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Work Design for Flexible
Work Scheduling: Barriers
and Gender Implications

by

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ABSTRACT: This paper investigates the assumptions underlying three important dimensions of work design, place, distance and time, and their significant linkages to flexible work scheduling and travel behaviour. Work design, defined as the interrelationship of work tasks, workers and workplace routines, moderates the relationship between distributed work, flexible work scheduling and travel behaviour. Models of work design based on conventional views of place, distance and time are restrictive in supporting the potential of flexible work scheduling. Work practices that assume work is conducted only in the workplace (place), during standard work time (time) in the proximity of co-workers and managers (distance) do not, in the main, support flexible work scheduling. This paper considers the broader framework of organisational change and work design from the employer perspective in the context of distributed work and diffusion of communications technology, and its influence on flexible work scheduling.

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Introduction

This paper investigates the assumptions underlying three important dimensions of work design, place, distance and time, and their significant linkages to flexible work scheduling (FWS) principally telecommuting, the compressed work week and flexitime. FWS refers to the use of telecommunications and/or information technology to modify and /or replace the commute to the usual workplace by salaried workers. Work design, defined as the interrelationship of work tasks, workers and workplace routines, moderates the relationship between distributed work, FWS and travel behaviour. Models of work design based on conventional views of place, distance and time are largely inadequate for introducing FWS into the workplace.

Place, distance and time serve as major barriers to flexible work design, and hence organisational change, essential for the successful introduction of FWS. Introducing FWS into the work organisation has not only far reaching implications for working patterns among workers, skill levels, performance and productivity, but also for modifying travel behaviour to and from work. These issues need greater emphasis by government and employers, and are forming a potentially major barrier to FWS. An increasing number of studies (e.g. Mahmassani et al 1993; Mahmassani & Chen 1992, Bernardino and Ben-Akiva 1996) focus on the role of the employer in influencing workers' opportunities to participate in flexible work arrangements but simplify the internal work environment of an organisation which imposes most constraints on FWS. The purpose of this paper is to look at the broader framework of organisational change and work design from the employer perspective, in the context of distributed work and diffusion of communications technology, and its influence on FWS and environmentally responsive travel behaviour as depicted in Figure 1.

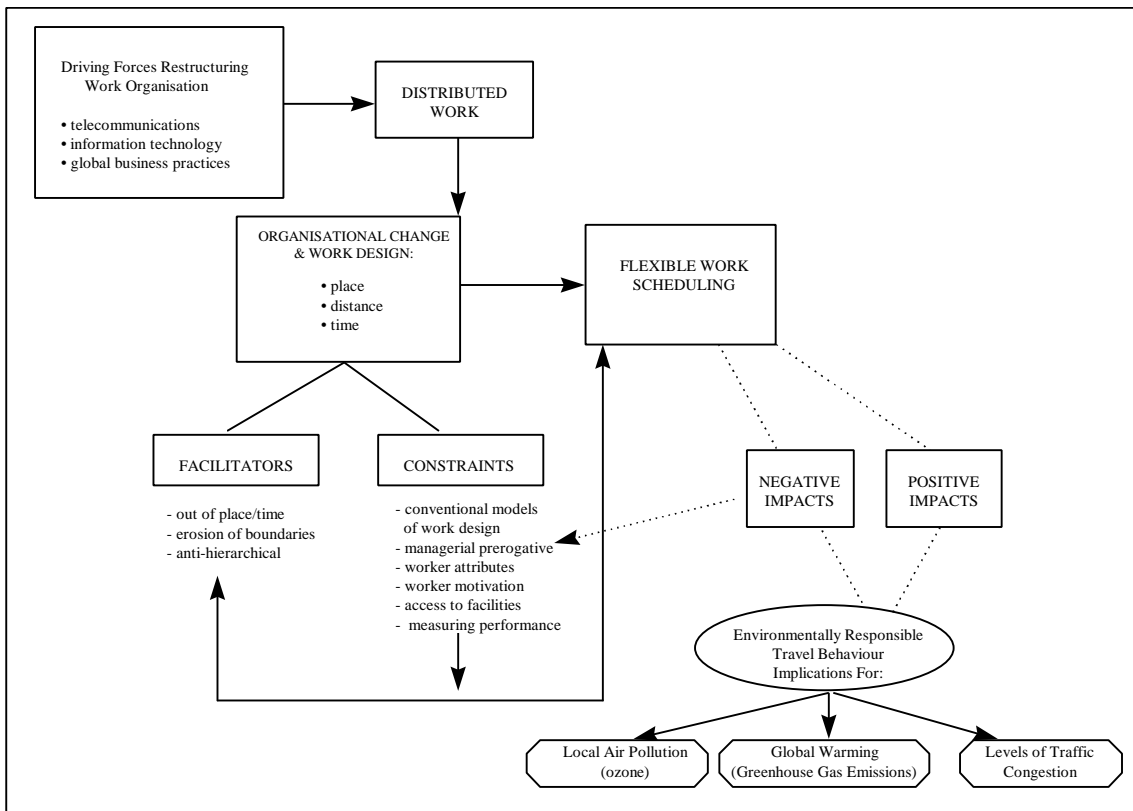


Figure 1: The Interrelationship between Distributed Work, Organisational Change, FWS and Travel Behaviour

Figure 1 depicts the key sections of the paper: driving forces of distributed work, analysis of place, distance and time; perceived barriers to FWS as they relate to place, distance and time; and the implications of work design for FWS as a form of organisational change.

Driving forces of distributed work

Distributed work is the closest so far to realising a ‘virtual’ work organisation amongst managers, workers and technology, enabling them to perform work which may be at variance spatially and temporally with each other. With distributed work, new work contexts become accessible, such as access to other organisations (e.g. network organisations and strategic alliances), workplaces (e.g. home, car, telecentre) or work sites (e.g. customer service outlet) (Venkatesh & Vitalari 1992).

There are three driving forces underlying this organisational change, firstly, an increasing perception that information is a significant economic resource, and secondly a need for greater flexibility in conducting business regardless of boundaries (Salomon and Schofer 1988, Warf 1989). Organisational flexibility is highly significant in the face of intense competition and increased labour costs which are placing pressure on management and unions to raise productivity, increase flexibility and quality of outputs (Porter 1990).

Distributed work is one way of addressing these initiatives providing management is prepared to engage in flexible work redesign and scheduling (Brewer 1993, 1994, 1995; Brewer & Hensher 1996; Harrison 1994).

Thirdly, new telecommunications and information technology have radically changed an organisation's capacity to distribute work processes. Developments in telecommunications indicate substantially improved opportunities for FWS programs. For example, problems, viewed as formidable in the past that plagued the successful implementation of telecommuting for example, such as access to information and maintaining the customer-interface, have been somewhat mastered today. With the increasing dispersal of business activities, FWS, and particularly telecommuting, are more relevant today than ever before (Gray, Hodson & Gordon 1993) although some concern remains in terms of cost of access, security of information and occupational health and safety issues for employees working remotely. More importantly as information technology makes work and customer activities more location-independent, distributed work will prove a greater incentive for employers in creating flexible forms of work scheduling, particularly telecommuting, which modifies the travel behaviour of workers (RTA Teleworking Pilot Project 1993/94). The choice to distribute work processes or not depends on an employer's *capacity* and *willingness* to operate and manage internal, inter-workplace and inter-organisational change. *Capacity* refers to organisational flexibility in terms of restructuring operations, redesigning work, changing technologies and assisting people in relocating business activities to take advantage of transport and telecommunications networks (McKay 1988). *Willingness* is a function of managerial ideology and psychology, reflected in the design and implementation of information technology and associated work practices and content. Consequently, organisational change moderates the relationship between distributed work, FWS and environmentally-responsive travel behaviour.

Analysis of place, distance and time dimensions

Instead of relying on past ways of designing work, there is a need to understand the fundamental dimensions of work design which centre on place, distance and time which pose constraints and opportunities in moving towards FWS. These dimensions of place, distance and time limit the way managers and workers imagine how work can be done as well as the way they design business practices, organisations, communication technologies and their link with travel behaviour. Despite the changing dynamics of business, for them work is still conducted in the workplace, during standard work time in the proximity of co-workers and managers who are linked to each other by way of a hierarchy.

Place, distance, and time are reflected in the way work is designed and organisation as shown in Table 1 below. Table 1 reflects the conventional view in the work design literature in that firstly *place* is viewed in terms of the perceived need for physical presence of workers, division of labour and the allocation of work to different parts of the workplace and the ownership of work space such as a work station or office. Secondly, *distance* is viewed in terms of proximity in workplace relationships, such as face-to-face interactions amongst coworkers, and the perceived need for control between supervisor and subordinate as well as work output. Finally, *time* is viewed in terms of

standardising work tasks as well as the amount of time spent at the workplace linked both to productivity and commitment. Understanding the dimensions of place, distance and time as barriers will provide not only valuable insights into work redesign but also assist directly in introducing FWS.

Table 1: The Significance of Place, Distance and Time to Worker and Work Organisation

	Worker	Work Organisation
Place	personal visibility/ or physical presence in workplace	division of labour, functional boundaries & resource allocation
Distance	proximity of interpersonal contact	hierarchical control & direct supervision
Time	amount of time invested at work is indicative of loyalty	work standardisation, amount of time devoted to reaching deadlines is associated with quantity of output and productivity

Place

Work tasks have been designed contingent on workers being physically located in particular places at specific times. One of the key barriers in rethinking work design is that workers are viewed as passive objects (i.e. a physical appendage to the work process) within the workplace as well as in communication and transport networks. Performing work entails a series of actions in particular situations undertaken by workers in the pursuit of goals (intended/unintended).

Within conventional models of work design, workers are seen as being in a given context that is a ‘position in time and place which is exactly definable’ (Lenntorp 1976, p.12) creating boundaries that become fixed and official. However, this aspect of work design overlooks an important dimension of being human, that is, people’s capacity to both shape and reshape their contexts, contracting or expanding the boundaries of work performance.

The issue of boundaries is important in realising telecommuting, where place may need to be viewed as ‘articulated moments in networks of social relations and understandings’ rather than as an office located in a particular place (Massey 1993 p.66). The rationale for introducing telecommunications and information technology enables people to ‘distribute’ themselves (McLuhan 1964) and not be tied to place. Communications technology potentially erodes territorial boundaries in the physical, although not in the political sense. The issue of boundary is important in terms of the distribution of personal capacity leading to workers questioning where they ‘draw the line’ in regard to their personal investment to the organisation in terms of time, workload and commitment. Moreover, the preoccupation with ‘place’ as a dimension of work design has led to the failure to exploit virtual reality and consider out-of-work place and out-of-work time. The idea of the detachment of the ‘person’ from the workplace and the integration of person within communication networks challenges conventional models of work design.

Preoccupation with 'place' has important skill implications. As place of work becomes less 'visible' through telecommuting, the skills of maintaining the work context may become more visible through co-ordination, co-operation and communication. Allowing for individual differences, these skills have been typically associated with women workers.

Distance

Just as distributing work has 'distance' connotations so do people's capacity to distribute 'themselves' impinge on this notion. In the case of telecommuting, workers are able to distribute themselves, by maintaining intimate real-time contact with co-workers and business associates through an infrastructure of communication and information technologies, making connections potentially intimate. Under this scenario, the nature of distance is changing both in terms of place (i.e. located anywhere) and time (i.e. increased response rate) (Moss 1987, p.536). As time and place have become 'undistanced' this has implications for work redesign. Under conventional models of work design, social interaction and cooperation, regarded as essential elements in most jobs, depend on 'proximity'. More significantly, modifying proximity leads to changes in the power and authority relationships particularly between supervisors and workers for a vast array of managerial practices e.g. managing enterprise change and resistance. Power is thus increasingly based on accessibility not proximity. For example, telecommuting is potentially anti-hierarchical in that it reconfigures work through the communication-information infrastructure to be more 'horizontal' in nature and less vertical. Under these conditions, the managerial hierarchy conflates as does the distinction between a two-tiered, internal labour market structure whereby assumptions are made about the competencies of occupational groups based on their internal labour market value and subsequently marginalised within the organisation.

Power based on accessibility may have gender-specific connotations. Women and men may express a different preference for controlling events. For example, a preference for control could be linked to a greater appreciation to telecommute so as to exercise greater influence over hours of the day between work and home. This type of influence also has implications for 'time'.

Time

Time is a critical issue in designing work. Time is usually conceived as physical in terms of observance of punctuality, deadlines and is associated with quantity of work output. The investment of physical time is then transformed into an emotional investment in the enterprise and equated with a worker's commitment or loyalty to the organisation. A significant oversight in work design is the psychological and cultural quality of time and its relationship to notions of career, work evaluation and comparability which also have specific implications for the way women and men approach work.

The quality of time may mitigate against FWS. For example in Australia, the shift in travel mode from public to private transport and to the car and drive alone has continued for the commute trip, as has the substitution in destinations from central city to suburban centers. Interestingly, the major move to drive alone has been by female workers (Gipps et al. 1996). One explanation for this is the extent to which women, in particular, may

have to engage in multi-tripping characterized by setting down and collecting family members, shopping, and attending to household business during their commute trip. In other words, working remotely may not overcome the need to engage in tasks associated with multi-tripping.

Empirical Focus

Perceived barriers to telecommuting and relationship to place, distance and time

Place distance and time act as constraints in terms of job suitability, perceptions of productivity (and measurement), company policy and the structuring of two tiered, internal labour market. The potential for organisational change to support telecommuting lies within examining and modifying managerial assumptions about place, time and distance. To support this view a literature review was conducted to identify definitions and perceived barriers to adopting telecommuting.

Definitions

The distinguishing feature between telecommuting and a compressed work week (CWW) is that with telecommuting, telecommunications is used as a surrogate for transportation for either all of the commute trip or part thereof (Memmott 1963; Nilles 1975; Mokhtarian 1990; Bush 1990), and subsequently it is perceived as a tool for reducing work trips and vehicle kilometres travelled (Bernardino & Ben-Akiva 1996). In the case of the CWW an employee works a four day week or a nine day fortnight reducing the commute trip by either one day per week or fortnight. In both cases, additional car trips may be made for other purposes on the day spent away from the workplace. A second distinction between telecommuting and the CWW is that with the CWW there is a day off-duty when there is no official expectation that work will be performed at home.

Telecommuting and the CWW can be either official when an organisation has a policy as part of their human resource management (HRM) policy which applies to all or part of the workforce; or unofficial, when there is an arrangement between individual workers and their supervisors. The further distinction between telecommuting and the CWW is that telecommuting provides the work organisation with greater opportunities for functional and numerical flexibility than in the case of the CWW. For example, telecommuting potentially operates seven days a week and 24 hours a day with any number of workers.

Perceived barriers

A survey of the telecommuting literature revealed over 20 articles focusing on the factors contributing to the decision to offer and accept telecommuting by both employers and employees (see for example, Bernardino & Ben-Akiva 1996, Mahmassani, Yen & Sullivan 1993; Mannering & Mokhtarian 1995; Mokhtarian & Salomon 1995; Mensah 1995). Almost without exception, the barriers to telecommuting are underpinned by

assumptions of place, time and distance. Specific interpretation of place, time and distance are summarised in Table 2 as substantive constraints on telecommuting. The literature survey revealed that generally employers are more reluctant to adopt telecommuting than workers.

Table 2: Perceived Barriers to Telecommuting categorised as Place, Distance and Time

<p>Place</p> <ul style="list-style-type: none">• job suitability: separation of work tasks from workplace• concern over data and information security• frequent input and ready access to information presently available in the office.• access to telecommunications from home email, voicemail, fax, internet etc. and subsequent cost• physical visibility of workers in the workplace and its relationship to performance recognition <p>Distance</p> <ul style="list-style-type: none">• contact with co-workers, customers, managers• ability to supervise employees• division of work between home and workplace <p>Time</p> <ul style="list-style-type: none">• amount of time devoted to work tasks and its relationship to work output and productivity• productivity growth is more significant than potential cost savings

The barriers to organisational change that support the successful introduction of FWS lie in a conventional view of the workplace based on assumptions of place, distance and time.

It is important to understand how employer and employee factors impede or facilitate the choice for telecommuting and CWW. If the role that telecommuting and the CWW can play in work organisations is to be better understood, potential barriers need to be investigated in terms of their link to potential increases in productivity and reduction of workforce problems. Are women or men more likely to engage in telecommuting and CWW; and why? How often will people telecommute or work a CWW?

To address these questions data was analysed from the Greenhouse Gas Emissions (GGE) study of urban travel behaviour conducted in six capital cities in mainland Australia (excluding Darwin) in 1994 by the Institute of Transport Studies (Hensher, Battelino, Milthorpe & Raimond 1994). The sample was a stratified random of over 1400 households (see Table 3).

Table 3: Sample Profile

Australian City	Men	Women	Total Frequency	Total %
Canberra	65	65	130	10.4
Sydney	148	111	259	20.7
Melbourne	144	103	247	19.8
Brisbane	151	96	247	19.8
Adelaide	95	81	176	14.1
Perth	115	75	190	15.2
Total	718	531	1249	100.0

The current analysis is based on data from 1249 respondents (response rate of 89 per cent) and questionnaires were delivered and collected from each household. Instructions requested that the respondent to be over 18 years of age and directly involved in the household's decision making about where to live and the purchasing of motor vehicles. The demographic profile of the sample is provided in Table 4.

Table 4: Demographic Characteristics: Men and Women

Characteristic	Men	Women
Age (years)		
Mean	39.4	37.6
S.D.	11.6	10.5
Personal Income		
Mean	\$30 - 40,000	\$12 - 30,000
Employment Status		
Full-time	49%	26%
Part-time	2%	12%
Occupational Category		
Managerial	67%	33%
Professional	53%	47%
Para- professional	42%	58%
Trade	91%	9%
Clerical	24%	76%
Sales	46%	54%
Plant operators	89%	11%
Labourers	69%	31%

Personal income for the group ranged from \$A3,000 to over \$A70,000 with equal distribution for women and men up to the \$A40,000 bracket. From \$40,000 and over, men outnumber women by more than 3:1. Eighty eight per cent of the sample were in paid employment outside the home.

The current analysis is based on information gained from the Commuter Questionnaire comprising five sections. Section 1 contained general opinion questions relating to

environmental issues, possible policy actions and life style changes. Section 2 contained questions about the respondent's work situation. Section 3 included details of the respondent's trip to work. Section 4 focused on *telecommuting*, *CWW* and *flexitime* which provides workers with a degree of flexibility in work start and finish times. Section 5 asks about parking availability and personal income. Although response rate was high overall, non-response was high on some sections as shown below.

Findings

Table 5 shows respondents who currently engage in FWS with and without the support of company policy. Men are more likely to work in a company that supports some form of FWS compared to women.

Table 5: FWS by Company Policy by Gender

Actually Work/ Company Policy	YES Men	YES Women	NO Men	NO Women
Work CWW	80.0	24.0	40.0	37.0
%	43.0	12.9	21.5	19.9
Work flexitime	24.0	7.0	110.0	79.0
%	7.2	2.1	33.1	23.9
Telecommute	10.0	1.0	34.0	25.0
%	11.4	1.1	38.6	28.4

Table 5 is interpreted row by row, since some respondents have checked more than one FWS strategy when asked about company policy. Twelve per cent of the sample currently engage in some form of FWS (including flexitime). Except in the case of the CWW, the majority of respondents do not take advantage of their company's policy for FWS.

In the case of the CWW, 11.6 per cent of men are engaged in either managerial, professional and associated professional work compared to 6 per cent of women. The majority of respondents working the CWW are non-managerial particularly men working in trades and labouring. For telecommuting, six per cent of men and women were engaged in either managerial, professional and associated professional work. Telecommuting is negligible in the non-managerial areas. Comparing both telecommuting and the CWW to flexitime, 32 per cent of men are engaged in either managerial, professional and associated professional work compared to 29 per cent of women. Understandably, flexitime is high for non-managerial workers, particularly for women engaged in clerical work.

17.6% of respondents' organisations support flexitime compared to 14.5 per cent (CWWs) and 5.6 per cent (telecommuting). This trend emphasises the conservatism

among employers about maintaining standard hours with either an extended period for early and late starts and finishes; or working a condensed week or fortnight rather than considering alternative work scheduling e.g. telecommuting. A further 7.4 per cent of the sample are seriously considering telecommuting but the majority (87 per cent) are not, as shown in Table 6.

Table 6: Experience with Telecommuting from Home

	Male	%	Female	%	Total Frequency	Total %
Have telecommuted	37	3.0	32	2.6	69	5.5
Seriously considering	60	4.8	33	2.6	93	7.4
Not considering	621	49.7	466	37.3	1087	87
Total	718	57.5	531	42.5	1249	100

Travel behaviour

The majority of respondents working the CWW use the car (68 per cent of men and 83 per cent of women) as the main transport mode to commute to work. This ratio is consistent with the overall sample where the use of private car is high (75 per cent) even though less than half (45 per cent) engage in multi-tripping by varying purpose and destination of trip (e.g. dropping and collecting children from school during the work commute). This work travel pattern suggests that mode of transport is not used as a constraint on the CWW. A similar work travel pattern exists for respondents who telecommute.

Work design barriers to telecommuting and CWW

To ascertain perceived barriers to telecommuting and CWW, place, distance and time were translated into a set of work design dimensions for both telecommuting and the CWW as shown in Tables 7 and 8. The six work dimensions in Table 7 - *contact, control, productivity, facilities access, job suitability and company policy*- are the main items of attention for telecommuting.

Table 7: Description of Work Design Dimensions, Description and Question Items for CWW

Work Design Dimensions	Description	Question Items
People contact (CONTACT)	contact with people (internal and external) necessary to perform work	I prefer the social and professional interaction of the office
Supervisory Control (CONTROL)	supervisor's power over work process(es)	Supervisor makes it difficult
Motivation - Productivity (PROD)	feeling motivated to work away from the office	I cannot get motivated away from the office.
Facilities access (FAC)	access to facilities necessary to perform work at home	I do not have the facilities to perform work at home
Job suitability (SUIT)	perceived prospects of promotion threatened by telecommuting	The work I do is not suited to telecommuting
Company policy (POLICY)	the company does not have a policy to support telecommuting	There is no company policy

The four work dimensions in Table 8 - *extra hours, policy, workload, and job responsibilities*- are the main items of attention for CWW.

Table 8: Description of Work Design Dimensions, Description and Question Items for CWW

Work Design Dimensions	Description	Question Items
Extra hours (EXTRA)	working extra hours to compensate for 1 day off a week or fortnight	I don't want to work extra hours
Company policy (POLICY)	the company policy is not relevant to employee	The company policy does not apply to me
Workload (WLOAD)	workload cannot be compressed into shorter time frame ie 5 days into 4 days	Workload requires full week coverage
Job responsibilities (RESP)	job responsibilities cannot be compressed into shorter time frame ie 5 days into 4 days	Job responsibilities require a full week's coverage.

Reasons for not engaging in FWS

Out of the 261 reasons provided by respondents for not engaging in telecommuting, Table 9 shows that job suitability is the most likely perceived constraint on telecommuting (48.3 per cent) followed by facilities access (10 per cent). Of those respondents reporting that job is unsuitable 79 per cent are full-time workers and 43 per cent are managers or professionals.

Table 9: Reasons For not Engaging Telecommuting

Work Design Dimensions	Male	%	Female	%	Total	%
People contact (CONTACT)	5	1.9	9	3.4	14	5.3
Supervisory Control (CONTROL)	3	1.1	0	0	3	1.1
Motivation - Productivity (PROD)	2	0.8	1	0.4	3	1.1
Facilities access (FAC)	26	10.0	17	6.5	43	16.5
Job suitability (SUIT)	126	48.3	65	24.9	191	73.2
Company policy (POLICY)	4	1.5	3	1.1	7	2.7
Total	166	63.6	95	36.4	261	100.0

From the 163 reasons provided by respondents for not engaging in the CWW, Table 10 shows that company policy is the most likely constraint perceived by both men and women for not engaging in the CWW followed by inability to condense workload into a 4 day or 9 day fortnight. While company policy is the reason cited for not engaging in the CWW, many respondents did not take advantage of FWS when company policy allowed for this (see Table 5).

Table 10: Reasons For Not Engaging CWW

Work Design Dimensions	Men	%	Women	%	Total	%
Extra hours (EXTRA)	13	8.0	12	7.4	25	15.3
Company policy (POLICY)	73	44.8	36	22.1	109	66.9
Workload (WLOAD)	18	11.0	5	3.1	23	14.1
Job responsibilities (RESP)	2	1.9	4	2.5	6	3.7
Total	106	65.0	57	35.0	163	100.00

Discussion

This study investigated whether there are differences between the way women and men perceive constraints when considering FWS options. This premise was based on the assumption that family roles compete more strongly with work roles and time among women than men. In this study, the views of women and men were more similar than different. Place, distance and time, when translated into work practice choices, are perceived by both men and women as constraints on FWS in terms of job suitability and access to facilities to work from home in the case of telecommuting, and in the case of CWW, company policy.

Job suitability as a place constraint

The dominant feature of telecommuting is people working from home providing their *job* allows for this (Salomon 1994). The findings in the literature review show that the concept of job suitability is a main obstacle in thinking about telecommuting. There is a persistent view that telecommuting is feasible for specific occupational groups of workers only. An often quoted example is ‘information workers’ (U.S. Department of Transportation 1993). Mokhtarian and Salomon (1996) in modeling the choice of telecommuting amongst a sample of predominantly information workers in San Diego, reported that job unsuitability allowed for 44 per cent of the constraint on telecommuting.

The reason for this persistent view is that despite a distributed work context, work activities are still designed (or rather have not been redesigned when work is distributed) to be conducted in the workplace due to issues of supervisory control, task output and productivity, information access and security, and interrelationships amongst co-workers and customers. As previously discussed, the majority of businesses today are based on information and consequently most workers are information workers. Access to the ‘information preserve’ is immediate and boundaryless, fundamentally reshaping the design of work and changing organisations. As with information work the conditions of telecommuting are more uncertain than in the past so workers need to be able to respond to and counteract the unexpected. Telecommuting leads to the substitution of managerial prerogative by an ‘information preserve’. Appropriate telecommunications and information technology should allow most people to perform their work responsibilities from home.

Job suitability is related to ‘distance’ in terms of proximity in workplace relationships, and the perceived need for control between supervisor and worker. A job implies certain structural outcomes which conflict with the flexibility of telecommuting. For example, a job is defined in terms of a given span of control, fixed tasks, skills and procedures, performed within standard working hours and conditions, most of which are perceived as inflexible. Conversely in contrast to the past, work is rarely performed as a ‘packaged job’ today, and instead is organised along lines of work-flow, process, scale, and social factors. Work reflects a mix of dimensions including market-focus, comprising an output, customer and place mix; a cross-functional and/or cross-skilling mix. This implies changing spans of control, functions, career structures, work practices and autonomy.

However, the language of 'job' and its underlying assumptions remain conventional and mirror little of this flexibility in practice.

Using job suitability as a reason for promoting FWS or not, therefore, is not only an artificial constraint but also a real barrier to organisational change and hence, FWS. The conventional notion of 'job' is the single most significant barrier to FWS. Understanding job in terms of how work is performed will prove a significant way forward for removing this constraint.

Two tiered workforce as a distance constraint

There is also a strong notion in the literature that only certain tiers of the workforce such as managers and professionals are eligible for FWS (Christensen 1988). In Australia, for example, approximately 52 per cent of managers and administrators and 31 per cent of professionals use some form of flexible start and finish times compared to 28 per cent of clerical staff and 14 per cent of sales personnel (ABS 6342.0 1993). If the assumption that managers and professionals are 'best' suited to FWS, this may limit women's access given their representation in these groups, particularly managerial.

Handy and Mokhtarian (1996) discuss the emergence of a two-tiered workforce structure comprising professional workers and support staff, and relevance for FWS. They contend that a two-tiered workforce has implications for FWS in that each group may experience alternative work scheduling, differently. The two tiers relate to the degree of control or autonomy associated with each group of workers, with professional workers having more control than support workers. This division correlates with the structure of the internal labor market in which assumptions are made about the competencies of occupational groups based on their internal labour market value. To claim that different occupational groups have different capabilities or capacity for controlling their work is also an artificial constraint. Within a distributed work context, providing appropriate organisational restructuring has occurred, there is no plausible reason as to why one group of workers 'lower' in the managerial hierarchy should be tied to the workplace compared to any other. This argument is particularly true when the rationale of distributed work is often accompanied by a decentralised organisation structure based on *trust* between management and workers (Pratt 1997).

The assumption of a two-tiered workforce, upon which managers make decisions about monitoring employees and productivity, is more to do with the power of groups defending their occupational boundaries than the way work is actually performed. It is a form of segmentation which separates 'lower paid' workers (women) from 'higher paid' workers (men). This assumption about occupational groups provides insight into this particular constraint on FWS. In other words, a decision being made about eligibility for participating in an FWS program on the basis of an occupational label or hierarchical position seems to be a fundamental barrier to address in this debate.

Company policy as a distance constraint

The decision to engage in FWS is a complex one, even the existence of a company policy may mask the real constraints which occur within the employment relationship itself. The unwillingness of many employers to allow workers to take up the option (Handy & Mokhtarian 1996; Sullivan et al.1993) manifests itself in different ways. For example, while a company policy may provide for FWS, the option to take it up by workers may be constrained by the unbalanced power or interpersonal relationship between supervisor and worker, or because a supervisor does not perceive the benefits of FWS. Some workers may assume that their visibility is linked to career opportunities e.g. promotion. In other cases, FWS works well without any policy or official decision making to support it because people perceive that it is expeditious to do so for a variety of reasons.

There is no doubt that telecommuting as a form of organisational change requires reinforcement by change in strategic policy. There is a clear advantage when there is a coherent combination of corporate policies, human resource management strategies and work practices (Guest 1987, Schuler and MacMillan 1984). For example, when business disperse production and distribution processes over distance, and organisational and work practices subsequently change, strategies need to be in place to allow workers to take advantage of the increased flexibility through FWS. The competitive benefit of FWS will eventuate not from a 'quick fix' solution but a more appropriate conception and implementation of organisational change. Ultimately this will lead to a more flexible and responsive organisation and strengthen the community's perception of corporate responsibility by introducing a process that aids environmentally responsible travel behaviour.

Productivity as a time constraint

Productivity growth is central to the employers decision whether or not to introduce FWS (Bernardino and Ben-Akiva 1996). In part the problem lies in management focusing on certain dimensions of work, e.g. costs, profits, technological change in isolation to the exclusion of other, possibly more important ones such as finding new ways of measuring productivity, effectiveness or quality. However, there is still much ambiguity surrounding productivity measurement. Associated with this is the ability of management to restructure workplaces horizontally, promoting teamwork and accountability necessary for distributed work processes to be effective. Access to training and appropriate telecommunications are essential (Schweizer 1993).

Towards flexible work scheduling

The current generation of workers are facing a new variant of work organisation, raising new questions about assumptions of place, distance and time in relation to work. The essence of the problem now is that past assumptions of work organisation focused on the *form* of work such as task standardisation, observance of punctuality, and supervisory control and ignored the *substance* of work such as the psychological quality of place, distance and time. FWS places a greater emphasis on the *substance* of work whereby

place and distance are not as easily defined as they are in the conventional model of work design, and time becomes virtual reality. Under these conditions, FWS fundamentally changes the organisation of work and the employment relationship.

Changing work organisation is crucial to moving towards FWS. The historical and narrow emphasis on place, distance and time in organising work has discouraged thinking about work which is conducted beyond workplace and out-of standard worktime. The existing definition of place, distance and time

- are situated deep within organisational and work practices, making them less readily observable
- reside within existing power bases (e.g. management and unions) in the workplace, and
- are linked to the worker's desire to protect their interests and job security.

It is time to redefine these critical work design dimensions in order to bring about organisational change to support FWS. Real change would mean a fundamental rethinking of the principles that organise work.

Recent technological developments parallel those that have been occurring for over twenty years (Nilles 1975) suggesting that technology alone was not the only constraint on FWS. For example, problems that hamper telecommuting concern issues about the measurement and monitoring of costs and productivity together with management's fear of loss of control over employees are as evident now as they were 20 years ago.

However, there is little doubt that recent technological developments allow individuals and work groups to perform in several different settings. Telecommunication and information technologies e.g. the internet and electronic mail, makes this more feasible by providing workers with new ways of performing work responsibilities in terms of communication, information-gathering, and decision making. The idea of considering both the detachment of 'workers' from the workplace and their simultaneous integration within communication networks challenges conventional work design principles of place, distance and time.

Gendered-thinking may be constructed and maintained by the conventional assumptions of place, distance and time in work organisations.

Conclusion

There are still many unanswered questions about FWS options and related barriers to access and implementation. It is argued that these barriers contribute to the under-utilisation of FWS options. Job suitability defined by the internal and external labour market is an important influence in terms of which workers will have access to telecommuting and which ones will be marginalised by taking up the option. It is important to develop a better understanding of the assumptions underlying work

organisation and labor market barriers and how these ultimately impact on travel behaviour to and from work.

Much of the existing literature has been speculative in regard to the widespread adoption of FWS. This reflects the difficulties of evaluating a process which is both relatively new and complex in its implementation. The information required for such analysis is essentially detailed workplace information (Brewer & Hensher 1997). The reason for this is that an understanding of the potential correlates and the development of adoption models needs to take into account work design factors, place, distance and time, that have been redefined to support the introduction of FWS.

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