have been studied before (Jarvenpaa and Ives, 1991; Khan, Lederer and Mirchandani, 2013; Roumani, Nwankpa and Roumani, 2017). For example, in the ground-breaking study of senior management support by Jarvenpaa and Ives (1991), they found that senior managers' support positively impacted on progressive use of IT within the firm. Their work is significant because they conceptualised the construct of senior managers' support as senior managers' involvement and participation, which refers to how critical they think IT is for their firms' survival and how much time and energy they are willing to invest in IT-related matters, respectively. This suggests that concept of support not only involves senior managers' actions but also related to their psychological state and attitude. Their sample size was limited to 57 senior managers, which affected the confidence in the findings. Roumani, Nwankpa and Roumani (2017) found that adoptors' attitude and intention is influenced by the trust in the IT system. However, there is an overlap in items of the construct of attitude proposed by both Roumani, Nwankpa and Roumani (2017) and Jarvenpaa and Ives (1991) which limits the statistical reliability and validity of the proposed construct and impacts the prediction of the measure (Bozeman and Perrewé, 2001). Khan, Lederer and Mirchandani (2013) showed that senior management support has a positive significant impact on IS performance. The proposed construct of support shows statistically sufficient reliability and validity. However, it is only limited to senior management support in the context of information systems operations. Senior managers' support of MIS implementation which gets us to operations has not yet been clarified. Their sample size of only 47 limited the confidence in the findings. This limitation has brought about the need to conduct a large-scale study. Moreover, there is a gap in the literature for a reliable and valid construct to measure senior managers' attitude and support toward MIS implementation.

A contribution of this research is to analyse how closely senior managers' attitudes are linked to UET, specifically, the impact of self-image on the attitude of senior managers. There are two main reasons that this topic has been overlooked. Firstly, senior managers are often reluctant to fill in lengthy questionnaires (Hambrick, 2007)(Finkelstein, Hambrick and Cannella, 2009). Secondly, the average response rate for studies involving senior management is 36.1% (Baruch, 1999), comparing to 55.6% of non-senior manager respondents, which make the findings more limited due to smaller sample size. Access to senior managers at board level is limited to the point that in a recent study by (Hill *et al.*, 2019), they proposed videometrics method to measure the characteristics of senior managers at board level. A larger sample size allows a more accurate estimate of the effect and easier assessment

of representativeness of the sample to generalise the results (Dichev and Skinner, 2002). In today's world, it is inconceivable that large organisations would need to implement MIS to maintain their supply chain operations (Grant and Preston, 2019). There are various factors that influence the decision to implement MIS including financial resources (Amid, Moalagh and Zare Ravasan, 2012), rewards such as improvements in business process, customer responsiveness, and strategic decision making (Shaul and Tauber, 2013), security risks (Jha and Pal, 2016), poor system quality and user dissatisfaction (Poba-Nzaou, Raymond and Fabi, 2008), etc. This study is focused on how senior managers' positive self-image influences their level of support toward MIS implementation. Based on the literature discussed above, we hypothesise that positive self-image influences managers' attitude toward MIS implementation and their attitude has a direct positive impact on the level of support given to MIS implementation. The paper structured in the following way: We start by outlining key theory, our conceptual framework and generated hypotheses. Our findings are presented before we conclude with implications to theory and practice.

Theory, model, and hypotheses

Upper echelon theory (UET) is one of the most influential theories in the upper echelon field and was first introduced by Hambrick and Mason (1984). The theory is significant because it identifies the underlying reasons for the way organisations act in terms of their strategic choices and efficiencies, which provides a better understanding of the reasons behind organisations performance and the things they do. This understanding enables organisations to improve their performance and consequently keep up their profitability. UET has been used to study firms' strategic actions and performance (e.g., Wang et al., 2016). López-Muñoz and Escribá-Esteve (2017) state that the upper echelon theory suggests that organisational objectives and outcomes are a critical reflection of the organisations' senior managers' characteristics. This is because organisational objectives are mainly decided by senior managers. Senior managers make decisions based on their characteristics including attitudes, demographics, values, beliefs, functional experiences, professional competencies and educational background (Hambrick, 2007). The upper echelon theory is a broad theory that emphasises the relation between procedures, characteristics, and senior management support structures (Hiebl, 2014) because senior managers make strategic choices based on their perceptions, which are shaped by their values, which are influenced by their characteristics.

Hiebl (2014) also states that the theory focuses on the organisations' strategic decisions and their performances while also including strategic renewal, internationalisation, acquisitions, and mergers. MIS implementation can be considered as a strategic choice ,which is defined as 'complex and of major significance to the organisation' (Hambrick and Mason, 1984, p.194) because MIS implementation is complex and often involves fundamental organisational changes (Amid, Moalagh

and Zare Ravasan, 2012). Abatecola and Cristofaro (2018) maintain that the theory indicates that the organisational performance and strategic outcomes are partially predicted by managerial background characteristics, i.e., the managers' values and cognitive basis for the managers' values. Besar et al. (2017) agreed and added that three basic principles that underlie UET include cognitive bias and values which are the reflection of the strategic decisions, knowledge, and values which conform to particular observable characteristics such as experience or training and the outcomes related to the observable characteristics of the senior managers. These studies highlight that senior managers' positive self-image impacts their attitude through their values and perceptions. Our research question related to UET is, therefore, " To what extent, does senior managers' positive self-image impact their attitude toward MIS implementation?"

Theory of planned behaviour (TPB) is a most influential conceptual framework used to study the behaviour of an individual and was proposed by Ajzen (1991) and Ajzen and Fishbein (1977). The theory demonstrates predictors of a complex concept of an individual's intentions to perform a behaviour with high accuracy (Ajzen, 1991). According to this theory, a person's intention to perform a specific act or their behavioural intention is associated with their attitude toward the behaviour. TPB is an extension of the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). TRA explains that attitude toward a behaviour, subjective norm, and perceived behavioural control are predictors of one's intention to perform a behaviour. Ajzen (1991) validated how the theory predicts the behaviour of an individual by analysing activities in 9 different studies. He found that there is a significant relationship between attitude and behaviour. The study of Ledgerwood and Shrout (2011) highlighted the importance of mediation analysis arguing that mediation analysis gives a better understanding of the underlying process of cause and effect. The studies reviewed above indicate that senior managers' intention to support MIS implementation is predicted by their attitude toward MIS implementation and their positive self-image impacts their attitude. This prompts a second research question: "To what extent does senior managers' attitude mediate the relationship between their positive self-image and support?"

Positive self-image and its effects on senior managers' attitude

Personality is conceptualised from a variety of theoretical perspectives. These perspectives and approaches have made a unique contribution in this field of interest where there is a need to determine how personality traits predict the job performance of an individual. The five-factor model (FFM) is one of the prominent paradigms of personality traits (see Costa & McCrae, 1992). FFM affects how an individual process information about their surroundings, organisations and capabilities

(Finkelstein, Hambrick and Cannella, 2009) which consequently impacts his or her behaviour. These five factors are neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Neuroticism is the opposite of emotional stability, where an individual has poor emotional adjustment and has a tendency to be more anxious and depressed (Barlow *et al.*, 2014). Extraversion demonstrates how sociable and positive an individual is (Wilt and Revelle, 2009). Openness to experience refers to an individual's tendency to be creative and flexible. An individual who scores high on agreeableness is kind and trustworthy. Conscientiousness refers to the tendency to be achievement striving (Costa and McCrae, 1992). FFM has received little attention in UET research because senior managers are often reluctant to fill in lengthy questionnaires to operationalise the FFM (Hambrick, 2007). Therefore, UET studies focused on individual personality constructs (e.g., locus of control, self-esteem, self-efficacy and emotional stability) to demonstrate positive self-image of an individual (Hiller and Hambrick, 2005). Quantifying these constructs assists researchers to differentiate individuals by their pattern of thoughts, feelings and actions (Costa and McCrae, 1992). These four well-studied constructs have significant conceptual similarities and the area of their similarity make up the underlying evaluation a person makes of one-self, which refers to positive self-image. Positive self-image brings all four constructs together and leads to more potent prediction of a person's behaviours than the individual variables (Hiller and Donald C. Hambrick, 2005).

Because self-image is important in influencing a senior managers' attitude toward implementing MIS, it is worth defining the concept of self-image. Seo, Shen and Benner (2019) defined self-image as a combination of various beliefs one holds about oneself. Their study demonstrated that the notion of self-image is dissimilar to self-awareness which embodies the extent of knowledge one has about oneself. Farrar et al. (2015) contributed to the field by highlighting that beliefs of others about oneself also contribute to the process of self-constructing the beliefs about oneself. These studies indicate that senior managers' self-image encompasses and consolidates both their own beliefs about themselves and others' beliefs about them, which shape their attitude toward MIS implementation.

Peixoto and Almeida (2010) and Di Fabio and Kenny (2016) found that there are multiple factors that contribute to the formulation of self-image, such as ideal self and self-esteem. The study of Weng and McElroy (2010) concluded that age, education and media are other factors that facilitate a person in framing their self-image. In contrast, the study of Evert et al. (2018) considered culture, gender, relationship, and appearance to be major determinants that contribute to formulating a self-image about one oneself. Additionally, the study of Seo, Shen and Benne (2019) highlighted that there are several sub-factors such as locus of control and self-esteem which assist an individual in developing either a productive or negative self-image about oneself. The research of Farrar et al. (2015) contemplated that self-efficacy and emotional stability are two major determinants that contribute to

establishing positive and negative self-image of oneself. It can be seen that the literature defines positive self-image in many ways, therefore this demonstrates why researchers have used different constructs to measure the same concept, which indicates the complexity of positive self-image. This study is using positive self-image to include all four variables mentioned above (locus of control, self-esteem, self-efficacy and emotional stability) and predict senior managers' attitude toward MIS implementation.

In their ground-breaking study of positive self-image, Judge *et al.* (2003) introduced the concept of core self-evaluation (CSE) as an effective approach or framework to measure positive self-image. because it uses the four underlying personality traits of self-esteem, generalised self-efficacy, emotional stability, and locus of control. Self-esteem demonstrates how an individual evaluates his self-worth (Rosenberg, 1965). Self-efficacy refers to an appraisal of an individual's ability to perform successfully in situations. Emotional stability is one's tendency to feel safe and calm. Lastly, locus of control is a person's belief that desired outcomes are a consequence of one's behaviour not from fate (Judge, 2002). CSE is a method to measure how an individual assesses himself and his relationship with the environment (Judge *et al.*, 2003). These four traits are highly correlated (Judge *et al.*, 2003). Their work is significant to the field because they proposed a 12-item scale which connects all four well-studied concepts of positive self-image and enables researchers to quantify senior managers' positive self-image. CSE has been validated and identified in several studies (e.g., Gardner and Pierce, 2010), but its relevance to senior managers and their attitude has not been examined widely. In this study, we used CSE as a tool to measure positive self-image because it provides a more potent predictor of senior managers' attitude toward MIS implementation, which consequently leads to a better understanding of the underlying reasons of senior managers' favourable attitude toward MIS implementation. Senior managers' attitude significantly impacts the success of MIS implementation because if they have favourable attitude toward MIS implementation, they will provide resources for a successful implementation.

Barrick, Mount, and Gupta (2003) and Judge and Ilies (2002) supported the opinion that senior managers with a more positive self-image are more confident and optimistic, so it could be assumed that they are more confident in making decisions with high risk. Chatterjee and Hambrick (2011) argued that such narcissism has a positive influence on mergers, R&D expenses, and capital expenditures. This is because a senior manager assesses risk based on his or her confidence. According to Hiller and Hambrick (2005), an individual with a healthy amount of narcissism can function successfully because it gives him or her secure self-esteem to survive everyday life. Thus, we predict a positive association between senior managers' positive self-image and attitude toward MIS implementation. MIS implementation requires significant amount of money and time investment

(Amid, Moalagh and Zare Ravasan, 2012), therefore, a more confident senior manager is more likely to make a decision to support MIS implementation. Senior managers' positive self-image influences their choice to support implementation.

Similarly, Finkelstein (1992) argued that top management team (TMT) characteristics predict their strategic behaviour. Positive self-image as one of the managers' characteristics shows how a person appraises his self-worth and capabilities. It is conceptualised as a higher-order construct. Personality theorists (e.g., Cattell, 1965) argued that positive self-image as a fundamental trait has a strong association with attitude. Experiences, values and personalities impact on an individual's information processing behaviour (field of vision, selective perception, interpretation) (Hambrick, 1984). These findings demonstrate the underlying factors which play a part in developing an individual's behaviour. Therefore, there is a strong association between senior managers' attitude toward MIS implementation and their positive self-image.

Judge and colleagues (1997) proposed that an individual takes actions because of their core self-evaluations which may indicate that a senior manager having a certain self-image will undertake to support MIS implementation. Brown et al. (2007) suggested that an individual's positive self-image impacts his commitment. Kamer and Annen (2010) also demonstrated that individuals with a more positive self-image are more committed to the goals they set. People with a high positive self-image are more committed to pursuing opportunities that are present to them (Johnsen et al., 2008). These findings suggest that positive self-image increases senior manager's commitment resulting in greater support of MIS implementation.

Erez and Judge (2001) argued that a person with higher positive self-image has increased motivation to perform tasks, which can infer that they will have more motivation to support innovations and new IS projects. Individuals with high positive self-image view their circumstances more positively and are less sensitive to negative information (Chang et al., 2012). Therefore, they are more positive to the challenges of new MIS implementation and more committed to supporting it. Given the significance of the findings above, we propose:

Hypothesis 1: Positive self-image is positively related to the attitude toward MIS implementation.

Senior managers' support toward MIS implementation

Attitude can be described as a person's disposition to react well or badly to an individual, an item, an organisation or an event, or to the way that an individual appraises a behaviour (Ajzen and Fishbein, 1977). In their wide-ranging study of individual behavioural intention to adopt IT, Lam, Cho and Qu

(2007) investigated the impact of self-efficacy, attitude, perceived IT beliefs and subjective norm on the intention to adopt IT. They found that positive attitude has a positive impact on the intention to adopt IT. They also showed that the productive outcome of any manufacturing project depends on the integrity and commitment of senior management that drives the workforce towards the success of the project (Elbanna, 2013). In addition, Lin (2010) demonstrated that the optimistic attitude of senior management towards themselves is of vital importance in order to maintain optimum productivity during the execution of projects as it ensures the required level of commitment and determination of the workforce for the project's success. These studies show the underlying influence of senior managers' attitude on their support toward IS project. The studies thus far provide evidence that senior managers manifest their favourable attitude toward MIS implementation by supporting it through their commitment and allocation of required resources for the implementation process.

Intention is defined as an individual's attempt to perform a behaviour (Fishbein and Ajzen, 2010). According to Lam, Cho and Qu (2007), behavioural intentions have a positive correlation with actual behaviour. The seminal theory of planned behaviour (Ajzen, 1991) suggests that the more positive attitude an individual has toward a behaviour, his intention to perform the behaviour is stronger. In the context of this study, senior managers' intention to implement MIS is determined by their perceptions about the positive and negative results of implementing MIS (attitude).

Kwok and Gao (2006) argued that an individual is more likely to perform a behaviour when he or she possesses a positive attitude. A favourable attitude is also likely to encourage employees to adopt and use an innovation (Quazi and Talukder, 2011). These findings are important because they highlight a causal relationship between attitude and support, which shows why senior managers show different degrees of support toward MIS implementation. The literature (Tandon et al., 2020) suggests that a positive attitude is significantly correlated with the readiness to participate in a given behaviour. Tandon *et al.'s* (2020) study is thorough because they also investigated the mediation effect of attitude between reasons and intentions. Mediation analysis gives better understanding of the underlying mechanism of senior managers' support toward MIS implementation.

Therefore, we propose:

Hypothesis 2a: Attitude toward MIS implementation is positively related to supporting MIS implementation.

Hypothesis 2b: Senior managers' attitude mediates the relationship between senior managers' positive self-image and their support.

Figure 1 graphically depicts the set of relationships, inner, and outer model.

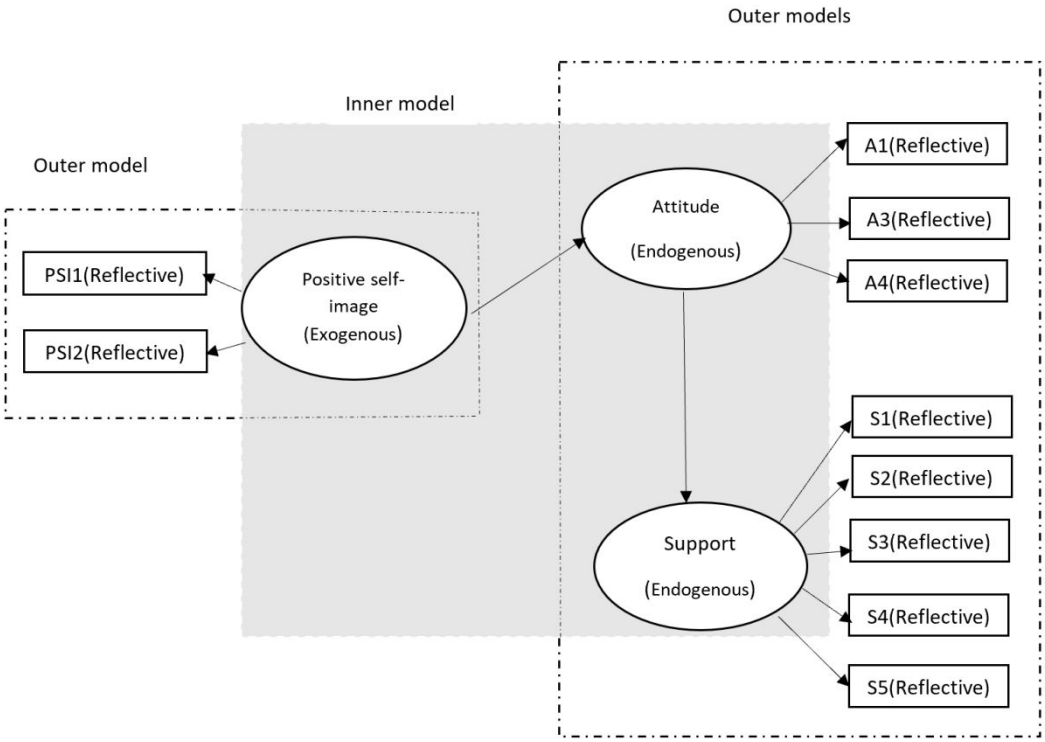

Figure 1: The theoretical model of this study

Methodology

Sample

Our sample consists of 400 senior managers in UK organisations selected from the population of firms operating in manufacturing industries. Cluster sampling was used because our subjects are fragmented over large geographical areas (Davis, 2005). All the manufacturing organisations in the UK were divided into 14 clusters based on their location, and then participants were chosen randomly in each cluster. 70% of participants were male, 29 per cent were females, and 1 per cent was non-binary. Participants' age ranged from 20 to 64 years, with a mean of 41.5 and a standard deviation of 5.31 years. Almost three-quarters of the participants were from companies that employ less than 1,000 employees. Twenty-three per cent of participants were from organisations that employ between 1,000 to 10,000 employees and just two per cent of participants were from companies with more than

10,000 employees. The online survey-questionnaire was sent to participants and data was collected over 7 days in July 2020. To ensure confidentiality, we did not collect participants names.

Measures

A 12-item measure that optimally taps the central core self-evaluation (CSE) constructs developed by Judge et al. (2003) was used. (Gardner and Pierce, 2010) argued that this measure is better to use when participant's time is limited and because senior managers' time is very valuable, we chose the direct approach to measure CSE. The validity of this scale was upheld by researchers (e.g., Gardner and Pierce, 2010). The 12-item measure was modified to make sure that we could distinguish between senior managers with high CSE and those with very high CSE, so we followed the recommendation by Hiller and Hambrick (2005). Some of the items were reworded to evaluate higher CESs more precisely. For instance, the item, 'When I try, I generally succeed' might be reworded as, 'When I try, I almost always succeed.' CSEs is a unidimensional scale (Judge et al., 2002), and item-parcelling method can be used. Two parcels of items (positive dimension of CSE and negative dimension) were created based on their item content (Landis et al.,2000). The internal consistency reliabilities and scree test results confirm the reliability of the parcels (see Table 1). The minimum standard for reliability (Cronbach's alpha>0.6) was reached for both parcels (Kishton and Widaman, 1994). Item parcelling improves commonality across indicators and improves modelling efficiency, providing more stable estimates, and fit the data better (Matsunaga, 2008).

Table 1 Number of items; internal consistency reliability; scree test

Parcel	Number of items	Internal consistency reliability	Scree test
PSI1	6	0.631	1
PSI2	6	0.624	1

Four measures were used to measure the senior manager's attitude. The participants were asked to evaluate four statements on a five-point Likert scale. We calculated the mean to create the 'attitude' variable. An item-based approach (see Matsunaga, 2008) was chosen because the number of observed variables is less than 6. Support was measured by five measures. The senior managers evaluated five statements on a five-point Likert scale. We took the average to create a value for the 'support' variable.

Analyses and results

Measure validation

Unidimensionality was assessed by means of confirmatory factor analysis (CFA) (Anderson and Gerbing, 1988) with results that suggested a good fit (see Table 2). We used IBM SPSS AMOS 26 software to perform the CFA. We evaluated the assumptions of multivariate normality and linearity using SPSS 26. Using box plots and Mahalanobis distance, we observed no univariate or multivariate outliers; there were no missing data.

Reliability of the measures is satisfactory because for all the measures the Cronbach's alpha is higher than 0.5 (Cronbach alpha for attitude, support scale, and PSI equalled 0.598, 0.751, and 0.705 respectively). Additionally, all items load on their hypothesised factors and the estimates are positive and significant.

Any scale should be validated to ensure that it measures what it is supposed to measure. The validity of construct investigates the relationship of one variable with other variables (Pallant, 2011). Exploratory factor analysis was used to measure the validity of the measurement scales. In this study, factor analysis was conducted via principal components analysis (PCA) using varimax rotation (Eignevalues >1; suppress factor loadings <0.3 suggested by Hair et al., 2010). Bartlett's (1954) test of Sphericity and KaiserMeyer-Olkin (KMO) value of 0.6 recommended by Kaiser (1970-1974) were used to determine the suitability of data to be factorised. Screeplots were inspected to investigate clear breaks in components.

Table 2 shows the exploratory factor analysis for senior managers' attitude toward MIS implementation, The Bartlett's test was significant ($p < 0.001$) and the KMO measure of sampling adequacy was 0.678, which is above the acceptable level of 0.6. All the items loaded onto a single factor explaining 47.8% of the variance. Attitude 2 did not meet the minimum value of 0.50 for factor loadings (Hair, Risher, et al., 2019), it was removed (see Table 2). The final measure consists of 3 scale items.

Table 2 Scale items, descriptive statistics and factor loadings for attitude (N=400)

Measure	Mean	SD	Factor loading
A1	2.40	0.996	0.736
A2	3.23	0.950	0.368
A3	2.13	0.799	0.780
A4	2.13	0.799	0.793

KMO 0.678
Bartlett's< 0.001
Variance explained 47.8%

After removing item 2, the model was rerun. The overall KMO was 0.659; the communality was above 0.50, and the rotated matrix was left with three factors or constructs. 61.47% of total variance

is explained by all items. The reliability of the construct was recalculated and Cronbach's alpha was 0.676.

KMO value was 0.791 and Bartlett's was less than 0.001. 50.3% of total variance is explained by all items loading on one factor with factor loadings between o,562 and 0.747. All items et the minimum value of 0.50 for factor loadings (Hair, Risher, et al., 2019) However, inspecting the communality matrix which measures of how much the model explained each variable. Values below 0.5 should be eliminated (Hair, Gabriel, et al., 2019). Communalities ranging from 0.316 to 0.573 and support 4 with communality value of 0.316 was eliminated. The final measure consists of 4 scale items.

After item 4 was removed, the model was rerun. The overall KMO was 0.76; the commonality was above 0.50, and the rotated matrix was left with four factors or constructs. The reliability of the construct was recalculated and Cronbach's alpha was 0.754.

Table 3 Scale items, descriptive statistics and factor loadings for support (N=400)

Measure	Mean	SD	Factor loading
S1	2.23	0.831	0.763
S2	2.21	0.807	0.720
S3	2.11	0.844	0.789
S5	2.17	0.808	0.760

KMO 0.76
Bartlett's < 0.001
Variance explained 57.51%

The squared multiple correlations (SMC) are also provided in Table 3; PSI2 (0.501) and PSI1 (0.245) have the highest and lowest, respectively. An interpretation is that the construct attitude account for 38.6% of the variance in attitude 1. Because of the good-fit indices, no post-hoc modifications were indicated from the analysis, and residual analysis did not indicate any problems (all items less than the cut point of 2.58 (Byrne (2001)).

Table 4 Squared Multiple Correlations

Observed variable	Estimate
PSI1	0.245
PSI2	0.501
MIS implementation Value (A1)	0.386
Efficiency from MIS implementation(A3)	0.426
Organizational benefits (A4)	0.469

Readiness to put Effort (S1)	0.401
Effective management strategies (S2)	0.411
Favouring MIS implementation(S3)	0.476
Active involvement (S5)	0.420

Table 5 Standardized and Unstandardized Coefficients for CFA

Observed variable	Latent construct	β	B	SE
PSI1	PSI	0.495	0.796	0.103
PSI2	PSI	0.708	1.000	
MIS implementation Value (A1)	Attitude	0.623	1.000	
MIS implementation cost (A2)	Attitude	0.224	0.343	0.085
Organizational benefits (A4)	Attitude	0.685	0.882	0.082
Readiness to put Effort (S1)	Support	0.631	1.000	
Effective management strategies (S2)	Support	0.635	0.977	0.095
Favouring MIS implementation(S3)	Support	0.707	1.138	0.103
Active involvement (S5)	Support	0.649	1.000	0.095

Descriptive statistics and correlations are reported in Table 4. The model depicted in Fig 1 was tested using structural education modelling. We chose maximum likelihood parameter estimation over other estimation methods (generalised least squares, unweighted least squares, scale-free least square, asymptotically distribution-free) because the data were distributed normally (Byrne, 2001). The construct reliability for the constructs of attitude and support were 0.713 and 0.721, respectively. The average variance extracted for attitude and support constructs were 0.45 and 0.46, respectively. Thus, the requirements for convergent validity and discriminant validity of the constructs were satisfied. The newly developed unidimensional scales of attitude and support qualified the tests of internal consistency, convergent and discriminant validity,

Testing the hypotheses

This section examines H1. To address Research Question 1, which concerns the impact of positive self-image on senior managers' attitude toward MIS implementation. Positive self-image significantly

impacts senior managers' attitude toward MIS implementation (0.869, p<0.001) confirming H1. Also, we examined the mediating role of senior managers' attitude to address Research Question 2. H2a and H2b were tested. The results also confirm H2a about the positive effect of senior managers' attitude on their support toward MIS implementation (0.931; p<0.001). H2b was tested using user-defined estimands and the results supported H2b (1.65, p=.009).

Table 6: Descriptive statistics and Pearson correlations

Variable	1	2	3
1. PSI[a]	1		
2.'Attitude'[a] toward MIS implementation	0.537**	1	
3. Level of 'support'[a] toward MIS implementation	0.501**	0.642**	1
M	2.646	2.471	2.471
SD	0.415	0.599	0.578

** $p < 0.01$

[a]average

Table 7: Structural model

Linkages in the model	**Hypotheses**		**Standardized parameter estimates**	
	Number	Sign	estimates	t-value
PSI→ Attitude	H1	+	0.869	6.881*
Attitude → Support	H2a	+	0.931	9.552*
PSI→attitude→support	H2b		1.65*	

Notes: model diagnostic: Chi-square= 72.446 (p<0.001); degree of freedom=42; GFI= 0.969; RMSEA=0.043; CFI=0.973; TLI=0.64; *p<0.001

Table 8 Standardized pattern coefficients (correlations) for measured and latent variables

	1	2	3	4	5	6	7	8	9	10	11	12
1.PSI	1											
2.Attitude	0.869	1										
3.Support	0.809	0.931	1									
4.support5(S5)	0.524	0.603	0.648	1								
5.Support3(S3)	0.559	0.642	0.690	0.447	1							
6.Support2(S2)	0.519	0.597	0.641	0.416	0.443	1						
7.Support1(S1)	0.512	0.589	0.633	0.410	0.437	0.406	1					
8.Attitude4(A4)	0.595	0.685	0.637	0.413	0.440	0.409	0.403	1				
9.Attitude3(A3)	0.568	0.653	0.608	0.394	0.420	0.390	0.385	0.447	1			
10.Attitude1(A1)	0.540	0.621	0.578	0.375	0.399	0.371	0.366	0.425	0.406	1		
11.PSI1	0.495	0.430	0.400	0.259	0.276	0.257	0.253	0.294	0.281	0.267	1	
12.PSI2	0.708	0.615	0.573	0.371	0.395	0.367	o.362	0.421	0.402	0.382	0.350	1

PSI (core self-evaluation scale); PSI1 (core self-evaluation scale parcel 1); PSI2 (core self-evaluation scale parcel 2); MIS implementation Value (A1); efficiency for MIS implementation (A3); organizational benefits (A4); readiness to put effort (S1); effective management strategies (S2); favouring MIS implementation (S3); active involvement (S5)

Figure 2 illustrates the structural equation model. This model had a good fit based on commonly-used fit indices: Comparative Fit Index (CFI) = 0.973 (within the excellent range fit (Bandalos's (2002)); Root Mean Square Error of Approximation (RMSEA) = 0.043; Tucker-Lewis fit index (TLI)=0.964; Goodness of Fit Index (GFI) = 0.969, and all factor loadings were statistically significant. These values indicate a good fit between the model and the observed data. Standardised parameter estimates are provided in Figure 3; unstandardised estimates are shown in Table 3. We did not conduct post-hoc modifications because of the good fit of the data to the model.

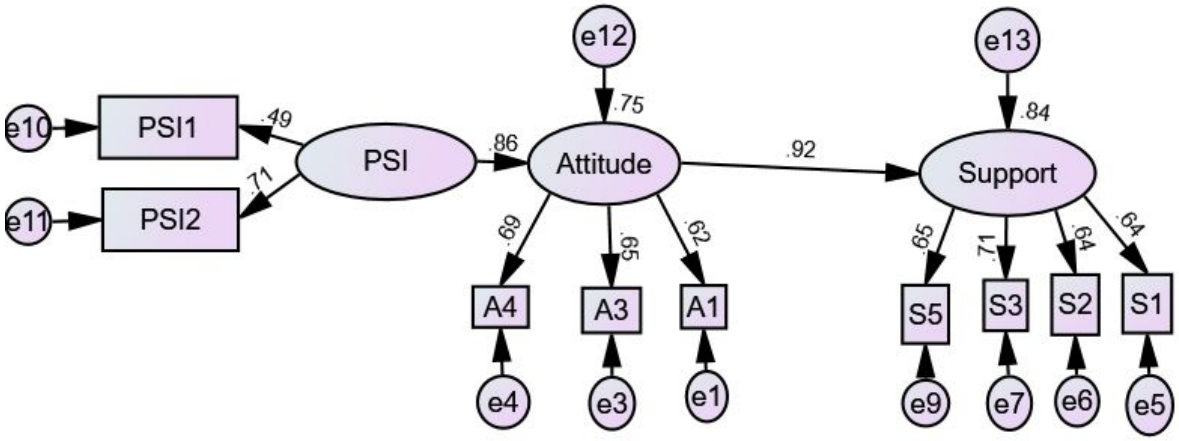

Figure 2: Structural equation model. PSI (core self-evaluation scale); MIS implementation Value (A1); efficiency for MIS implementation (A3); organizational benefits (A4); readiness to put effort (S1); effective management strategies (S2); favouring MIS implementation (S3); active involvement (S5)

Discussion

In this study, we designed two new unidimensional scales to measure two important constructs of senior managers' attitude and support toward MIS implementation in a manufacturing setting. Our findings are aligned with the findings of previous research. Our study sought to explore the impact of positive self-image on the attitude of senior managers towards MIS implementation. Our findings provide strong support for the research framework developed in this paper We found that positive self-image has a direct positive impact on senior managers' attitudes, consistent with the literature (e.g., Barrick, Mount, & Gupta, 2003) suggesting that positive self-image impacts senior managers' perception of available strategic actions.

Our findings are aligned with the finding of Judge and Ilies (2002) who maintained that an individual with more positive self-image is more motivated to perform a particular behaviour. In contrast to other studies (Judge and Ilies, 2002; Hiller and Hambrick, 2005; Wang et al., 2016), our study used item-parcelling to analyse the construct of positive self-image which provides more stable estimates and a more efficient model (Matsunaga, 2008). Judge and Ilies (2002) investigated the relationship between the FFM of personality and an individual's performance motivation. They found that Neuroticism (emotional stability) and Conscientiousness were significant predictors of performance motivation. Our results are similar to their findings because they also showed that positive self-image has an influence on how a person behaves.

Our findings are similar to the work of Hiller and Hambrick (2005), as they both identified that senior managers' self-image impacts their behaviour. However, our research differs from theirs in that they used an indirect approach to measure CSE, while we used a direct approach of measuring CSEs. They found that the personalities of senior executives impact their understandings of situations and their decision-making. Our findings are in line with theirs that personality traits of senior managers impact their attitude. Hiller and Hambrick (2005) maintained that CEOs usually have higher CSE than general population and have suggested that those at the higher end of the CSE scale could be described as having 'executive hubris'. In our study, we attempted to identify individuals at the higher end of the CSE scale by rewording some of the statements in our questionnaire that related to CSE. The result showed that CSE ranged from 1.08 to 3.67, with a mean of 2.64 and a standard deviation of 0.414. It would be worth creating criterion which distinguish hubris from high CSE for future research.

Our findings are aligned with the work Wang et al. (2016) which posits that positive self-image of CEOs is significantly associated with their strategic actions. They used CSE, the FFM of personality, and HEXACO taxonomy to measure positive self-image. They found that CEOs with a more positive self-image tend to take more strategic risks which is similar to our result that found that an individual with

more positive self-image has a more positive attitude to taking strategic actions like MIS implementation.

Our study and findings contribute to the upper echelon tradition in several ways and has identified possible future research possibilities. The study presents one of the first empirical tests investigating the impact of personality traits on support of MIS implementation. Previous studies mostly investigate the impact of personality traits on strategic decision making or performance of a firm (e.g., Boone and Hendriks, 2009).

Erez and Judge (2001) investigated the impact of CSE on motivation and performance. They used an indirect approach to measure CSE in which they measured four traits of CSE separately on three different samples. They put forward that CSE is a predictor of motivation and performance. Boone & Hendriks (2009) looked at the top management team (TMT) rather than looking at senior managers or CEOs. They argued that TMT diversity has an influence on financial performance through the moderating effect of three team mechanisms (collaborative behaviour, accurate information exchange, and decision-making decentralisation). They focused on functional-background and locus of control (LOC) to distinguish TMT diversity. They used the Rotter scale (Rotter, 1966) to measure LOC, while we use the whole concept of CSE.

By investigating senior managers' positive self-image, we extend upper echelon research which has in the past almost exclusively focused on demographic characteristics (e.g., age, tenure, education). In their study, Carpenter et al. (2001) argued that the international experience of CEOs impacts their performance in international organisations. However, they did not look into the correlations between psychological traits of senior managers and their performance.

In addition to the main contribution of our study, we looked at the impact of self-image on the attitude of senior managers. Our study further investigates how senior managers' positive self-image can influence their support toward MIS implementation through their attitude. We found that a senior manager who had a positive self-image was more enthusiastic and supportive in implementing MIS. By investigating self-image, Upper Echelon Theory is extended in comparison with other studies who limited their research to use of only demographic characteristics. So, in the future, those carrying out research in this area should consider traits such as self-image and their impact.

Implications

The research can be considered as significant because it may assist managers in implementing MIS to improve organisational efficiencies. Studies like ours are often used by senior managers in national and international organisations to analyse the effective implementation of MIS (Laumer et al., 2017). MIS is crucial in companies as it helps them to improve their efficiency and achieve organisational

success (Padek et al., 2018; Thiesse et al., 2015). Having found in our study that senior managers attitude towards MIS implementation varies according to their positive self-image our research could be used by senior managers to self-assess how they would perform when implementing MIS.

Previous research has shown that personality characteristics such as positive self-image influences the intention to behave (Joshi et al., 2016; Iden and Eikebrokk, 2015). Senior managers also effectively assess their values because it is considered as one of the most compelling attributes in a manager (Dust et al., 2020). Therefore, our research may assist senior managers to shape organisational behaviours through their values. The research in beneficial to organisations because it provides insights about the attitude and behaviour of senior managers and the support they give in the implementation of MIS. The research specifically focused on the implementation of MIS in the manufacturing industry, which is also beneficial for manufacturing organisations on a global scale (Laumer et al., 2017; Thiesse et al., 2015).

Limitations

Our research was conducted by evaluating the factors that influence the support managers provide in implementing MIS. We found that the scales are valid in manufacturing industry in the UK, but they need to be validated in other industries and countries, Data collection was limited because it was obtained via a questionnaire. Further study in this area could be carried out by collecting data through qualitative methods such as interviews with senior managers of the manufacturing firms. This would allow an in-depth analysis of the participants' behaviour and experiences. This research has dealt with the impact of senior managers' positive self-image on their support toward MIS implementation but does not focus on MIS implications. A further study with more focus on MIS implications therefore suggested. Moreover, this study focused on ERP, CRM and SRM, future research may be conducted on other management information systems. There is abundant room for further progress in studying various number of risks and rewards associated with MIS implementation.

Future research and conclusion

Our research has shown a gap in our understanding of the factors that influence the effectiveness of senior managers in implementing MIS. To narrow this gap, future research might use different measures to quantify positive self-image and use internal and external locus of control. In addition to personality traits of senior managers, it might also look at demographic factors that influence their effectiveness. These would include age, education, prior career experience and prior involvement with IS projects. We feel highly motivated to carry out the necessary research that will further illuminate this topic and provide practical suggestions for how companies and organisation can improve the efficiency with which they implement IS.

This research has demonstrated the importance of the psychological attributes of senior managers and their positive attitude in ensuring the effective implementation of MIS. Our study recommends that senior managers assess their personality characteristics and reflect on how their attitude impacts their actions. A senior manager's self-awareness markedly influences their support during the implementation process.

Appendix A. Questionnaire

Construct	Question	Scale	Source
Positive self-image	I am *very* confident I get the success I deserve in life.	Strongly disagree 1 2 3 4 5 Strongly agree	
	Sometimes, I feel depressed (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	
	Sometimes, when I fail, I feel worthless (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	
	When I try, I almost always succeed.	Strongly disagree 1 2 3 4 5 Strongly agree	
	I complete tasks successfully.	Strongly disagree 1 2 3 4 5 Strongly agree	
	Sometimes, I do not feel in control of my work (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	
	Overall, I am *really* satisfied with myself.	Strongly disagree 1 2 3 4 5 Strongly agree	
	I am filled with doubts about my competence (Reverse coded)	Strongly disagree 1 2 3 4 5 Strongly agree	
	I *almost always* determine what will happen in my life.	Strongly disagree 1 2 3 4 5 Strongly agree	
	I do not feel in control of my success in my career (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	
	I am capable of coping with most of my problems	Strongly disagree 1 2 3 4 5 Strongly agree	
	There are times when things look pretty bleak and hopeless to me (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	Adapted from (Judge *et al.*, 2003)
Attitude toward MIS implementation	I do not see a value in MIS implementation (Reverse coded).	Strongly disagree 1 2 3 4 5 Strongly agree	
	Using MIS helps me to be more efficient and save time.	Strongly disagree 1 2 3 4 5 Strongly agree	
	Using MIS would be beneficial to both me and my firm.	Strongly disagree 1 2 3 4 5 Strongly agree	
Support toward MIS implementation	I would be ready to put necessary effort to support MIS implementation.	Strongly disagree 1 2 3 4 5 Strongly agree	
	I would use effective change management strategies and processes to support MIS implementation.	Strongly disagree 1 2 3 4 5 Strongly agree	
	Supporting MIS implementation is a good idea.	Strongly disagree 1 2 3 4 5 Strongly agree	
	I am ready to actively get involved in MIS implementation.	Strongly disagree 1 2 3 4 5 Strongly agree	

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