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# THE INFORMATION SYSTEM IN SHARING THE KNOWLEDGE UNDER INFLUENCES OF THE CULTURAL DIVERSITY IN THE CONSTRUCTION ORGANIZATION

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## ABSTRACT

*The influences of the cultural diversity (CD) in the process of the knowledge sharing (KS) by using the information system (IS) and how these influences affect the project performance (PP) are analysed. To shed some lights on the CD effects. Thus, the CD is given particular attention in this study to ensure the workers have a better understanding of it, and to achieve excellent PP in the multicultural construction organization. Therefore, a survey questionnaire is accomplished and used to collect the required data. The collected data is interpreted and analysed by developing a causal model simulating in the dynamic modelling system. The findings of this study evidenced the CD as one of the major problems in the multicultural construction organization. The CD influences negatively the knowledge flow by using the information system. The CD also lowers the PP of the organization.*

**Keywords:** Cultural diversity, Knowledge sharing, Information system, Project performance in the construction projects

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## 1. INTRODUCTION

Recently we are in the rapid development of technology and business innovation is changing the worldwide business field. That can be noticed by evaluating how a business activity is done. Utilizing very fast speed internet connection for emails and knowledge collecting via phones, laptops, and handheld devices. Everybody today has a very high expectation of the business culture of the internet. The set of information technology (IT) systems for diverse business such as e-learning, customer relationship management instruments, web-page, and gateway enhance the process of the KS capability [1].

Knowledge management (KM) referred to it as a technical platform operated to preserve and deliver knowledge [2, 3, 4]. The tasks of KM are to obtain, enhance, collect, and transfer the obtained knowledge in order to come out with a methodology and a system to support the organization and encourage them to contribute more [5]. The KS creates chances to take full advantage of an organization's ability to make solutions and give the business competitive leverage [6, 7]. The best knowledge collection is created by capturing and sharing the experiences of the team members and experts in the organization [8]. KS is very useful for the organization. It gives the ability for the organizations to prevent the redundant learning attempts and improves the possibilities of the innovation [9, 10, and 11].

The KS is defined as a procedure of receiving and giving knowledge [12]. The process of KS enables the individuals to exchange their experiences in form of technical knowledge [13]. Knowledge of the individual is the only single supply of the organization. The KS exchange of the individuals provides more knowledge not only for the organization but also to the other individuals [14]. The successful completion of the construction projects is based on the accuracy, efficiency, and exchange the needed information on the time to the team members of the project. This exchange is possible to make it happen by making the use of the IS [15].

The IS in the construction organization is known formally as a system accumulates stores, manages and reports data from different sources to provide most wanted information to the decisions makers [16]. The purposes of the IS to save and transfer the needed information. The best ISs are the ones do the work with lower cost in an effective and efficient way. The IS enables the organization to transfer the knowledge to the new team members in the organization. Also formulates and merger the earlier accumulated knowledge in the organization [17, 18, 19]. However, the process of KS is proven to be influenced deeply by CD in multicultural organizations [20].

The culture in straightforward is acknowledged as deep shared, unspoken experiences of specific society or group of people earned from a generation and passed to the next generation. That comprises the approach of life, religions, beliefs, norms, attitudes, and values [21, 22]. The culture tends to increases the ambiguity of the exchanged knowledge in the organization. The process of the KS from a cultural side, specifically communication, is corporate language. It is a very significant factor in the KS process. The significance of language happens to be more important once the company's member's native languages different from each other [9]. This is because of poor understanding in the corporate language in process of KS. The trust level of the individuals in the shared knowledge in the organization is decreased. Due to that poor quality learning from the shared knowledge of the organization is taken place. The CD effects communication and learning [14, 23, 24]. Therefore, the capability of the innovation to happen in the organization will be very small [20]. From the previous research, the variables which are influenced by the CD in the process of the KS activities are observed. The corporate languages in the process of KS (Communication), the trust in the shared knowledge in the organization (trust), the learning

from the shared knowledge in the organization (learning), and the ability of the innovation to happen in the organization (innovation).

From this point, the unanswered question has arisen. Does the CD influence the process of the KS by using the IS in the organization?

However, Historically the IS was more failure than success [25]. Nevertheless, it is hard to recognize the failure point of cycle life of the IS [26]. The failures of the IS became very frequent. In the United States, the rate of IS failure was 75% [27]. IS failure is very costly and more noticeable than before. For instance, in 2002 was spent on the information technology in the worldwide about \$2 trillion. In the US alone was spent on the information technology around \$1 trillion which consider about 50% of total spend [28]. The average companies spend around 4.2% from their yearly income on the information technology represents more than 50% of the total central budget. Even though, it is not easy to count the financial cost increasing from the low success rate related to the IT projects [29, 30]. In the US around \$ 150 billion and \$ 140 billion in the European Union were lost by wastage of IT. While many systems fail due to non-technical problems like organizational problems [14]. Therefore, in the past decade, a lot of researchers have addressed the cultural problems of IS in the organization. It refers to the fact of so many IS adoption proposals fail. The failing was due to the misfit between the culture and IS, or the managers fail to understand the culture and how that impacts the IS adoption. The culture appears to be an unnoticeable significant problem in the IS adoption in the multicultural organization [31]. Since, the organizational culture is well known for a long time back as an important key for the PP [32, 33, 34]. PP in the construction sector defined as the finishing time, cost and quality. Usually, cost, schedule time, quality, as well as safety are the goal, which is well thought-out as the most significant keys to any construction projects' success. Thus, the (cost, schedule, quality, and safety) will be the main focus of this research, to analyze how the CD influences the process of the KS by using the IS of the organization.

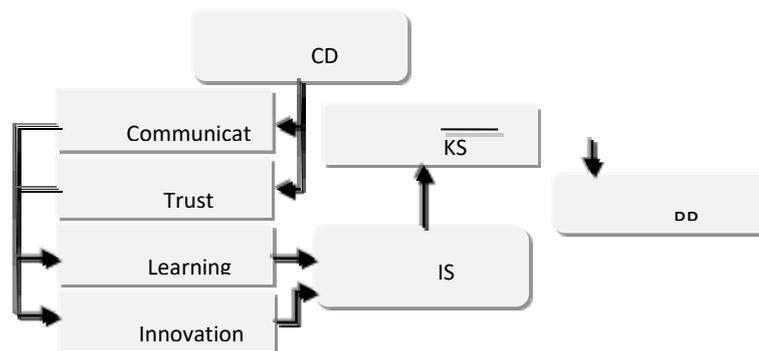
## 2. THE RESEARCH METHODS

In this research, the influences of the CDs on the process of the KS by using the IS and how this effect on the PP will be analyzed. From the earlier literature review, the influenced variables by the CD and obstacles the process of KS between the team members in the organization are obtained, (communication, trust, learning, and innovation). Therefore, in this research, these variables will be analyzed. To evaluate whether the CD influences the process of KS by using the IS of the organization, as shown in Figure. 1.

To analyze the CD influences on the KS activities by using the IS, a survey questionnaire is developed. The questionnaire consists of a list of questions were chosen carefully. To guarantee the needed data is collected accurately and economically. Construction Sunway Company in Malaysia is chosen in a sample size of 30 respondents. The targeted respondents are the (experts) of the company.

The questionnaire questions are divided into two parts as explained below:-

- a) In the first part of the questionnaire. To what extent (communication, trust, learning, and innovation) are important in the KS activities by using the IS and its effectiveness on the PP.
- b) In the second part. To what extent the CD influences the KS activities by using the IS and to what extent these influences affect the PP.



**Figure. 1.** The hypothesis of the study

### 3. THE DATA ANALYSIS (STATISTICAL ANALYSIS)

The collected data is analyzed, interpreted and summarized by using descriptive and statistical techniques such as total percentages. The system dynamic modeling is used. A causal model simulation and formulas are developed in the system dynamic to analyze CD influences on the KS activities by using the IS and how this is reflect on the PP.

The steps of how the obtained data was analysed by the system dynamic modelling

The obtained data of the questionnaire was analyzed by using the system dynamic in two steps (A and B) as explained below:-

#### 3.1. The first part of the questionnaire

The questionnaire in the first part consists of (4) questions and each question has subsections. The first part of the questionnaire as mentioned earlier is inquiring about the importance of the KS process by using the IS and its effect on the PP. Thus, the first question (Q1Part 1) in part one is taken as an example of how the analyse was done by the system dynamic modelling. Q1part 1 consists of (3) subsections (a, b, and c). Q1Part 1 inquires about the significance of the corporate languages (communication) in process of the KS by using IS, as shown in Table 1.

**Table.1.** The experts' answers on the importance of corporate languages (communication) in the process of KS by using the IS (no CD influences)

The Corporate Languages					
Scales					
	Very low (1)	Low (2)	Medium (3)	High (4)	Extreme high (5)
Q1 <sub>Part 1</sub>	Rs*1	Rs*2	Rs*3	Rs*4	Rs*5
a	0	2*2=4	7*3=21	18*4=72	3*5=15
b	7*1=7	10*2=20	11*3=33	1*4=4	1*5=5
c	3*1=3	6*2=12	11*3=33	7*4=28	3*5=15

Where, R is the respondent's number (30). S is the scale value (5). C is the subsections (a, b, and c) (3). Rs the respondent's number on the scale.

Equation (1) is the used formula in the system dynamic modeling to analyze the significance of the corporate language in the process of the KS by using the IS.

$$Q1_{part\ 1} = \frac{1}{R * C * S} (a_1 + a_2 + a_j) + (b_1 + b_2 + b_j) + (c_1 + c_2 + c_j) \tag{1}$$

$$Q1Part\ 1 = 60\ %$$

The result of the Q1Part 1 is the corporate language in the KS process by using the IS normal organization.

### 3.2. The second part of the questionnaire

The second part of the questionnaire contains (4) questions. The first question (Q1<sub>part 2</sub>) in part two is taken as an example of how the simulation is done by the dynamic system modeling and what formula was used. Q1<sub>part 2</sub> inquires about the influences of the CD on the corporate languages in process of the KS by using IS.

**Table. 2.** The Experts' Answer on the Influences of the CD On The Corporate Languages In Process Of The KS By Using IS.

The Corporate Languages	Scales				
	Very low (1)	Low (2)	Medium (3)	High (4)	Extreme high (5)
Q1Part 2	Rs*1	Rs*2	Rs*3	Rs*4	Rs*5
	0	0	4*3=12	16*4=64	7*5=35

Table 2 shows the influences of the CD on the corporate language in process of KS by using IS. Where R = (27), S = (6), and Q1Part 1 = 60%.

Which Q1Part 1 is the ideal case of the corporate language in the KS process by using the IS in the normal organization.

Equation (2) is the used formula in the system dynamic modeling to analyze the influences of the CD on the corporate language in process of KS by using IS.

$$Q1_{part\ 2} = \left( \frac{1}{R * S} a_1 + a_2 + a_j \right) * (Q1_{part1}) \tag{2}$$

$$Q1Part\ 2 = 40.8\ %$$

Equation (3) is the applied formula in the system dynamic modeling. To give a clear vision on the corporate language in the KS process by using the IS in the ideal case (normal) organization and the influences of the CD on the corporate language in KS process by using the IS in the multicultural organization.

Then, Q1Part 1 - The obtained result of equation (2)

$$(Q1_{part1} - Q1_{part\ 2}) = \text{CD influence on (communication) in KS by using IS} \tag{3}$$

CD influence on (communication) in KS by using IS = 19.2%, as presented in Figure . 2

The similar calculation process is applied in the simulation of system dynamic modeling to the rest of the variable of the KS process by using IS.

## 4. THE RESULT AND DISCUSSION

### 4.1. The General Information about the Respondent.

The target respondents are the only experts of the company, the collected data gathered the respondents' information as presented below in Table 3.

**Table 3.** General Information about the Respondents

Age	27 ~ 48 years
Level of the Education	High diploma Bachelor's degree Master degree
Working experience	3 ~ 24 years
Respondents' positions	Senior executive Project manager Assistant manager General manager Deputy project manager

### 4.2. The KS process by using the IS in the ideal case organization and the influences of the CD on the KS process by using the IS in the multicultural organization.

The KS process by using the IS in the normal organization and the influences of the CD on the KS process by using the IS in the multicultural organization is presented in Figure. 2.

The influenced variables by the CD in process of the KS by using the IS are expressed as. The ability of the team members of the organization to understand the corporate languages in the process of the KS by using IS (Communication). The trust of the exchanged knowledge in the organization by the IS (Trust). The capability of the team members to learn from the exchanged knowledge by IS in the organization (Learning). The possibility of the innovation to happen in the organization by using the exchanged knowledge by IS (Innovation).

The finding of this study, from the analyzed data by the system dynamic modeling the respondents, highlighted.

The corporate language (communication) in process of the KS by using IS is high as 60% in the normal organization. The workers are able to understand and communicate easily and freely without any obstructions by using the IS of the organization.

While, the negative influences of the CD on the corporate languages (communication) in process of the KS by using IS makes the workers incapable to understand and deal with the corporate language of IS in the multicultural organization, where no multi-languages are facilitated by used IS. That leads to hinder the KS process between the workers and increase the misunderstanding of the exchanged knowledge by IS, dropping off the level of the knowledge flow from 60% to 19%.

The trust (Trust) in exchanged knowledge by using IS is high as 67% in the normal organization. This is because there is no CD influences is involved.

In addition, the negative influences of CD effects the workers' trust (Trust) in the exchanged knowledge by IS of the multicultural organization. This is proven from 67 % of the workers' trust in the exchanged knowledge by the IS in the norm organization, dropped to

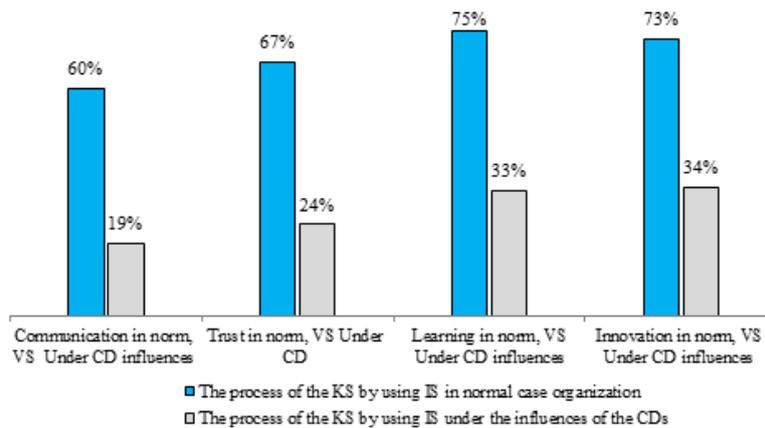
24% in the multicultural organization. Causing less knowledge exchange by using the IS for other workers in the organization.

The learning capacity of the workers from the exchanged knowledge by using IS is high as 75% in the normal organization. Since the communication and the workers' trust in the exchanged knowledge by using IS is high in the organization. The workers' learning level from shared knowledge by the IS becomes spontaneously high.

However, the negative influences of CD effects the workers' learning capacity from the exchanged knowledge by using the IS in the multicultural organization. This is proven from 75 % of the workers' learning level from the exchanged knowledge of the IS in the norm organization, reduced to be 33% in the multicultural organization. As low fluent in the corporate language in process of the KS by IS, and low workers' trust in the exchanged knowledge by using IS. The workers' learning level from the exchanged knowledge by the IS becomes small.

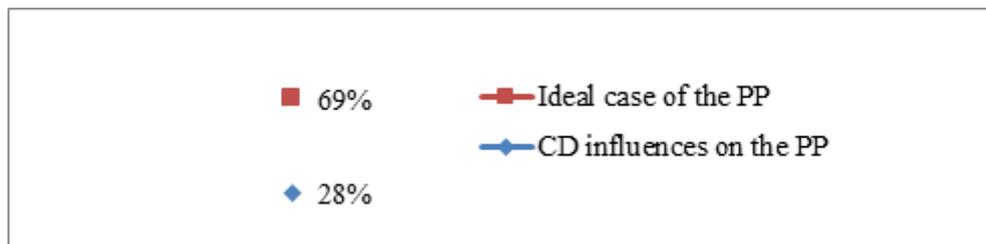
The possibility of innovation to happen is high as 73% in the normal organization. This is because of the high level of learning in the organization is guaranteed, and no CD influences.

Once again, the negative influences of CD effects the innovation to happen in the multicultural organization. As bad communication, low workers' trust, and small learning capacity are confirmed due to the CD influences. The innovation to occur in the organization becomes as small as 34%.



**Figure. 2.** The KS process by using the IS in the normal organization VS the influences of the CD on the KS process by using the IS in the multicultural organization

Since it is proven that the CDs influence process of the KS by using the IS in the organization. Thus, these influences are reflecting badly on the PP as clarified in Figure 3.



**Figure. 2.** The PP in the normal organization and the PP in the multicultural organization

It is declared that the PP is high as 69% in the normal organization. This explains the affectivity of the IS in process of the KS in the organization.

However, the PP is sharply decreased to 28% in the multicultural organization. Due to the CD influences on the process of KS by using the IS. This is this resulting in less knowledge flow in the organization.

## 5. CONCLUSION

The outcome of the carried out a survey in the form of a questionnaire is concluded in this research to analyze the influences of the CD in the KS process by using the IS in the multicultural organization, and how these influences impact the PP (safety, quality, and cost).The previous studies emphasized that the KS process is a significant key in the construction organizations' success and increased the PP. Due to that, the organizations tended to used the IS to keep the leverage of the knowledge flue. The IS enables the workers to exchanged their mind fast and freely. It is also confirmed that, the CD influences and obstacle the process of the KS process in the organization. Therefore, in this study, the influences of the CD in the KS process by using the IS in the multicultural organization is analyzed by using the system dynamic modeling.

The finding of this study indicated the CD influences negatively the KS process by using the IS in the multicultural organization. The CD lowers the workers' learning capacity from the exchanged knowledge by the IS. Decrease the level of the workers' trust in the exchanged knowledge by IS. Cause poor understanding in the corporate language in the process of the KS by using the IS. Lower the possibility of innovation to take place in the organization. It is also evidenced that, the PP is high in the normal organization.

But the negative influences of the CD lower the PP due to less knowledge is exchanged by the IS in the multicultural organization. Therefore, the authors perceived the need of coming out with IS capable of solving the influences of the CD in the KS process by using the IS in the organization.

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