People Critical Success Factors of IT/IS Implementation: Malaysian Perspectives

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***Abstract*—**Implementing Information Technology/ Information System (IT/IS) is critical for every industry as its potential benefits have been to motivate many industries including the Malaysian construction industry to invest in it. To successfully implement IT/IS has become the major concern for every organisation. Identifying the critical success factors (CSFs) has become the main agenda for researchers, academicians and practitioners due to the wide number of failures reported. This research paper seeks to identify the CSFs that influence the successful implementation of IT/IS in construction industry in Malaysia. Limited factors relating to people issue will be highlighted here to showcase some as it becomes one of the major contributing factors to the failure. Three (3) organisations have participated in this study. Semi-structured interviews are employed as they offer sufficient flexibility to ensure that all relevant factors are covered. Several key issues contributing to successful implementations of IT/IS are identified. The results of this study reveal that top management support, communication, user involvement, IT staff roles and responsibility, training/skills, leader/ IT Leader, organisation culture, knowledge/ experience, motivation, awareness, focus and ambition, satisfaction, teamwork/ collaboration, willingness to change, attitude, commitment, management style, interest in IT, employee behaviour towards collaborative environment, trust, interpersonal relationship, personal characteristic and competencies are significantly associated with the successful implementations of IT/IS. It is anticipated that this study will create awareness and contribute to a better understanding amongst construction industry players and will assist them to successfully implement IT/IS.

***Keywords*—**critical success factors, construction industry ,IT/IS, people

I. INTRODUCTION

THE information technology era has revolutionised the current global business practice, including the Malaysian construction industry. The industry already seen as struggling to enhance its productivity in the face of fierce global competition and technological breakthrough. Evidence on the positive impact of IT in construction industry is undeniable. For over a decade, many researchers have discussed the potential benefits of IT/IS application in construction industry. [1-5]. Among the benefits of implementing IT/IS are reducing cost of construction, enhancing quality of service delivery, increasing capacity of government, Improving decision making process, transparency, improved efficiency and instant access to relevant information[6].Due to the potential benefits of IT/IS, many industries including the Malaysian construction industry, have started to invest in it. Investment rate in IT/IS continues to rise as every industry fighting to maximise the power of technology despite the current economic situations [7].

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Over the past decade, it is sad to say there are ample evidence of IT/IS failure to deliver the expected return [8]. This scenario has concerned many researchers to investigate the main cause of failure. Earlier findings show that this is due to problems relating to technical aspects [9]. Recent findings on the other hand show that people issue is the major barrier in implementing IT/IS in construction industry [10-12]. People issue has become the critical factor thereby needing full attention from everyone. To date, very little research has been conducted on CSFs in implementing IT/IS within the context of the Malaysian construction industry. As one of the major contributors to the Malaysian economy, it is important for the industry to improve its business process strategically by using IT/IS. The uniqueness of this industry is due to its fragmented nature, geographically and functionally [13]. Therefore, more research on this issue should be carried out for the continuous survival of the Malaysian construction industry. In relation to this matter, this research is carried out to identify factors that influence the successful implementation of IT/IS in Malaysian construction industry.

II. RESEARCH METHODOLOGY

This preliminary study was conducted as part of a PhD programme to develop a 'people-readiness' model of IT/IS implementation in the construction industry. Firstly, the author reviewed and analysed literature from year 2001 to 2010 to identify existing evidence concerning CSFs in IT/IS implementation across industries. Fifty four (54) literatures were reviewed, which are not only limited to articles published in peer reviews and journals, but also thesis. Then, three organisations involved in the construction industry were selected to discern the factors. The organisations ranged from the government sector, semi-government to the private sector. These three organisations are located in Klang valley; where all the major construction took place. Semi-structured interviews were employed to reflect the reality of the current situation. By applying this method, it has allowed rich collection of data in terms of experience and perception through probing the conversation in details, where the collected data cannot be measured in quantitative approach [14]. The interviews were conducted between December 2010 and February 2011. The interviews took place in the interviewees' office, and lasted for 40 minutes to 1 hour each.

III. CRITICAL SUCCESS FACTOORS (CSFs) FOR IT/IS IMPLEMENTATION

The concept of CSFs was first introduced by John F. Rockart of MIT [15-17]. The purpose of this concept is to identify the key area that needs special attention in order to succeed. Méndez, Pérez, Mendoza, & Ortega [18] defines CSFs as the right performance of certain activity or task which contributes to successful IT/IS implementation. Therefore,

identifying people CSFs become the major concern to reduce the failure rates. Table 1 below reveals the literature review of people CSFs that contributes to successful implementation of IT/IS across industries.

TABLE I

FACTORS CONTRIBUTING TO SUCCESS OF IT/IS IMPLEMENTATION IDENTIFIED ACCROSS 54 LITERATURES

People CSFs	Authors	No. of Citations
Motivation	Davis & Songer[10] , Nahar, Lyytinen, Huda, & Muravyov[19] , Peansupap & Walker[20] , Al-Alawi, Al-Marzooqi, & Mohammed [21]	4
Training/ skills	Peansupap & Walker [20], Nahar et al.[19], Kelegai & Middleton[22] , Buruncuk & Gülser[23] , Eadie, Perera, Heaney, & Carlisle[24] , Habib[25] , Aggarwal[26], Stewart, Mohamed, & Marosszeky[27] , Sabherwal, Jeyaraj, & Chowa [28]	9
Top management support	Nahar et al.[19], Kelegai & Middleton [22], Buruncuk & Gülser [23], Hussein, Abdul Karim, Mohamed, & Ahlan[29] , Eadie et al.[24], Standing, Guilfoyle, Lin, & Love[30] , Habib [25], King [31], Lind & Culler[32] , Aggarwal [26], Lou & Alshawi [33], Chrusciel & Field [34], Moh'd Al-adaileh [35], Young & Jordan [36], Doom, Milis, Poelmans [37], Stewart et al. [27], Sabherwal et al.[28]	17
Communication	Nahar et al.[19], Havelka [38], Gajendran, Brewer, & Chen [39], Habib,[25], Lind & Culler [32], Mazri [40], Wikforss & Löfgren [41], Hartmanna & Fischer [12], von Urff Kaufeld, Chari, & Freeme [42], Chrusciel & Field [34], Ngai, Law, & Wat [43], Bhatti [44], Moohebat, Asemi, & Jazi[45] , Kronbichler, Ostermann, & Staudinger [46], Al-Alawi et al.[21]	15
Knowledge & experience	Nahar et al.[19], Kelegai & Middleton [22], Buruncuk & Gülser [23], Hussein et al [29], Eadie et al [24], Standing et al.[30], Habib [25], King [31], Mazri,[40], Thong [47], Tambovcevs [48], Sabherwal et al.[28]	12
Leadership/ IT Leader	Standing et al.[30], Aggarwal [26], Gottschalk & Karlsen [49], von Urff Kaufeld [42], Doom et al [37], Stewart et al.[27]	6
Willingness to change	Peansupap & Walker [20], Davis & Songer [10], Havelka [38], Chrusciel & Field,[34]	4
IT staff roles and responsibility	Jiang, Klein, & Pick [50], Martinsons & Cheung [51], Salleh [52]	3
Organizational culture	Eadie et al.[24], Habib [25], Yeganeh [53], Indeje & Zheng [54], Gallivan & Srite [55], Xiao & Dasgupta [56], Poku [57], Twati [58]	8
Commitment	Peansupap & Walker [20], Buruncuk & Gülser [23], Havelka [38], Standing et al.[30], Gajendran et al. [39], Habib [25], Aggarwal [26]	7
Management style	Hussein et al.[29], Standing et al.[30], Jamshidian & Rahnama [59]	3
User involvement	Buruncuk & Gülser [23], Havelka [38], Habib [25], Lind & Culler [32], Thong[47], Sabherwal et al [28]	6
Attitude	Davis & Songer [10], Nahar et al.[19], King[31], Abukhzam & Lee [60], Mazri,[40], Sabherwal et al.[28]	6
Team work/ Collaboration	Mazri [40], Utley [61], Ngai et al.[43], Hwang & Xu [62], Bhatti [44], Kronbichler et al.[46]	6
Interest in IT	Lou & Alshawi [33]	1
Employee	Lou & Alshawi[33], Hedelin & Allwood	2
behaviour towards collaborative environments	[63]	
Awareness	Stewart et al.[27]	1
Focus & vision	von Urff Kaufeld et al [42]	1
Trust	Al-Alawi et al. [21], Aberer & Despotovic [64], Li, Valacich, & Hess [65]	3
Interpersonal relationship	Park & Abels [66], Mullen [67]	2
Satisfaction	Attar & Sweis [68], Adam Mahmood, Burn, Gemoets, & Jacquez [69], Colman [70], Sabherwal et al.[28]	4

The review of 54 publications across industries focusing on people CSFs in IT/IS implementation revealed 26 factors. All of these CSFs were then tested in construction industry to confirm its existence.

I. CASE STUDY DESCRIPTIONS & FINDINGS

Three organisations involved in the construction industry were selected. All of them have successfully implemented IT/IS. This section briefly describes the three companies and its findings.

Organisation A - Organisation A is a large government sector that acts as a technical advisor to the Malaysian government in delivering the implementation of developmental projects and maintaining Malaysian infrastructure assets. The organisation was incorporated in 1872 with approximately 30,000 staff throughout the country. To serve 28 ministries with over 7000 project nationwide, this organisation experiences difficulties to closely monitor all projects. More problems arise as the state and regional offices need to report and update the status of each of the projects. Therefore, the organisation has to find ways to improve this situation with the application of IT/IS. The improvement is focused on finding ways to control and monitor the construction of projects to generate information and reporting on the project status. To achieve this, the organisation needs to have a system that is capable of integrating all construction information.

Initially, the organisation explored and evaluated the available software products in the market. Yet, there were no software applications that were suitable with the needs of the organisation. Then, the organisation has decided to develop its own system.

Finally, system 'X' was developed in 1985 with the aim to improve its monitoring and reporting system. System 'X' is a web-based Database Management System (DBMS) that enables to store, update, modify and extract information from a database. There are five (5) modules in the system. They are planning, design, procurement, construction and handing over. As time progresses, modifications were made to the system to suit current needs and recent technology. The usage of the system can be considered as success as it has been used for about 26 years.

TABLE II

FINDINGS FROM ORGANISATION A

CSFs	Comments/Findings
Top Management	They actively participate in sharing information with users, giving advice and suggesting

Support	improvement. They are also involved in changing policies when problems arise due to system's implementation.
Communication	A robust line of management reporting is established in this organisation as users are required to report everything to the top management. Communication methods include e-mail, meeting, telephone and memo.
User involvement	Steering committee is involved from the early development of the system until completion.
Training/Skills	Staff are formally trained by the IT department a month before the system implementation. The 3-day training enables staffs to use the system effectively.
Leader/ IT Leader	The IT manager has adequate leadership skills as he is able to perform his work without any problem.
Organisation culture	Positive culture exists in this organisation as they manage to successfully implement the system.
Knowledge/ Experience	IT leader and staff have the required knowledge and experience to enable them to develop and maintain their own system.
Motivation	Users in this organisation have no choice but to use the system since the top management only accept report using the system format. However, they are motivated to use the system when they understand its benefits.
Teamwork/ collaboration	Everyone from the same or different department and even different profession help each other when they have problems in using the system.
Willingness to Change	Majority of users resisted to use the system at the early stage. However, they accepted the system with better understanding of its benefits.
IT staff roles and responsibilities	IT staff have very important roles as they are responsible for developing and maintaining the system.
Attitude	Most of the users give negative reactions towards the system's implementation as they are not confident of using it.
Commitment	Everyone in this organisation from the top management to users give full commitment to utilise the system.
Management Style	Participative management style is employed in identifying the most suitable system for the organisation. Decision on the system is made based on opinions from staff (steering committee)
Interest in IT	Older generations have problems with this factor as they are not readily interested to use the technology.
Employee behaviour towards collaborative environment	Most users gave negative reactions towards the system's implementation at the early stage. Their behaviour is as expected since they are not involved in developing the system due to the existence of the steering committee; however this problem is only temporary.
Awareness	Majority of the staff are not aware of the development of the system as they are not involved with it since the organisation has its own steering committee. However, when the system is about to be used in the organisation, everyone is informed about it during the meeting.
Focus and ambition	IT Manager has clear focus and ambition which lead to the successful implementation of the system.
Trust	Users are able to use the system without any doubt which indicates their trust on the system. They also share their perception of the system which shows their trust of their colleagues and the management.
Interpersonal Relationship	The existence of social association among people in this organisation enables them to overcome problem relating to system's implementation.
Satisfaction	Users are satisfied with this system as it help them to perform their work effectively.

Organisation B - Organisation B is a semi-government organisation involved especially in housing development projects. Incorporated in 1997, there are approximately, 2000 staff throughout Malaysia responsible in handling approximately 80projects across the country.

In handling the many housing projects throughout Malaysia, the organisation began to encounter problems in managing their data. Preparing report became problematic as data was difficult to retrieve. The organisation began to find solutions to overcome the problems through technology. The improvement is focused on finding effective ways to manage data so as to generate information in the preparation of reports. To achieve this, the organisation needs find a system that is able to suit their needs.

Off-the-shelf system have been explored and evaluated. Eventually, they found a system 'Y' that suited their needs. System Y is an Enterprise Resource Planning System (ERP) that integrates all the functions of the entire organisation from finance, property sales, human resource, property management, customer relationship management, office administration and others. However, some modifications need to be done on the system to suit the organisation's work process. The system has been used since year 2000 and its implementation can be considered a success as the organisation has been using it for a long period and there are already plans to buy more modules of the system, in the future.

TABLE I1I
FINDINGS FROM ORGANISATION B

CSFs	Comments/Findings
Top Management Support	Top management actively advices/encourages use of the system especially during meeting. Users are instructed to update information in the system.
Communication	Communications are usually via e-mail and through web-based portal. Formal meetings are only carried out when necessary
User involvement	Users are asked to identify their requirement before the organisation purchase and customise the system. Users however are not involved in testing the system after the customisations are made.
Training/Skills	Users are trained 5/6 months earlier before the system implementation. The training took about 3 days and is conducted by the system vendor.
Leader/ IT Leader	The IT manager has adequate leadership skills as he is able to perform his tasks without any problem.
Organisation culture	Organisation culture is believed to be in good order as it manages to overcome problems arising due to the system's implementation
Knowledge/ Experience	IT leaders & IT staff also have the required knowledge and experience. However, they are only responsible for maintaining the system and hardware in these organisations due to the limited number of workforce
Motivation	Users are motivated to use the system as it can speed up their work, are easy to use and enable them to perform their job effectively.
Teamwork/ collaboration	A very high level of cooperation as users helps each other when they encounter problems with the system.
Willingness to Change	A minority of the users were reluctant to use the new system at the early stages of the system's adoption. However, they do not have much choice but to use the system as they receive instruction from top management
IT staff roles and responsibilities	Their roles and responsibilities are limited to maintaining the system only.
Attitude	Most of staff gives positive reaction towards system's implementation and they are excited and very confident to use the system.

Commitment	Everyone gives full commitment to use the system.
Management Style	Users' opinions are considered when purchasing the suitable system for the organisation. Therefore, the organisation is seen as practicing the participative management style in this context.
Interest in IT	Majority of staff are interested with the technology due to the benefits it offers.
Employee behaviour towards collaborative environment	Positive feedback obtained from users as they are aware of the system thus enabling them to give positive reactions towards the surrounding.
Awareness	Users are aware of the system's implementation as they were asked to identify their needs in the early stages.
Focus and ambition	IT Manager s clear focus and ambition which lead to the successful implementation of the system.
Trust	No issues regarding trust of the system or of the management ever arise in this organisation which indicates positive feedback on this factor.
Interpersonal Relationship	Everyone interacts and socialises with one another which enables them to solve any problem faced during the system's implementation.
Satisfaction	Users are satisfied with the system as it helps them to perform their work effectively.

Organisation C - Organisation C is a private sector organisation formed in 1988. The organisation started its business as an infrastructure maintenance provider. The organisation then expanded its business into other sectors of the maintenance industry such as airport airside maintenance, commercial building maintenance and plant shutdown maintenance in the oil and gas industry. Approximately, there are 900 workforces responsible in handling all the maintenance-related issues. In handling the many maintenance projects has made it difficult for the organisation to keep track with the status of its maintenance work. The organisation began to look for solutions by using the off-the-shelf system. System 'Z', a Computerised Maintenance Management System (CMMS) was incorporated in the organisation in year 2000. The system provides integrated process in managing and controlling the facilities. Among the modules available in the system include work orders, asset management, inventory control and safety. The system however, needs to be customised to meet the client's requirements. The use of the system can be considered a success as the organisation is currently upgrading its version.

TABLE IV
FINDINGS FROM ORGANISATION C

CSFs	Comments/Findings
Top Management Support	The top management is very supportive as they regularly asks for updates and suggests input for process improvement such as faster work order reporting and increase revenue.
Communication	Communications are usually by e-mail, telephone, memo and meeting when necessary.
User involvement	Users were involved in the earlier stages of the system's adoption as they were in Business Requirement Study (BRS). Users were then asked to test the trial version and gave feedback on the system before the organisation decided to buy the system.
Training/Skills	Formal training to users is given by the IT department prior to system's implementation. A Two-day training is given a week before the system's

	implementation.
Leader/ IT Leader	The IT manager has adequate leadership skills as he is able to perform his tasks without any problem.
Organisation culture	Positive culture exists in this organisation as it manages to successfully implement the system.
Knowledge/ Experience	IT leaders & IT staff also have the required knowledge and experience. However, they are only responsible for maintaining the system and hardware in these organisations due to the limited number of workforce
Motivation	Users are motivated to use the system as it user friendly, speed up their work and enables them to enjoy the benefits of mobile office
Teamwork/ collaboration	A very high level of cooperation as users helps each other when they encounter problems with the system.
Willingness to Change	A minority of users resisted to use the system at early stages. However, logical explanation like system obsolescence, faster system adoption helps to overcome the situation.
IT staff roles & responsibilities	IT staff are responsible for maintaining and customised the system.
Attitude	Mixed reactions encountered from users. Even so, majority of them are confident to use the system.
Commitment	Everyone gives full commitment and is excited to use the system due to the benefits that they will gain by using it.
Management Style	Participative management style is introduced in this organisation to help them find the most suitable system.
Interest in IT	The majority of users are interested with technology as it offers many benefits.
Employee behaviour towards collaborative environment	Positive reactions towards the surrounding are obtained from users as they are aware of and are involved in the systems adoption.
Awareness	Users are aware of the system's implementation as they are involved from the early stages to testing the prototype.
Focus and ambition	IT Manager has clear focus and ambition which lead to the successful implementation of the system.
Trust	Users trust their colleagues and management as they share their perception and opinions of the system. They also have no issues regarding trust of the system.
Interpersonal Relationship	Social interactions among people in this organisation are proven to help them encounter any problem regarding the system application.
Satisfaction	Users are satisfied with the system as it enables them to enjoy the flexibility of mobile office.

All the CSFs found in literature are proven to exist in the construction industry. However, two (2) additional CSFs are found during the interviews. They are personal characteristic and competencies. From the experience of the IT managers in all three organisations; individual characteristics such as their confident levels, thoughts and ideas will encourage them to use the system which leads to the successful implementation of the system itself. All three managers agree that competencies do contribute to a successful system's implementation. This includes the competencies of IT managers, IT staff and also users.

V. DISCUSSION

In this section, the three (3) organisations involved in the interview sessions will be compared in terms of their background and the observed CSFs.

Top Management Support
Communication
User involvement
Training/Skills
Leader/ IT Leader
Organisation culture
Knowledge/ Experience
Motivation
Awareness
Focus and ambition
Satisfaction

Teamwork/ collaboration
Willingness to Change
Attitude
Commitment
Management Style
Interest in IT
Employee behaviour towards collaborative environment
Trust
Interpersonal Relationship

Personal characteristic

Competencies

CSFs FORM INTERVIEWS

TABLE V
OVERVIEW OF SELECTED CASE STUDY

	Organisation A	Organisation B	Organisation C
Year Incorporated	1872	1997	1988
Business Sector	Government	Semi-Government	Private
Business Type	Technical Consultant	Housing developer	Infrastructure Maintenance provider:
No. Of Employees	Approx. 30,000	Approx. 2,000	Approx. 900
Reasons for systems adoption	Problems to control and monitor construction and to generate information in preparing report on the status of the project	Problem in managing data due to the many projects throughout Malaysia	Difficult to keep track on the status of maintenance work
No. of years using the system	26 years	11 years	11 years
Customised/developed system	Developed	Customised	Customised
Entity responsible for the customisation/ development of the system	In-house	Vendor	Vendor
Type of system used	Database Management System	Enterprise Resource Planning	Computerised Maintenance Management System

Top Management Support: Studies on the three organisations show that, the top management highly support the implementation of IT/IS in their organisations. They were actively participate in sharing information with users, give advice, are involved in changing policy when problems arise due to system's implementation and they regularly ask for updates and suggest input for process improvement such as faster work order reporting and increased revenue. Therefore, this is a confirmed factor t contributing to the successful implementation of IT/IS.

Communications: This factor is considered important as each of the three organisations have effective interactions amongst them. Methods of communications include e-mail, meeting, telephone, memo and web-based portal.

User involvement: The level of user involvement varies in the three organisations. However, all three organisations emphasize on user requirement, confirming the importance of this CSF.

Training/Skills: Findings show that all three organisations emphasize on training. Even though the gap between training and implementation varies in the three organisations, this factor remains fundamental in all three case studies.

Leader/ IT Leader: Leader/ IT leaders in the three organisations perform their duties very well as they encourage users to use the system as well as to be involved in changing policy. Therefore, this factor is an important CSF for successful IT/IS implementation.

Organisation culture: Findings show that all three organisations have practised good organisational culture as they manage to implement the system successfully and manage to overcome all problems. Therefore, this factor is considered important for successful implementation of IT/IS.

Knowledge/ Experience: Knowledge and experience of IT leader and IT staff is very important as this will lead to a high level of IT/IS usage in the organisation. Findings reveal that knowledge and experience are fundamental in all organisations.

Motivation: All three organisations successfully motivate users to use the system in many ways, such as only accepting reports which use the system's format, enabling them to enjoy the benefits of mobile offices and others. This shows that motivation is very important to successfully implement IT/IS.

Teamwork/ collaboration: This factor, however, do not directly affect the success of the system's implementation. However, it also has an effect on how the system is used as well as in hoe individuals and organisations benefit from teamwork/ collaboration. Therefore, this factor is a less important CSFs for successful IT/IS implementation.

Willingness to Change: There are different feedbacks obtained from the three organisations. However, Users' willingness to change is strongly correlated to successful implementation of IT/IS; therefore, this is an important CSFs.

IT staff roles and responsibilities: There are different roles and responsibilities of IT staff encountered in the three organisations. Their job function is strongly correlated and contributes towards the successful implementation of the system. This indicates that IT staff is an important factor for IT/IS implementation.

Attitude: Various feedbacks are encountered from the three organisations. However, this factor is important CSFs due to strong correlation to IT/IS implementation.

Commitment: Everyone in all three organisations give full commitment in using the system and this have strongly influence the successful implementation of the system.

Management Style: Participative management style is employed in all three organisations involving users in decision making. This factor, however, does not have direct effect on the system's implementation's success, thus making it less important CSFs.

Interest in IT: Most of the users in all three organisations are interested with technology, something that the older generations tend to have problems with. It is an advantage for the organisations if they have users who are interested with technology as they will be self-motivated to use the system. This factor, however, does not directly affect the system's implementation's success, thus making it less important CSFs.

Employee behaviour towards collaborative environment: There are mixed reactions obtained from the three organisations. This factor is considered important as it may influence the successful implementation of the system.

Awareness: Users in one of the three organisations are not aware of the system's implementation due to the existence of the steering committee. This factor, however, does not directly affect the system's implementation's success, thus making it less important CSFs.

Focus and vision: This factor is well in place in all three organisations, confirming it as important CSFs.

Trust: Users in all three organisations trust the system, the management and their colleagues as they share their opinions and perceptions of the system. This factor is important as it may influence the successful implementation of the system.

Interpersonal Relationship: Good interpersonal relationship enables users to solve problems they face during the system's implementation. This factor, however, do not directly affect the system's implementation's success. Therefore, this factor is a less important CSFs for successful IT/IS implementation.

Satisfaction: This factor, however, does not directly affect the system's implementation's success. Users will be happy when they are satisfied with the system. Thus, this factor is a less important CSFs for successful IT/IS implementation.

VI.CONCLUSION

IT evolution has encouraged the construction industry to incorporate the latest technological advancement. These advancement, however become challenges when ample evidence showed that IT/IS failed to deliver the expected return [8]. People issues are identified as the major barrier. Therefore, it is important for the construction industry to identify people CSFs that can contribute to the successful implementation of IT/IS. Literature research shows that there are 20 People CSFs that influence the successful implementations of IT/IS across industries. Three construction organisations were selected to test the existence of these CSFs found in literatures. All the 20 factors were confirmed to exist and contributed towards the successful implementations of IT/IS in the Malaysian construction industry. Surprisingly, two additional CSFs found during the interviews; personal characteristic and competencies. It can be concluded that, there are 22 CSFs that need to be considered to successfully implement IT/IS. It is anticipated that these findings will allow managers to broaden their view in identifying factors that require attention that might have been overlooked over the years. This research only points out the presence of People

CSFs in construction industry. The importances of each CSFs are still unknown and in need of further research.

VIII.FUTURE RESEARCH

Further research will be carried out to identify the most significant CSFs that can contribute to the successful implementations of IT/IS in the Malaysian construction industry. A questionnaire will be developed based on the identified CSFs found in this research and will be empirically tested in the Malaysian construction industry. The findings can be used to obtain the priority and ranking of each CSFs. The findings are anticipated to give a better and clearer understanding of these CSFs to benefit the construction industry in the quest of successfully implementing IT/IS.

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