ANALYSIS OF LITERATURE REVIEW ON FACTORS INFLUENCING THE ADOPTION OF TELECOMMUTING

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ABSTRACT

Telecommuting is increasingly being perceived as a viable travel demand management strategy that aims to reduce peak hour traffic congestion by allowing commuters to work from home or a nearby telecommuting centre on certain days of the week. The increasing private vehicle usage by International Islamic University Malaysia (IIUM) community is posing a strain on the ability of the existing road and the related infrastructure to cope with the increasing traffic volume and parking demand within the campus. Due to the diverse travel patterns and work characteristics of IIUM employees, adoption of telecommuting by staffs is perceived as a potential means of reducing the peak hour traffic in IIUM. The aim of this study is to investigate the perceptions of IIUM employees on various aspects of telecommuting. This paper, however, highlights on the rationale behind the study and literature background of telecommuting aspects especially on factors influencing the preference towards telecommuting.

Keywords: telecommuting, teleworking, employees, travel demand, peak-hour traffic.

1. INTRODUCTION

Malaysia has witnessed an explosive rise in the demand for transport vehicles in recent decades in conjunction with its rapid economic growth. A high growth of urbanization and motorization was recorded in Kuala Lumpur, the capital city of Malaysia and the Klang Valley region, in which the rates of increase in vehicle ownership were the highest in Kuala Lumpur compared to any other parts of the country (Abdullah, 1997). As of in 2010, the federal territory of Kuala Lumpur has registered the highest number of motorcars compared to other states which is 4,635,212 vehicles in total, followed by Johor (2,768,266) and Selangor (2,261,883) (Ministry of Transport Malaysia, 2010). With the increase in car ownership, it was estimated that the demand for travel to the central area of the city will increase far beyond the capacity of the road network, even after improvements to the existing roads and new road constructions have taken place. Thus, it is posing an enormous strain on the ability of the existing infrastructure to cope with the increasing traffic volume. Private

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vehicles today have become the main means of travel for urban living in developing countries. Consistent economic growth, rising incomes and urbanization have led to rapid growth in vehicles ownership and usage and thus contributing towards air pollution and other environmental hazards (Noresah, 2012).

In view of the above problems, Kitamura et al. (1990) has suggested that telecommuting as one of the transportation planning measures to reduce peak hour traffic through the reduction of commute trips. Telecommuting was foreseen way back as early as 1950s, but it did not become practical until the advent of personal computers and portable modems in the early 1970s (USDT, 1993 and Hill et al., 1998). It was regarded as a powerful tool to reduce traffic congestion, pollution and energy consumption. It also improves lifestyle quality and job satisfaction by providing employees flexible work schedules to address workload and personal requirements (Bernardino, 1995).

The increasing private vehicle usage by International Islamic University Malaysia (IIUM) community is posing a strain on the ability of the existing infrastructure to cope with the growth of traffic volume and parking demand in the campus. It is important to highlight that this paper has taken into account of traffic issues which are considered as one of the reasons for conducting a study on telecommuting. Nevertheless, these issues are considered crucial for the employees to consider telecommuting as an alternative work option. Due to the diverse travel patterns and work characteristics of IIUM employees, adoption of telecommuting by staffs is perceived as a potential means of reducing the peak hour traffic in IIUM. The purpose of this study is to investigate the perceptions of IIUM employees on various aspects of telecommuting. However, this paper highlights on the literature background of telecommuting aspects especially on the factors influencing employees' preferences towards telecommuting.

2.   LITERATURE REVIEW

2.1. Factors Influencing the Choice of Adopting Telecommuting Mode

2.1.1. Personal and Household Factors

Studies showed that a high number of personal and household characteristics were significant in influencing one's choice to telecommute (Dam, 2009). Yen and Mahmassani (1994), Sullivan et al. (1993) and Peters et al. (2004), had mentioned that the decision to telecommute is governed by socioeconomic variables. Popuri and Bhat (2003), Yap and Tng (1990) and Wells et al. (2001) had suggested telecommuting would be of particular interest to women employees. Thériault et al., (2005) suggested that older workers were more likely to telecommute than younger ones and would be of particular interest to employees who are married (Popuri and Bhat, 2003; Yap and Tng, 1990; and Wells et al., 2001). In the case of Rafidah and Abdul Razak (2003), a survey was conducted in Kuala Lumpur for Human Resource Departments where 43% of respondents were willing to telecommute. Among those who were willing to telecommute, 60.5% of respondents were female

and 55.6% married. A study on the attitudes of female computer professionals towards telecommuting conducted in Singapore had reported that 73% of the respondents were in favour of telecommuting (Yap and Tng, 1990). Even though age has been acknowledged as one of the key aspects driving the decision to telecommute, results from a survey of 4,000 employees in Europe uncovered that interest in telework is positively related to one's experience with new technologies and negatively associated with their age (Huws et al., 1990).

Several studies have suggested that telecommuting would be of particular interest to employees who have children (Popuri and Bhat, 2003; Yap and Tng, 1990 and Wells et al., 2001). Peters et al. (2004) assumed that the likelihood of preferring telecommuting is positively influenced by the number of children especially children in the youngest age group. Employees with children under the age of four were more often prefer to telecommute than employees with children over 12 years old. With regards to presence of children in household, contrary to the popular hypothesis that family concerns, such as child care is a primary motivation for women to adopt telecommuting, Huws et al. (1990) illustrate that the desire to telecommuting is more common with couples with no children than couples with one or two children. This finding could be explained by the study done by Kinsman (1987) which revealed that working at home with young children is very challenging as reported by telecommuters. Peter et al., (2004) had mentioned that well-educated employees were found to be more likely to practice telecommuting. Results from several large data collection efforts, Olszewski and Mokhtarian (1994), Luukinen, (1996) and Felstead et al. (2002) revealed that most telecommuters were highly educated, had high incomes (higher than average), were middle-aged, and were male professionals. Lastly, other factors, such as household distractions (Mokhtarian and Salomon, 1996b; 1997 and Mannering and Mokhtarian, 1995) and spending time with family (Mannering and Mokhtarian, 1995; Mokhtarian and Salomon, 1996b; 1997; Bailey and Kurland, 2002; Mokhtarian and Salomon, 1994 and Baruch, 2001) have been well documented as important predictors and contributors to the decision to adopt telecommuting. Overall, past studies have shown that personal factors have a significant impact on telecommuting adoption.

2.1.2. Work-related Factors

Walls et al. (2007) claimed that both the choice and frequency decisions of telecommuting were found to be substantial influenced by workplace-related factors. The choice to telecommute could influence by the availability of office space at home (Dam, 2009). The availability of physical space for a home office could be a larger constraint in telecommuting adoption in some places more than others. For instance, in Taipei, the relatively small living spaces may be a barrier to home-based telecommuting (Yen, 2000). Taipei is not the only place where small housing design is an issue for creating office space. In the United Kingdom, most dwellings cannot accommodate comfortable working space for telecommuters (Sullivan and Lewis, 1998). Thus, there are regional differences in the ability to create office space for telecommuting. Nevertheless, the availability of a separate workspace is an important aspect when deciding to take on telecommuting (Baruch, 2000).

Moreover, the length of service also found to be one of the important influential factors for the decision to telecommute (Bagley and Mokhtarian, 1997). Safirova and Walls (2004) confirmed that having more professional experience in general and a longer tenure with one's current company and one's current supervisor would boost the probability of telecommuting. Popuri and Bhat (2003) also suggested that employees with a long period of service with the current employer tend to be more inclined to telecommute. Euro survey 2000 had shown results highlighting that telework was the most widespread among employees, who used IT frequently in their jobs (Peters et al., 2004).

According to Brown (2010), job position plays an important role in the selection process or in some non-telecommuters' decision to opt out of telecommuting. An individual's choice to adopt telework could depend on the nature of work at one's job and the suitability of technology for specific work-related tasks. Examples of suitable job traits include: high control in time spent on individual work and working with others remotely – little need for face-to-face interaction (Dam, 2009). Since information workers and sales and marketing personnel are examples of jobs that exhibit the appropriate characteristics, thus, employees with these types of occupations are more likely to pursue telecommuting (Mokhtarian, 1998). On the other hand, occupations that require a physical presence, such as chefs, hair stylists, food service workers or firefighters, are not candidates for telecommuting. The results of the present research also provided evidence on the existence of and association between employees' profession and telecommuting choice. Gray et al. (1993) suggested that computer programmers, systems analysts, catalogue shopping telephone order agents, and data entry clerks were more often than other, suitable for full-time telecommuting category. Thus, it is important to note that examining specific details of the jobs rather than looking at the general job characteristics is a better predictor of whether an individual can pursue telework (Mokhtarian, 1998). Nevertheless, some jobs have selective tasks that can be completed remotely (away from the office). Therefore, some occupations fall at opposite ends of the spectrum (can or cannot telecommute), while others fall in between the extremes (can telecommute for some tasks or for some of the time).

2.1.3. Travel-related Factors

Commuting to and from work daily may take a toll on some people depending on how long the commute is or how stressful the traffic congestion may be. Thus, elimination of the commute trip could be a driving force behind current telecommuters. In several studies, it was documented that the commute trip from home to work is proportional to the propensity to adopt telecommuting (Nilles, 1988; Mahmassani et a1., 1993; Sullivan et a1., 1993 and Mokhtarian and Salomon, 1997). Jiang (2008) and Mokhtarian and Salomon (1996a) explained workers who have longer commute distances may be more likely to telecommute. In many studies commuting time was indeed found to have a large positive effect on telecommuting adoption (Mokhtarian and Salomon, 1997). Peters et al. (2004) mentioned that the preference to telecommute was more likely for individuals who have long commuting time. A survey conducted by Mokhtarian and Salomon (1996) for the employees

of the city of San Diego revealed that people who have longer commute were more likely to report that they want to telework. Jiang (2008) mentioned that workers who have longer commute distances may be more likely to telecommute. Drucker and Khattak (2000), however, found that distance to work is negatively correlated with working at home – that is, the farther the individual lives from the job, the less likely to telecommute.

2.1.4. Motivators and Drawbacks of Telecommuting

In terms of motivating factors of telecommuting, various benefits to organizations and workers can be harvested from the implementation (Noorliza and Muhammad Hasmi, 2004). Several studies suggested that telecommuting reduces absenteeism, increases employee loyalty to the organization, and increases their general satisfaction. Moreover, improved productivity and quality of work associated with telecommuting is probably the most cited organizational benefits in the literature. Some telecommuting specialists evaluate the increase in productivity to be between 15 and 50% (Alvi and McIntyre, 1993; Barthel, 1995; Baruch and Nicholson, 1997; Coté-O'Hara, 1993; Gordon and Kelly, 1986; Kirkley, 1994 and Langhoff, 1996). Minoli (1995) suggested that productivity gains are linked to the elimination/reduction of traditional commuting which is compensated by a telecommuter's willingness to work longer hours. Telecommuting also allows organizations to reduce certain expenses. Typically, lower costs can be realized from reducing office space, energy consumption, parking spaces, and overcrowding of offices. Ernst and Young were able to save US$25 million annually by reducing office space by two million square feet (Monnette, 1998). Finally, telecommuting allows for a more efficient usage of the organization's information system, particularly during non-office hours (e.g., at night and on weekends) (Gordon and Kelly, 1986 and Hamilton, 1987).

As for the positive impacts on individuals, telecommuting provides staffing flexibility where the staffs are able to work regardless of weather or traffic peaks (Langhoff, 1996) and also provides an opportunity to improve workplace productivity (Lovelace, 1995). Because of telecommuting, employees experience greater schedule flexibility, they can work when they prefer, and thereby improve their productivity. Further, Kurland and Bailey (1999) stated popular press accounts of successful telecommuting programs often report that telecommuters take fewer sick days, are absent less, have higher job satisfaction, and have higher work performance ratings. These factors might positively affected productivity.

Moreover, telecommuting could improve organization's concern on the social responsibility towards the environment (Noorliza and Muhammad Hasmi, 2004). As indicate by Lovelace (1995), telecommuting could avoid long commutes on congested highways or city streets, and to adjust their workday according to their needs, unbounded by traditional office hours. Meanwhile, society also benefits from telecommuting such as energy consumption, environmental degradation, reduce traffic congestion and reduce pollution (Straton, 2001). In the case of London, telecommuting solved the chronic overcrowding by 25% reduction in the number of public transport users, cars and

people (Khalil, 2001). With reference to table 1, Mills et al. (2001) and Tung and Turban (1996) have classified motivational factors to telecommute into three categories namely organizational, individual and societal.

Table 1: Motivators of telecommuting

Categories	Motivational factors
Organizational	Securing skilled employees Saving in office rental cost Reducing absenteeism Productivity gains Increase organizational flexibility
Individual	Reduction in commute time Cost savings related to work habits (e.g., travel, food) Flexibility in organizing work hours and leisure activities Increase in productivity
Societal	Reduction of air pollution and dependence on fuel Enable disable people to work from home Reduce traffic during rush hours and demand on transport

Source: Mills et al., 2001; Tung and Turban, 1996; Baruch and Nicholson, 1997; Olson, 1988

Despite the potential motivational factors, teleworking also have negative impacts on both organizations and individuals. In terms of organizations, one of the negative impacts is the discontentment of those managers in charge of telecommuters. This often arises due to managers' difficulty in adapting their management styles to the new reality imposed by telecommuting (Christensen, 1992). Secondly, the security of transmitting corporate data via telecommunication networks concerns managers (Gray et al., 1993 and Katz, 1987). More telecommuting is being done over the Internet. However, because of its openness and ubiquity, managers were concerned that company data can not only be intercepted but also manipulated by unauthorized parties (Greenstein and Feinman, 1999). This, however, seems to result from a misunderstanding of the different security measures available.

Telecommuting may also produce some undesirable effects on individuals. For example, increased levels of overwork, the invasion of personal life, a loss of confidentiality, the lack of adequate feedback related to work performance, and with the social isolation of telecommuters (Pinsonneault, 1999). In fact, feelings of isolation and the loss of morale were the most commonly cited drawbacks of telecommuting (Fitzer, 1997; Haddon and Lewis, 1994; Huws, 1993 and Solomon and Templer, 1993). In a study conducted with 103 telecommuters, 29% of respondents identified being left out of office communications and the feeling of isolation as important disadvantages of telecommuting (Reinsch, 1997). Another potential negative impact related to telecommuting is the emergence of conflicts between family and work related roles (Hartman et al., 1991 and Richter and Meshulam, 1993). Such situations usually arise when telecommuters, working from their homes, become less productive because distractions and interruptions abound (Mogelonsky, 1995). Not surprisingly, results from a survey conducted with 97 telecommuters showed that family disruptions were significantly negatively correlated with telecommuting satisfaction ($p = 0.004$) (Hartman et al.,

1991). However, such problems can generally be avoided by ensuring that one room in the home is reserved specifically for telecommuting purposes and that family members support the initiative (Baruch and Nicholson, 1997 and Nilles, 1994). Table 2 shows drawbacks of telecommuting which are divided into two categories namely organizational and individual (Mills et al., 2001 and Tung and Turban, 1996).

Table 2: Drawbacks of telecommuting

Categories	Drawback factors
Organizational	Security risks Problem of supervision Performance control difficulty
Individual	Feeling of isolation Reduction in chance of promotion Tendencies to overwork Unavailability of necessary supplies or equipment Family interruptions and household distractions No separation of work and home life Lack of interactions with co-workers Impedes career opportunities

Source: Mills et al., 2001; Tung and Turban, 1996; Fitzer,1997 and Solomon and Templer, 1993

3. CONCLUSIONS

Telecommuting is seen as a transportation demand management strategy especially reducing peak hour traffic by allowing commuters to work from home or nearby telework centres on certain days of the week. Once perceived as a panacea for solving urban highway congestion, telecommuting is now regarded as simply one ingredient of maintaining a well-balanced transportation system. The decision to telecommute is complex and is governed by a host of demographic, occupational, and attitudinal factors (Drucker and Khattak, 2000). Several researchers have used stated preference surveys to examine the impact of these factors on telecommuting choice. Travel, work and socioeconomic variables included in this study are aimed to understand the characteristics of individuals and workplace that leads to preference towards telecommuting. Obviously, for any research, literature review normally constitutes the first stage of the study. Reviewing literature related to the selected topic would not only provide useful insights about the area but also provide adequate understanding about the various aspects and dimensions of the selected topics. It also helps to formulate objectives, methodology and other related aspects of the study. Hence, literature review is regarded as an important stage of any research. This study also started with reviewing literature on the aspects related to the selected topic. As an attempt to provide literature background of the study, this paper highlights an overview of literature pertaining to the influence of personal and household, travel and work related factors towards the choice of telecommuting adoption. The ways in which these factors influence the decision to telecommute based on literature review are discussed in this paper. Even though, direct findings from this study are not presented in this paper because of initial stage of the study, it is highly expected that this paper would provide useful

insights, based on literature review, on the understanding of factors influencing the adoption of telecommuting.

4. ACKNOWLEDGMENTS

REFERENCES

Abdullah AR (1997). Transport and communication for urban development car pooling in Kuala Lumpur public perception. Available at www.unhcs.org.

Bagley MN and Mokhtarian PL(1997). Analyzing the preference for non exclusive forms of telecommuting: modelling and policy implications, Transportation, Vol. 24, pp. 203-226

Bailey DE and Kurland NB (2002). A review of telework research: findings, new directions, and lessons for the study of modem work. Journal of Organizational Behavior, 23, 383-400.

Baruch Y (2000). Teleworking: benefits and pitfalls as perceived by professionals and managers. New Technology Work and Employment, 15, 34-49.

Baruch Y (2001). The status of research on teleworking and an agenda for future research. International Journal of Management Reviews, 3, 113-129.

Baruch Y and Nicholson N (1997). Home, sweet work: requirements for effective home working. Journal of General Management, Vol.23 No.2, pp. 15-30

Bernardino AT (1995). Adoption of telecommuting: Modeling the employer's and the employee's decision process. Ph. D. thesis. Department of Civil and Environment Engineering, Massachusetts Institute of Technology.

Brown JMO (2010). Telecommuting: the affects and effects on non telecommuters. Faculty of the Virginia Polytechnic Institute and State University.

Christensen KE (1992). Managing invisible employees: How to meet the telecommuting challenge. Employment Relations Today, Summer, 133-143.

Dam I (2009) Exploring the relationship between social influence and telecommuting. Open Access Dissertations and Theses. Paper 4375.

Drucker J and AJ Khattak (2000). Propensity to work from home – Modelling results from the 1995 National Personel Transportation Survey. Transportation Research Record 1706, TRB, National Research Council, Washington , D.C., pp.108-117

Felstead A, Jewson N, Phizacklea A and Walters S (2002). The option to work at home: another privilege for the favoured few? New Technology Work and Employment, 17,204-223.

Fitzer MM (1997). Managing from afar: Performance and rewards in a Telecommuting Environment, Compensation and Benefits Review, 29 (1), January-February, 65-73.

Gray M, Hodson N, and Gordon G (1993). Teleworking explained. John Wiley and Sons Ltd, Chichester, West Sussex, England.

Greenstein M and Feinman TM (1999). Electronic commerce: Security, risk management and control, McGraw-Hill, New York: NY.

Haddon L and Lewis A (1994). The experience of teleworking: An annotated review. The International Journal of Human Resource Management, 5 (1), 193- 223.

Hartman RI, Stoner CR, and Arora R (1991). An investigation of selected variables affecting telecommuting productivity and satisfaction, Journal of Business and Psychology, 6 (2), Winter, 207-225.

Hill JE, Miller BC, and Weiner SP (1998). Influences of the virtual office on aspects of work and work/life balance. Personnel Psychology, Durham, Autumn, Vol.51, Issue 3.

Huws D, Korte WB, and Robinson S (1990). Telework: towards the elusive office. Chichester: John Wiley & Sons.

Huws U (1993). Teleworking in Britain, The Employment Department Research Series, No.18., London.

Jiang Y (2008). The impact of telecommuting on the journey to work: A two-sample instrumental variables approach. University of Maryland.

Katz AI (1987). The management, control, and evaluation of a telecommuting project: A case study, information and management, 13, 179-1190.

Khalil Khairallah (2001). Get a life, leave London. New Statesman, Vol.130, Issue 4526. 26th February 2001.

Kinsman F (1987). The telecommuters. In The homeworker's tale, ed. Kinsman, F., 70-93. New York: John Wiley & Sons.

Kitamura R, Nilles JM, Conroy P, and Fleming DM (1990). Telecommuting as a transport planning measure: Initial results of California pilot project. UC Transportation Center. No.58.

Knight PJ and Westbrook J (1999). Comparing employees in traditional job structures vs. telecommuting jobs using herzberg's hygiene & motivators. Engineering Management Journal, March, Vol.11, Issue 1.

Kurland NB and Bailey ED (1999). Telecommuting: The advantages and challenges of working here, there, anywhere, and anytime. Organizational Dynamics, New York, Autumn, Vol.28, Issue 2.

Kurland NB and Cooper C (2002). Manager control and employee isolation in telecommuting environments. Journal of High Technology Management Research, Vol.13, pp. 107-126

Langhoff J (1996). It's time to telecommute. Telecommuter Resource List (http://www.gohome.com).

Lim H, van der Hoom A, and Marchau V (2003). The effects of telework on organization and business travel. Paper submitted for Symposium on Teleworking, 4th Interbalkan Forum International IT conference, Sofia, Bulgaria, 6-7 October 2003

Lovelace G (1995). Creating the framework for a mobile workforce. Telesis, Ottawa, October, Issue 100.

Luukinen A (1996). A profile of Finnish telework: survey results concerning the nature, extent, and potential of telework in Finland. In Directions of telework in Finland: report by the Finnish experience with telework project, ed. Luukinen, A., 1-49. Helsinki: Ministry of Labour: Publication of Labour Administration.

Mahmassani HS, Yen JR, Herma R and Sullivan MA (1993). Employee attitudes and stated preferences toward telecommuting: an exploratory analysis. Transportation Research Record, 1413,31-41.

Mannering JS and Mokhtarian PL (1995). Modeling the choice of telecommuting frequency in Califomia: an exploratory analysis. Technological Forecasting and Social Change, 49, 49-73.

Mills J, Wong-Ellison C, Werner W, and Clay, J (2001). Employer liability for telecommuting employees. Cornell Hotel and Restaurant Administration Quarterly, Vol. Oct-Nov., pp. 48-59

Mokhtarian PL (1998). A synthetic approach to estimating the impacts of telecommuting on travel. Urban Studies, 35, 215-241.

Mokhtarian PL and Salomon I (1997). Modeling the desire to telecommute: the importance of attitudinal factors in behavioral models. Transportation Research Part A-Policy and Practice, 31, 35-50.

Mokhtarian PL and Salomon I (1996a) Modeling the choice of telecommuting: the importance of attitudinal factors in behavioral models. Environment and Planning, Vol. 28, pp. 1877-1894.

Mokhtarian PL and Salomon I (1996b). Modeling the choice of telecommuting: 3. identifying the choice set and estimating binary choice models for technology- based alternatives. Environment and Planning A, 28, 1877-1894.

Mokhtarian PL and Salomon I (1994). Modeling the choice of telecommuting - setting the context. Environment and Planning A, 26, 749-766.

Mongelonsky M (1995). Myths of telecommuting : Telecommuting might seem like a dream job, but here's the reality - it's still work. American Demographics, 17, 15-16

Nilles JM (1988). Traffic reduction by telecommuting: a status review and selected bibliography. Transportation Research, 22A, 301-317.

Nilles JM (1994). Making telecommuting happen. Van Nostrand Reinhold, New York: NY.

Noresah MS (2012). Private vehicle ownership and transportation planning in Malaysia. International Conference on Traffic and Transportation Engineering 2012. IPCSIT, Vol.26, IACSIT Press, Singapore.

Noorliza Karia and Muhammad Hasmi Abu Hassan Asaari (2004). Telecommuting: Flexibility cum financial incentives. International Business Management Conference 2004.

Olson MH (1988). Organizational barriers to telecommuting, in Korte W.B., Steinle, B. and Robinson S. (eds.), Telework: Present situation and future development of a new form of work organization, Amsterdam: North-Holland, 77-100.

Olszewski P and Mokhtarian PL (1994). Telecommuting frequency and impacts for State of California employees. Technological Forecasting and Social Change, 45, 275-286.

Peters P, Tijdens K, and Wetzels C (2004), Employees' opportunities, preferences, and practices in telecommuting adoption‖ , Information & Management, Vol. 41 No. 4, pp. 469-82

Pinsonneault A (1999). The impact of telecommuting on organizations and individuals: A review of the literature. Martin Boisvert, S.I.X., Inc. Cahier du GReSI no 99-09.

Popuri Y and Bhat CR (2003). On modeling choice and frequency of home-based telecommuting, Transportation Research Record, Vol.1858, pp. 55–60

Rafidah and Abdul Razak H (2003). Telecommuting as an alternative work system in Malaysia. Paper presented at the Seminar of Graduate Studies of FTSM, Universiti Kebangsaan Malaysia, Kuala Lumpur.

Reinsch NL Jr. (1997). Relationship between telecommuting workers and their managers: An exploratory study. The Journal of Business Communications, 34 (4), 343-369.

Richter J and Meshulam I (1993). Telework at home: The home and the organization perspective. Human Systems Management, 12, 193-203

Ministry of Transport Malaysia (2010). Transport Statistics Malaysia. www.mot.gov.my

Safirova E and Walls M (2004). What have we learned from a recent survey of teleworkers? Evaluating the 2002 SCAG Survey. Discussion Paper 04–43. NW: Resources for the Future, Washington, D.C

Straton MC (2001). Public and private approaches to telecommuting. FDCH Congressional Testimony.

Sullivan C and Lewis S (1998). Home-based telework and the family: space, territory and the work-family boundary. In the British Psychological Society Conference.

Sullivan MA, Mahmassani HS, and Yen, JR (1993). A choice model of employee participation in telecommuting under a cost-neutral scenario. Transportation Research Record, 1413,42-48.

Thériault M, Villeneuve P, Vandersmissen M, and Des Rosiers S (2005), Home working, telecommuting and journey to workplaces: are differences among genders and professions varying in space?. The 45th Congress of the European Regional Science Association, 23-27 August 2005 .Vrije Universiteit Amsterdam

Tung LL and Turban E (1996). Information technology as an enabler of telecommuting. International Journal of Information Management, Vol.16 No.2, pp. 103-18.

[USDT] U.S. Department of Transportation (1993). Transportation implications of telework. Washington DC.

Yap CS and Tng H (1990), Factors associated with attitudes towards telecommuting', Information & Management, Vol. 19, pp. 227–235

Yen JR (2000). Interpreting employee telecommuting adoption: an economics perspective. Transportation, 27, 149-164.

Yen JR and Mahmassani HS (1994). The Telecommuting Adoption Process: Conceptual Framework and Model Development. Report 60055-1, Center forTransportation Research, The University of Texas at Austin, Austin, Texas.