# EFFECT OF PUBLIC SPACE ON KNOWLEDGE SHARING

Kayode Oloruntoba[1], Mohd Hisyam Rasidi[2], Ismail Said[3]

[1]Doctoral Candidate, [2]Senior Lecturer, [3]Associate Professor,
Department of Landscape Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia, Malaysia
kayodetoba@yahoo.com

**Abstract:** This study investigates the role of the public space in the development of knowledge sharing among the residents of Cyberjaya (science city) Malaysia. Thus, Cyberjaya Malaysia was selected as the study area based on its concept as a technological city that footholds on knowledge sharing towards it knowledge based development. The study adopted validated measuring tools and developed a theoretical framework that link public space utilization with the knowledge sharing determinant factors. Survey questionnaires were administered on the residents in the study area and structural equation modeling (SEM) was used to validate the research framework. The finding indicated that public space utilization demonstrated significant influence on knowledge sharing.
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## 1. Introduction

Numerousauthors have adjudged public space as an important factor of human neighborhood and physical environment that signify urban beauty and the inhabitant social networkingpotentials (Gehl, 2001; Carmona et al., 2003; Bonilla, 2013). The public space concept can be traced to the Greek notion of Agora and the open Roman forum that were considered as arena of public affairs among residents and the sociology refers to it as spaces for daily social interactions (Tonnelat, 2010).Today, man has begun to realize the unhidden importance of public space in human life particularly the social development aspect. Carmona et al. (2008) averts that a successful public space meets the social need of the society as it intertwined the social economic production requirement (Pasaugallari and Doratli, 2004; Lefebvre, 1991; Lewis, 2012). Public place is a social area within a neighborhood that accesses or reachable for both passive and active activities that provide other public benefits to the residents and others users without undue restriction (Gehl, 2001; Carmona et al., 2008; Cobb, 2011) while private public space is protected and policing by Law having designated restriction for free access (Frug, 1999).

Public space provides beyond places for recreational social benefits, it accommodates neutralities and free flow of movement in the urban settings to a quantifiable environmental and economic benefit (Braza, 2003; and Pasaogullari and Doratli, 2004). Carr et al. (1992) explained in their research work on public space that it is primary role rally around the provisions of four major important needs to the users which includes comfort, active and passive engagements with environment, discovery, and relaxation. Public space utilization develops human psychological and social comfort that trigger sense of safety. Carr et al. (1992) defined comfort derived from public space as a function of the duration and time spent in the public space by the users. Relaxation is said to hinge on the natural feelings and experience associated with public space environment, it is capable to relief burden minds.

The high priority of about 40% given to open greenery including public spaces for residents' social activities in science city physical development that is feasible in Cyberjaya, Malaysia (Rasidi and Shinozaki, 2009) couple with its goal towards effective knowledge sharing (Ergazakis et al., 2006). The aforementioned necessitates Cyberjaya Malaysia as a suitable study area for this research. Thus, this study is part of ongoing doctoral work by the corresponding author.

## 2. Research Background

The advent of the industrial economy to the knowledge based economy as operationalized in science cities has made the industries with applied knowledge in achieving a better product in a quicker way (Drucker, 1993). Science city primarily consists of the industry professionals, the researchers and marketing experts working in various industries and innovation sectors, and research institutes with the idea of exhibiting good knowledge sharing towards knowledge based development (Anttiroiko, 2004). As such, science city (technological city) solely depends on knowledge as a tool for technology development. Knowledge can be viewed as an experience and skill acquired in the span of time (Allee, 1997) and the potentials to act (Sveiby, 1997). Knowledge encompasses principles, instincts, rules, ideas, insights and skills that engendered human actions. It can be described as what we value and have believed in as a result of substantial information

through interaction, experience and taught (Zack, 1999). Hence,the knowledge needed to be shared for effective organization and productivity. It's an offshoot of information flow that is being put into action (O' Dell and Grayson, 1998; Nonaka and Takeuchi, 1995) and a state of mind that having links to relevant information (Wasco and Faraj, 2000). Knowledge is about knowing the hidden fact and know-how while information is associated with historical and descriptiveness (Kock and McQeen, 1998a, 1998b). It encompasses interaction among groups with expectations of innovative output (Hong *et al.*, 2011), which is organizational intellectual capital. For instance, the new knowledge of inventing smart telecommunication phones and mini computers can be exchanged and improved among groups of professionals for better performance output and innovations through sharing of their know-how in public space gathering. Alavi and Leidner (2001) opined that in the index social literature, the idea of data hierarchy, knowledge and information in defining knowledge is the most common. As such, knowledge, information, and data were differentiated accordingly. The authors described data as a raw number, an observation or objective fact. In addition, Zack (1999) averts that data has no direct meaning as it requires further analysis and explanations. Information was described as data that is being put in a meaningful path. It is a flow of messages, but knowledge is the product organized and developed from them. These authors stress tacit knowledge as a major component of organizational productivity development that hinges on trust, and reliability exhibited by individuals. Therefore, when information is being authenticated and validated it becomes knowledge (Alavi and Leidner, 2001). Knowledge sharing through social interactions is capable of producing good technological results (Patrick and Dotsika, 2007). It is regarded as the major enabler of knowledge management (Alavi and Leidner, 2001) and the act of making knowledge re-use (Lee and Al-Hawamdeh, 2002) while Mahzounzadeh (2013) refers to meta congnitive knowledge as a prodct of mutual social interactions among group of individual using teacher and student relationship as an example.However, much of knowledge sharing occurs in informal settings and pleasant environment (Hong et al., 2011; Chen et al., 2012) and public space signify urban pleasant environment for social activities (Gehl, 2001). Public spaces consist of various open spaces within the city and community layout that is resides for landscape and human activities in support of social contacts and community comfort. As such, when experts and researchers have one-on-one contacts in public spaces they often discuss vital and technical issues that have emanated from their various area of specialization and seek for or give innovative advice on the subject matter (Boer et al., 2011). Therefore, gradual participation and community social interaction gives rise to social cohesion among neighborhoods. Social network develop job satisfaction (Mohsenzadehand Ahmadi, 2013) as a factor of social cohesiveness (Huang, 2009).Knowledge sharing is quickly achieved when good cohesion is strengthening (Levin and Moreland, 1990).

## 3. Knowledge Sharing

Numerous researchers emphasize the significance of knowledge-sharing and innovative organizational development in innovation, research and development (Kaser and Miles, 2002; Bock *et al.*, 2005; Alavi and Leidner, 2001; Harbi *et al.*, 2011), and it is obvious that high-tech firms must develop knowledge to boost output (Chorev and Anderson, 2006). Gold et al. (2001) avert that knowledge sharing is an important assert towards the organization drive to attain sustainable and national competitive advantage. In science city, knowledge sharing can be defined as a human social bond and interaction that encompass the exchange of employee skill and experiences for effective development. It is a process by which the experience and skilled of the individual is being disseminated to others with the intention to assist in solving problems and formulating innovative policy. Knowledge sharing occurs when individuals choose to transfer and shared his know-how and know-where with others within a science city (Ryu et al., 2003; Kelloway, 2003). Knowledge is acquired primarily by developing strong cohesion. Ardichvili*et al*. (2003) described knowledge sharing to consist of supply of and request for new and innovative knowledge while Hooff and Weenen, (2004) acknowledged knowledge sharing as a two-dimensional development that involve donating knowledge and the act of knowledge collecting. Thus, knowledge donating is a practice of individuals sharing their private knowledgeable capital to colleagues and friends, importantly among those that needed such knowledge. Knowledge collecting is a process of consulting co-workers or associates to inspire them on the need to share their knowledgeable capital. It involves behavioral processes of interchange the human attained knowledge. To achieve a desirable knowledge sharing among people, the knowledge sharing institutions needed to put in place necessary supportive resources that can boost sharing culture among peoples. Knowledge sharing consists of exchange of employee valuable know-how, ideas and experience among others. It occurs at both the organizational and individual basis. At individual basis, knowledge sharing involved communicating with colleagues in order to seek people assistance in solving a challenge faster and efficiently. At organization basis, knowledge

sharing involved forming, recycling, and conveying experience-based knowledge (Ling *et al.*, 2009).However, the Theory of Reasoned Action "TRA" by Fishbein and Ajzen (1975), and Theory of Planned Behavior "TPB" (Ajzen, 2002) are most acceptable models of human intentional behavior in both information technology and human social behavior in the Institutes of Science Index literature (Kuo and Young, 2008). The two models assumed that the actual human sharing behavior can be predicted by human attitude and their subjective norms where Attitude toward sharing described as encompasses exchanging knowledge and information arising from the individual desires to share; Subjective norms to share described as represents an influence by community members and others to share; Intention to share described as the level of human belief that will be engaged in the knowledge sharing conduct.

Thus, the potentials of public space in providing space for human social activities and interactions as a predictor of social cohesion suggest an assumption that public space capable of influencing knowledge sharing.

## 4. Research Methodology

### 4.1 Measurements

Knowledge-sharing was accessed using three items: attitude to share knowledge, subjective norms to share knowledge, and intention to share knowledge which were adopted and modified from Hutchings and Michailova (2004), Requena (2003) and Chow and Chan (2008) (Table 1). Three variables were used to measure human subjective norm to share knowledge. Five indicators each were used to measure the attitudes to share knowledge and the intention to share knowledge respectively.Attitude toward sharing encompasses exchanging of knowledge and relevant information arising from the individual desires to share. Subjective norms to share represent an influence by community members and others to share. Intention to share reflects the level of human belief that needed to be engaged in the knowledge sharing conduct (Chow and Chan, 2008).

Public space utilization was measured using four variables as suggested by Pasaogullari and Doratli (2004). The variables were attractiveness, quality, comfort, and accessibility to public space (Table 3.3). Thus, public space accessibility was measured using three indicators: traveling distance, proximity, and barrier to its accessibility. Travelling distance and proximity were both adopted from Erkip, (1997). Barrier to access public space was adopted from Whyte (2000). Attractiveness was measured with four items: landscape, maintenance, aesthetics, and form. Landscape item was adopted from Gobster (2002), public space maintenance and aesthetics were espoused from Pasaogullari and Doratli (2004). Public space form was adapted from Wu and Plantinga (2003). The comfort derived from public space was measured using three indicators: safety, physical features, and size. Safety was adopted from Erkip (1997), physical features and size were adopted and modified from Ward-Thompson (2002), and Low et al. (2006), respectively. The authors highlighted that the size and physical features are good predictors of comfort derived in the physical environment and public spaces. Public space quality was accessed with three indicators-facilities, amenities, and human activities espoused from Pasaugullary and Doratli (2004). The validated measuring variables as adopted in this study were presented in Table 1.

Table 1 Summary of measuring variables applied in the study

| | Measuring variables | Authors | Validity of the constructs | Recommended Indicators |
|---|---|---|---|---|
| | **Public space utilization** | | | |
| **1** | Accessibility to public space | Tinsley et al. ( 2002), Pasaogullari and Doratli (2004)Kong et al. ( 2007) | Empirically validated | Recommended |
| **2** | Attractiveness of public space | Giles-Corti et al. ( 2005), Tinsley et al. (2002), Sallis et al. (1998) | Empirically validated | Recommended |
| **3** | Quality of public space | Tinsley et al. (2002), Pasaogullari and Doratli (2004) | Empirically validated | Recommended |
| **4** | Comfort derived in public space | Gobster (2002), Bertolini and Djist (2003), Carmona et al. (2003), Paumier (2004) | Empirically validated | Recommended |
| | **Knowledge sharing** | | | |
| **1** | Altitude towards sharing | Hutchings and Michailova (2004), Requena (2003), Chow and Chan (2008) | Empirically validated (SEM) | Recommended |
| **2** | Subjective norm towards sharing | Hutchings and Michailova (2004), Requena (2003), Chow and Chan (2008) | Empirically validated (SEM) | Recommended |
| **3** | Intention to share | Hutchings and Michailova (2004), Requena (2003), Chow and Chan (2008) | Empirically validated (SEM) | Recommended |

### 4.2 Hypothesis Development

There is no single definition of knowledge (Suppiah and Sandhu, 2011). Knowledge is embedded in the Individual cognitive view and reasoning and it is an essential resource gaining much attention in research based on non-quantifiable elements (Davenport and Prusak, 1998; Suppiah and Sandhu, 2011; Yi, 2009). It has been suggested that knowledge can either be explicit or tacit (Mooradian, 2005). Tacit knowledge is achieved through experience, information, and theory. It is a social network that provides the paths necessary to acquire information (Chang and Chuang, 2011). Based on social cognition theory, Bruner (1996) suggests knowledge refers to sharing within a designated circle. Hence, knowledge-sharing is a product of effective group social cohesion, requiring both positive attitudes to share within a social system and subjective norms that govern sharing expectations (Bock and Kim, 2002). This factor depends on long-term traditions of immediate community members and teams. It is social influence to perform or not perform a behavior or action (Kuo and Young, 2008), while attitude reflects individual willingness to perform an action or behavior. Attitude clearly influences knowledge sharing (Yang, 2008).

The aforementioned is consistent with the Theory of Reasoning Action (TRA) that suggests attitudes and subjective norms as determinants of intention to perform an action (Fishbein and Ajzen, 1975). Thus, the relationship between public space and social cohesion signifies that there exist influences of public space on knowledge sharing. Therefore, the confirmatory analysis model was developed (Figure 1) and hypotheses that;

H1: Public space utilization exhibits statistically significant influence on knowledge sharing.

H1a. ITS can positively influence KS
H1b. SNS can positively influence KS
H1c. ATS can positively influence KS
H1d. ACC can positively influence PSU
H1e. CTP can positively influence PSU
H1f. QTP can positively influence PSU
H1g. ATP can positively influence PSU

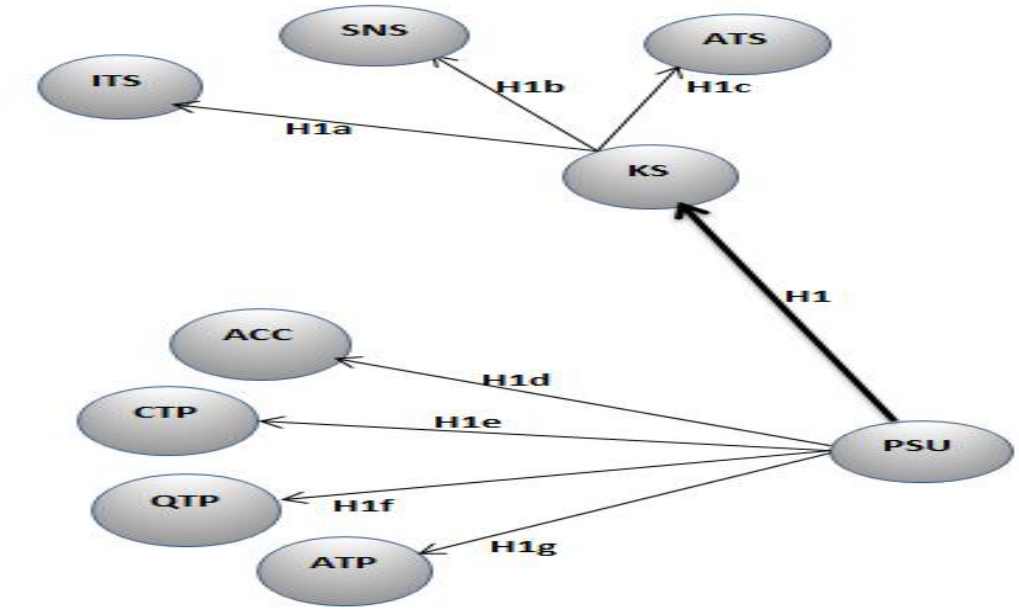


**Figure 1**Proposed confirmatory analysis model of public space in relation to knowledge sharing
**Note:** SC=Social cohesion, CM=Collective mind, SNS=Subjective norms to share knowledge, ATS=Attitude to share knowledge, ST=Social ties, ITS=Intention to share knowledge, KS=Knowledge-sharing, PSU= Public space utilization.

### 5. Analysis and results

Measuring model constructs were analyzed via confirmatory factor analysis (CFA) as proposed by Anderson and Gerbing (1992). The factor loadings exceeded the recommended benchmark of 0.5 values at p=0. 000. Themeasurement variance analyses and reliabilities were presented in Table 2. The observed normalized $\chi^2$for the measuring model was 1.525 ($\chi^2$/df = 1.525, where df = 293). This result signifies a very good value as consistent with Bagozzi and Yi (1988). The goodness of fit index (GFI) recorded 0.869 and the (AGFI) adjusted goodness of fit index value is 0.843 that aligned with the marginal recommended value of ≥ 0.8 (Chau and Hu, 2001). Thus, the (CFI) comparative fit index recorded 0.958 that was in line with the recommendation of ≥ 0.9 values (Chau and Hu, 2001). The (RMSEA) root mean square error of approximation was 0.050 that indicates a very reliable value (Browne and Cudeck, 1993). These authors posit that root mean square error of approximation (RMSEA) of ≤ 0.08 indicates strong fit (Figure 2)

**Table 2** Measurement variance analyses and reliabilities

| Variables and Indicators | Estimates | T-values | Cronbach'sAlphas | Average Variances Extracted | Composite Reliabilities |
|---|---|---|---|---|---|
| Accessibility | | | 0.849 | 0.655 | 0.851 |
| ACC1 | 0.774 | | | | |
| ACC2 | 0.827 | 11.669 | | | |
| ACC3 | 0.826 | 11.664 | | | |
| Attractiveness | | | 0.849 | 0.680 | 0.895 |
| ATP1 | 0.815 | | | | |
| ATP2 | 0.790 | 12.601 | | | |
| ATP3 | 0.850 | 13.823 | | | |
| ATP4 | 0.843 | 13.698 | | | |
| Comfort | | | 0.854 | 0.749 | 0.900 |
| CTP1 | 0.889 | | | | |
| CTP2 | 0.840 | 15.453 | | | |
| Attitude to share | | | 0.893 | 0.612 | 0.887 |
| ATS1 | .817 | | | | |
| ATS2 | .803 | 9.395 | | | |
| ATS3 | .776 | 8.977 | | | |
| ATS4 | .707 | 7.951 | | | |
| ATS5 | .803 | 9.396 | | | |
| Intention to share | | | 0.935 | 0.736 | 0.933 |
| ITS1 | .908 | | | | |
| ITS2 | .886 | 14.242 | | | |
| ITS3 | .921 | 15.697 | | | |
| ITS4 | .808 | 11.635 | | | |
| ITS5 | .755 | 10.238 | | | |
| Subjective norms to share | | | 0.881 | 0.714 | 0.881 |
| SNS1 | .841 | | | | |
| SNS2 | .936 | 11.015 | | | |
| SNS3 | .748 | 8.937 | | | |

**Note**: SC=Social cohesion, CM=Collective mind, SNS=Subjective norms to share knowledge, ATS=Attitude to share knowledge, ST=Social ties, ITS=Intention to share knowledge, KS=Knowledge-sharing.

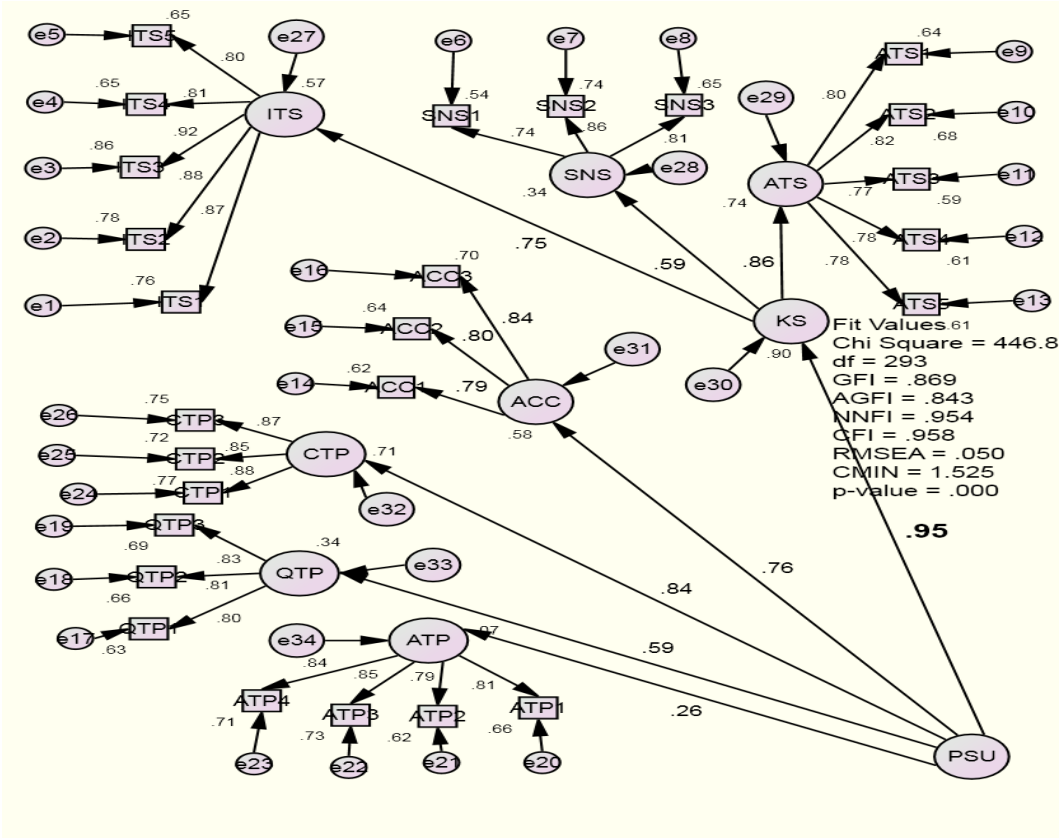


**Figure 2** Confirmatory analysis model of public space utilization in relation to knowledge sharing
**Note:** ATS=Attitude to share knowledge, ST=Social ties, ITS=Intention to share knowledge, KS=Knowledge-sharing. Comfort = CTP, Quality = QLP, Accessibility = ACC, Attractiveness = ATP, Public space utilization= PSU

## 6. Discussion

The impact of public space on knowledge sharing was accessed via the Hypothesis 1 (H1) with the sub-hypotheses range from H1a, H1b, H1c, H1d, H1e, H1f, and H1g (Figure 1). Path loadings of approximately 0.2 and higher were considered as practically significant loading (Cohen, 1988, 1992a, 1992b). The AMOS analysis output of the confirmatory model exhibited strong and reliable path loadings (Figure 2). All measuring constructs of public space have path loadings that range from 0.59 to 0.84 on public space utilization while measuring constructs of knowledge sharing exhibits path loadings ranges from 0.59 to 0.86 on knowledge sharing.Public space utilization exhibited path loading of 0.95 on knowledge sharing. This is the strongest loading in this relationship. It implies that public space utilization effectively reflects individual and collective potential of Cyberjaya professionals to share their knowledge. The main hypotheses (H1) alongside with the sub-hypothesis (H1a, H1b, H1c, H1d, H1e, H1f, and H1g) were supported by this analysis. Hence, it is appropriate to postulate that public space utilization positively influence tacit knowledge sharing (Figure 2 and Table 3). The influencing relationship is associated with the social ties and share goal exhibited among the Cyberjaya professionals in their public space usages that have an influential factorin their attitude, subjective norm, and intention to share knowledge. It means that when the residents in Cyberjaya utilize public space they acquires social cohesion via social interactions and therefore develop the potential to share their tacit knowledge. Thus, this result supported the prime hypothesis - **H1**; public space utilization can significantly influence knowledge sharing (Table3).

**Table 3** Summary of the results structural model

| Hypothesis | Hypothesized path | Path coefficient | Results |
|---|---|---|---|
| **H1a** | ITS can Positively influence knowledge sharing | 0.75 | Supported |
| **H1b** | SNS can Positively influence knowledge sharing | 0.59 | Supported |
| **H1c** | ATS can Positively influence knowledge sharing | 0.86 | Supported |
| **H1d** | ACC is significant to public space utilization. | 0.76 | Supported |
| **H1e** | CTP is significant to public space utilization. | 0.84 | Supported |
| **H1f** | QTP is significant to public space utilization. | 0.59 | Supported |
| **H1g** | ATP is significant to public space utilization. | 0.26 | Supported |
| **H1** | Public space utilization can significantly influence knowledge sharing | **0.95** | **Supported** |

## 7. Conclusion

It is imperative to adjudge that utilization of public space trigger social cohesion and social cohesion among Cyberjaya inhabitant and facilitates their potential to share knowledge among their peers. This study reveals further that the users of public space in Cyberjaya acquire needed comfort and social satisfaction in public space through its features: landscape, facilities, amenities, aesthetics, and its location distance. The resultant factor of public space utilization embodied social cohesion. Since social cohesiveness trigger people know-how exchange. Therefore, public space users have the potential to share their knowledge. Consistent with this discussion, this study empirically reveals that public space users in Cyberjaya have the influential potential to share their knowledge among their peers and workers. This implies that when the professionals in Cyberjaya utilized public space, they tend to share their knowledge. This knowledge revolves around their theoretical and technical know-how. This type of knowledge refers to as tacit. This is knowledge that been acquire in social form and informal medium. For instance, a worker in a specific telecommunication can have the opportunity to share his or her electronic design challenges with a researcher in similar areas of study that has vast knowledge of such thereby share his knowledge of the possible remedies to the challenges when they meet and interacts in public space. In either way, both parties will have knowledge exchange and benefit towards knowledge based development.

**Corresponding Author:**
Kayode OLORUNTOBA,
Faculty of Built Environment, School of Postgraduate Studies, Universiti Teknologi Malaysia, Malaysia.
kayodetoba@yahoo.com

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