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Factor Analysis of Individual Outcomes for Teleworkers

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Abstract

Developments in information and communication technology (ICT) have enabled new organisational structures and business process designs that offer previously unavailable flexibility in when and where work is performed. ICT has facilitated the transportation of knowledge-based work between workers, colleagues, and firms. Despite the increasing popularity of telework, little is known about the individual outcomes from working in this way. In our study, we found that issues do arise for teleworkers in the accounting professions. Our survey revealed seven major individual outcomes: (1) Effectiveness, (2) Self-assurance, (3) Collegiality, (4) Work pressures, (5) Professionalism, (6) Physicality and (7) Task complexity. Further analysis revealed that telework during normal office hours affected perceptions of effectiveness and collegiality. While telework undertaken outside of normal working hours affected perceptions of professionalism and self-assurance. This research builds on earlier conceptual work provided by the Systems-Based Framework for Telework and the Telework Behaviour Model. The results further our understanding about the impact of telework on work practices and personal outcomes.

Keywords

Telework, work redesign, individual outcomes

INTRODUCTION

Over the past three or more decades there has been a growing body of literature concerned with the issues surrounding telework adoption and use.¹ Over the same period, the incidence of telework has increased significantly. As telework gains wider acceptance, practitioners and researchers need to better understand the factors that affect its success or failure. However much of the existing research has only examined the advantages and disadvantages of telework and has not adopted the necessary broader research perspectives required to examine the deeper issues and the roles played by the various affected stakeholder groups. Nevertheless, we do know that telework introduces distinct discontinuities from traditional face-to-face work environments and that these discontinuities have been shown to bring about significant changes in communication patterns (Campbell 2006; Rafaeli and Ravid 2003). The motivation for this paper is to develop an understanding of the structural impacts associated with telework and of their association with telework practice in real world organisational settings.

Telework facilitates changes in the temporal-spatial structure of an organisation by allowing work activities to be performed at locations other than the traditional office, and at times outside of what might be considered normal working hours (Kompast and Wagner, 1998). Telework is a workplace arrangement that involves the use of ICT to support work activities away from the traditional office work environment during or outside of normal office working hours. The incidence of telework in the accounting and financial services sectors is significant and continues to increase (Frank and Lowe 2003; Hunton 2005; Phelan 2002, SENSIS 2007). Telework is particularly important to accounting professionals as they are often responsible for undertaking telework tasks, monitoring the performance of others involved in telework, or in the allocation of resources for telework activities. This paper builds on earlier conceptual work in the Systems-Based Framework for Telework (Campbell and McDonald 2007) and the Telework Behaviour Model (Hunton and Harmon 2004) by identifying the structure of individual outcomes from telework. The following section briefly discusses existing research frameworks for telework.

¹ Jack Niles is credited with having first coined the terms “telecommuting” and “telework” in the early 1970s.

TELEWORK ADOPTION

Economic factors such as increased productivity and cost reductions are frequently cited as the main organisational driver for telework adoption (see Hill et al. 1998; Watad and DiSanzo 2000; Wustemann 1999). While economic considerations are generally the most important driver for the adoption of workplace technologies, it is also important to consider the legal, ethical, and human issues (Davenport and Pearlson, 1998). In particular, the establishment of sound working relationships between teleworkers, non-teleworking employees and managers is critical (Guimaraes and Dallow 1999; Reinsch 1997).

Alternative conceptual models for telework adoption and utilisation have been proposed in the literature. Some of these models focus on the relationship between different telework task configurations and employee attitudes and behaviours (Feldman and Gainey 1997; Hunton and Harmon 2004; Shamir and Salomon 1985). While others have proposed a supply/demand approach (Gray 1997), or emphasised the relationship between different telework practices and organisational outcomes (Belanger and Collins 1998).

Siha and Monroe (2006) proposed a research model following an extensive review of the telework/telecommuting literature (see Figure 1). In the Siha and Monroe model, competition and government regulation provide the impetus for organisations to consider telework strategies. Consequently, their model follows a top-down perspective beginning with a strategic organisational dimension that is influenced by the regulatory and competitive environment within which an organisation operates. This strategic view is further moderated by the level of support from employees and management for telework and is reliant on the deployment of appropriate technologies to adequately support telework activities.

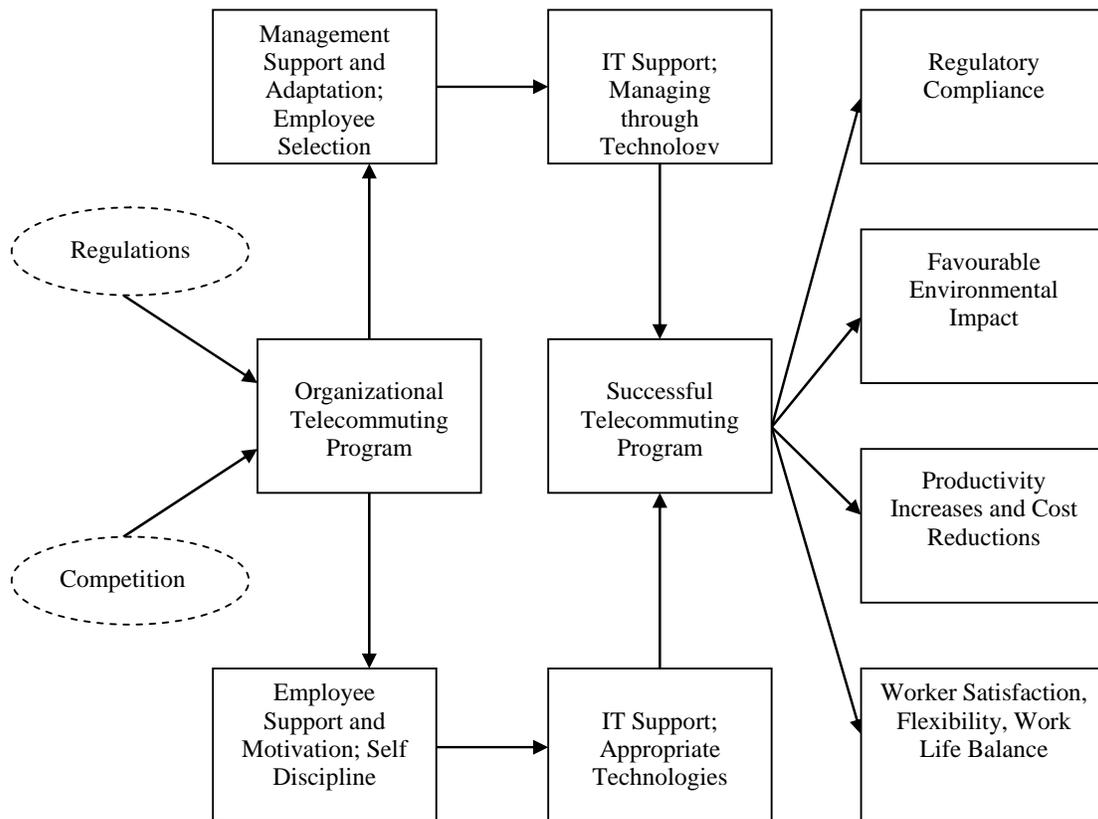


Figure 1: Telework/telecommuting success model adapted from Siha and Monroe (2006:p. 472)

According to Siha and Monroe, the success of a telework program is determined by how well an organisation performs in terms of regulatory compliance; positive environmental impact; productivity increases and cost

reductions; and worker satisfaction. However there are several substantive problems with this model. First, telework adoption in some organisations may not follow a rational decision-making process. For example, telework may evolve over an extended period of time from the work practices of only a few individuals. Second, the criteria for successful telework are reliant on stakeholder perspectives that are not well-defined and may change over time. Third, there is a lack of focus on the human challenges associated with telework particularly in how work practices are altered and how these might infringe on family and personal life.

In contrast, the Telework Behavioural Model (TBM) developed by Hunton and Harmon (2004) focuses on psychological effects, individual outcomes and organisational consequences (see Figure 2). In the TBM, the link between human motivation and telework choices (whether to telework, where to telework, and how often to telework) is mediated by the range of telework options allowed in organisational policy (Hunton and Harmon 2004: p. 422). Hunton and Harmon argue that telework choices have psychological effects (cognitions and affects) that will in turn lead to individual outcomes or consequences such as more or less work family conflict, reduced commute time, scheduling flexibility and other individual outcomes. Telework choices can also impact organizations in ways that will require a modification of behaviour. For example, an organization's telework policy may result in work practices that reduce real estate costs and staff turnover, or alternatively reduce service and collegiality. Consequently, organizations will need to monitor and modify their telework policies with the aim of accruing the most value while minimising negative outcomes. Like the Siha and Monroe model, little is offered by the TBM for those organisations where telework practices are slowly evolving through processes other than through formal organisational policy, or those situations where individuals are able to negotiate or appropriate a unique telework regime.

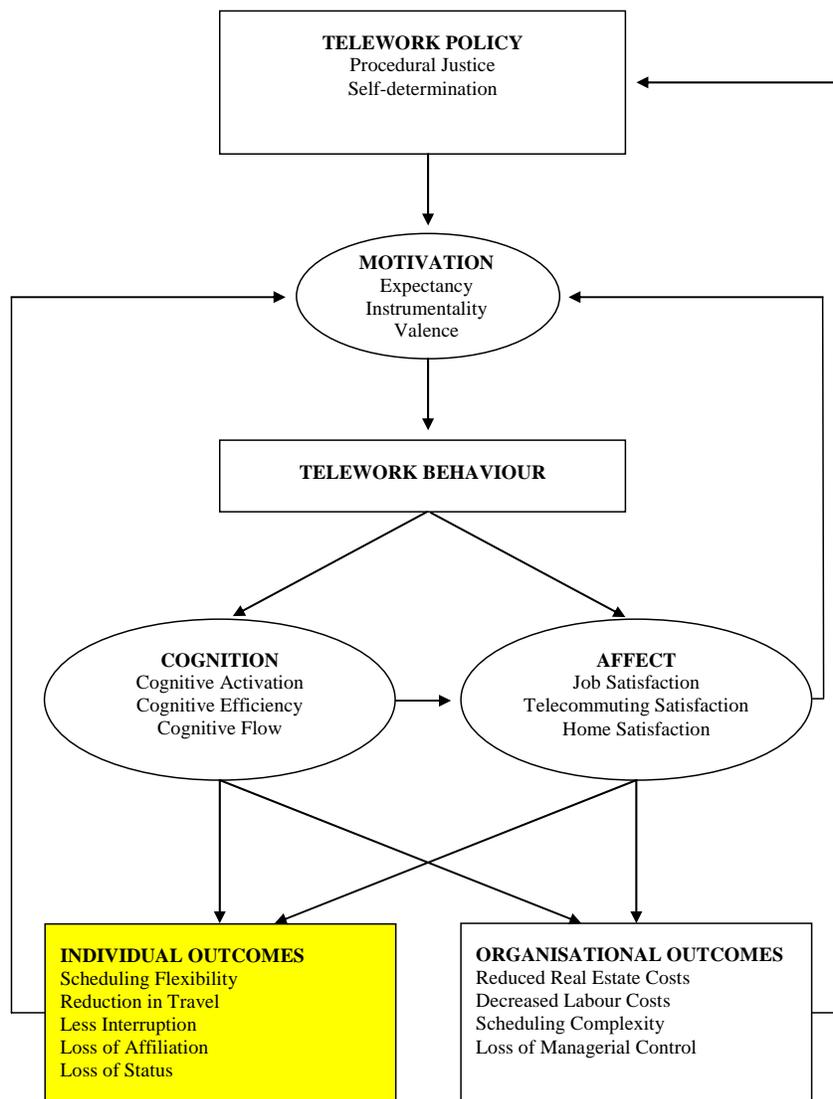


Figure 2: Telework Behaviour Model - Source: Hunton and Harmon (2004: 422)

More recently, Campbell and McDonald (2007, 2008) have proposed a Systems-Based Telework Framework (SBTF) that presents a more organic view of the development of telework practices (see Figure 3). The model reflects three fundamental structural elements of telework practice within organisations: the motivation for adopting telework (Telework Drivers), telework activities and processes (Telework Processes) and the outcomes and consequences of telework activities (Telework Outcomes). These structural elements are all highly interrelated. The SBTF is a meta-model with the potential to accommodate a range of philosophical perspectives in telework research from investigations on technology appropriation (Orlikowski, 2000) through to critical studies on the micro-political processes associated with the performance and management of work (Deetz, 2005).

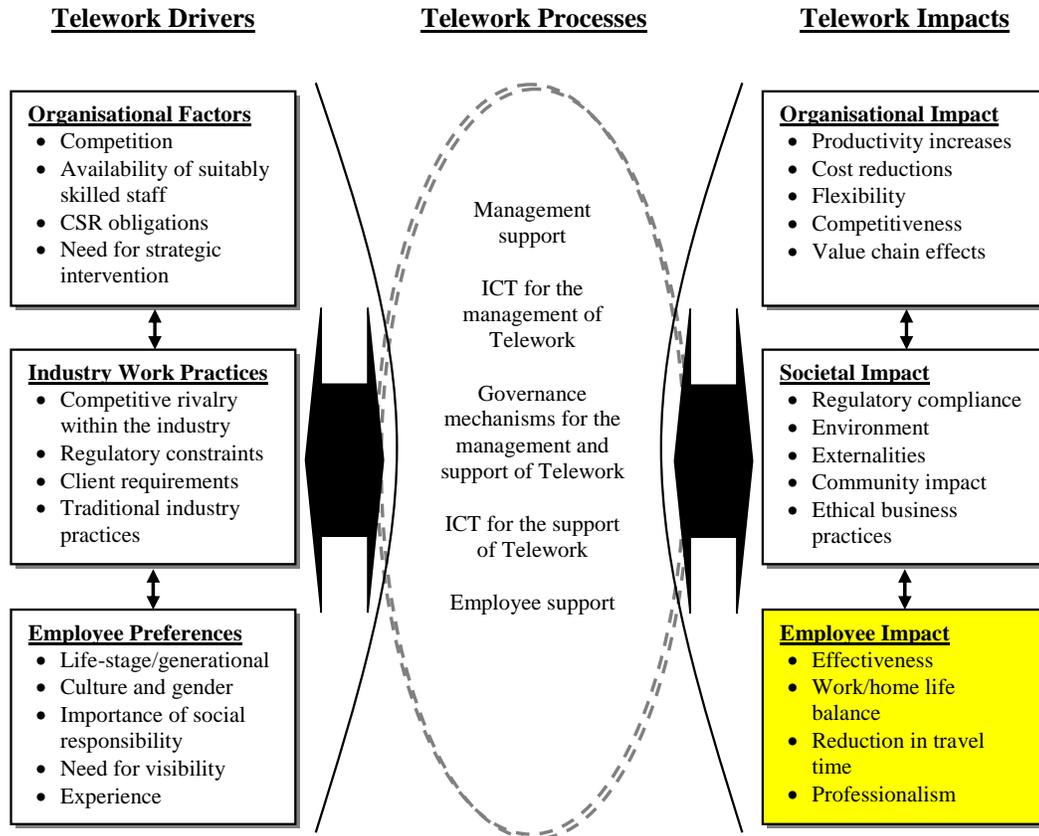


Figure 3: Systems-Based Telework Framework

Our aim in this study is to inform both the SBTF and TBM by assessing (1) the structure of individual outcomes for teleworkers and (2) assess the relationship between this structure and telework behaviour (our focus is highlighted in Figures 2 and 3). The nature of these individual outcomes as described in both models is at this stage somewhat uncertain and unspecified. Therefore this research is of an exploratory nature and aimed at specifying the individual consequences of teleworking.

RESEARCH DESIGN

As reported above, the incidence of telework in the accounting and financial services sectors is significant and continues to increase (Frank and Lowe 2003; Hunton 2005; Phelan 2002) The most recent SENSIS Business Index Report on SMEs shows that the greatest uptake of telework in Australia has and continues to occur in the Business Services (34% teleworkers with 11% growth expected over next 12 months) and the Finance and Insurance (23% teleworkers with 3% growth expected over next 12 months) industry sectors (SENSIS 2007). Our study involved a survey of CPA Australia members on their telework practices. An extensive review of the literature was undertaken to review items that reflect consequences or outcomes for those members who telework based on comprehensive review papers in the extant literature including the work of Bailey and

Kurland (2002), Baruch (2001), and Siha and Monroe (2006). Table 1 contains the list of individual outcomes of telework that were identified in this review. The reliability of the subsequent survey questions was established by trialling the instrument on three practitioners and two academic staff involved with telework and who were familiar with the process of survey design.

Table 1. Individual outcomes of telework identified from the extant literature

- Travel between home and the office
- Work related travel
- Costs relating to telework activities
- The level of managerial control by others over work
- Flexibility in scheduling work
- The complexity of work tasks
- The regard that others have for work produced
- Level of professionalism
- Ability to collaborate with others
- Capability to get things done in your job
- The overall quality of work
- The time it takes to get things done
- The number of interruptions experienced when working
- Relationship with work colleagues
- Collegiality in the workplace
- Feelings of personal achievement
- The number of different work tasks able to be undertake
- The ability to be contacted by work colleagues and/or clients
- Work related stress
- Workload
- Status within the organisation
- Time for family and friends
- Capacity to work
- Commitment to the organisation

A survey was conducted by telephone during December 2007. Of the 1718 individuals contacted 600 valid responses were obtained representing an overall response rate of 34.9 per cent. From this group a total of 250 responses were from active teleworkers. The teleworking respondents were required to provide their assessment of the personal impact of telework on each of the items contained in Table 1. An exploratory factor analysis was then used to reduce the 24 survey items down to a smaller number of meaningful constructs that provide a basis for understanding how the relationships between these items are structured.

RESULTS

Most respondents were aged between 21 and 30 years of age (34.8%) and were male (approximately 64%). Most respondents had a partner (73.2%) but only thirty-two per cent had dependent children living at home. Teleworking respondents had been with their current organization for 6.5 years on average and spent almost 11 hours per week working away from their main place of employment (6.5 hours during office hours and 4.3 hours outside of normal office hours). Forty-four per cent of respondents worked for organizations that had a formal policy on telework. However, almost 13 per cent reported that they did not know whether their organization had a formal policy or not.

Figure 4 shows the responses for the 24 survey items relating to the consequences of telework for the 250 teleworkers. User responses to each item are separated into five response categories: a lot more; a bit more; no difference; a bit less; a lot less. At one extreme the responses for nine items (4, 5, 6, 10, 11, 13, 14, 18 and 24) show that respondents perceived that there were significant changes associated with their telework activities. While the perceived consequences of telework for the remaining fifteen items are less pronounced, clear patterns still emerge. For example, there are strongly positive outcomes in terms of getting things done (13), capacity to work (24), flexibility in scheduling work (18), collaboration (14), ability to be contacted (5), and number of different work tasks undertaken (6). Surprisingly there is a perception that telework has little impact on travel between home and the office (22), managerial control by others (19), and collegiality in the workplace (8).

The data was further analysed using Factor Analysis. Factors were extracted using Principal Axis Factoring using Promax rotation with Kaiser Normalization. The resultant structure and their interpretations are provided

in Table 2. Seven factors were identified and labelled as: (1) Effectiveness, (2) Self-assurance, (3) Collegiality, (4) Work pressures, (5) Professionalism, (6) Physicality and (7) Task complexity. Each of these factors had an eigenvalue greater than one and satisfied the scree test. The total amount of variance explained by these seven factors was more than 61 percent. The absence of complex variables that load on more than one factor (i.e., loading scores greater than 0.5) suggests that each item reflects different aspects of independent constructs.

To test how these factors are affected by telework behaviours, we followed up with two MANOVA analyses using the actual hours of telework per week both during and outside of normal office hours (i.e., 9:00 am to 5:00 pm Monday to Friday). The median number of telework hours per week during and outside normal office hours were used to create two groups for each usage variable (high and low telework during office hours; and high and low telework outside of office hours). These variables were then used as independent variables to test the effect on the seven factors identified above. Tenure, age, partner, dependents and gender were all used as covariates in subsequent analyses.

MANOVA analysis of telework during normal office hours showed that higher levels of participation resulted in significantly higher perceptions of Effectiveness and Collegiality. This is an interesting result and suggests that daytime telework made workers feel more confident about their ability to work with others as well as providing perceived improvements about getting work done. In contrast, the MANOVA analysis of telework outside of normal working hours showed that higher levels of this kind of activity resulted in higher perceptions about Professionalism and Self-assurance. This finding suggests that telework outside of normal working hours improved perceptions of image and capabilities within the organisation.

DISCUSSION AND CONCLUSIONS

The motivation for this paper was to build on earlier work by Campbell and McDonald (2007, 2008) and Hunton and Harmon (2004) by developing an understanding of individual outcomes and their association with telework practices. To achieve this we conducted a survey of accounting professionals. The resultant data was factor analysed which revealed seven important constructs that define the individual outcomes for teleworkers and provide important insight into the impact of telework on work practices. These work practices are shaped not only by the impact of telework on effectiveness and work task complexity, but also on the professionalism, perceived collegiality, work pressures, physicality and self-assurance of teleworkers. We suggest that the seven factors can be incorporated into both the TBM and SBTF as distinct categories for individual outcomes thereby enhancing opportunities for further empirical research and theoretical development. Future research should seek to provide a better understanding of how each factor relates to actual telework behaviours. Information and communication technologies are rapidly changing the workplace and this study has shown that there is a pattern of outcomes for teleworkers. Future research is also required to test the relationship between these individual factors and organizational consequences (and social impact as suggested by the SBTF).

Our analyses also showed that higher levels of telework during normal working hours resulted in higher perceptions of Effectiveness and Collegiality. While greater telework activity outside of normal working hours resulted in higher perceptions of Professionalism and Self-assurance. Apart from the diversity of these findings, this study is one of the first to distinguish between telework practices during and outside normal office hours. The preliminary results suggest that this differentiation provides an interesting research direction to follow for further research. It suggests that the effects may be more related to when work is done – not uniquely to a technology or a particular way of working.

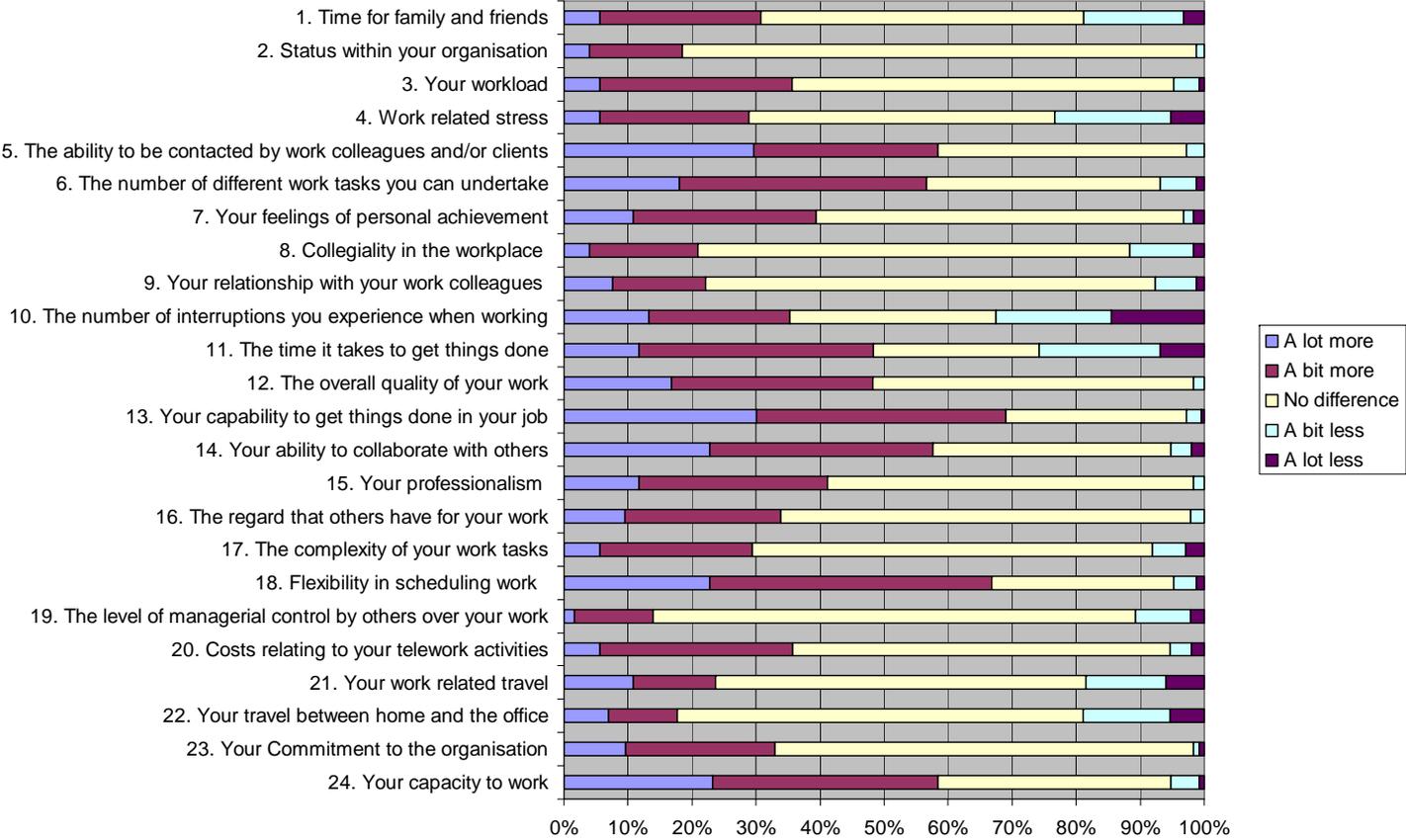


Figure 4: Perceptions of change in work practices relating to telework activities

Table 2. Factor analysis of user perceptions of the impact of telework

	Factor 1: Effectiveness	Factor 2: Self-assurance	Factor 3: Collegiality	Factor 4: Work pressures	Factor 5: Professionalism	Factor 6: Physicality	Factor 7: Task complexity
Your capability to get things done in your job	.840	-.022	-.071	-.050	.099	-.107	.023
Your capacity to work	.688	-.246	-.046	.032	.141	.033	-.300
The ability to be contacted by work colleagues and/or clients	.575	.062	.137	.140	-.098	-.063	-.038
Your ability to collaborate with others	.547	-.022	.224	.026	.021	.112	-.034
The number of different work tasks you can undertake	.516	.402	-.039	.011	-.169	.072	.114
The overall quality of your work	.480	.154	-.049	-.101	.305	-.039	.061
Flexibility in scheduling work	.426	.091	-.148	-.122	-.106	.135	-.271
Your feelings of personal achievement	-.046	.769	-.020	-.026	-.012	.016	.003
Your commitment to the organisation	.044	.701	.081	-.013	.020	-.092	.052
Status within your organisation	.046	.429	.237	.144	-.004	.051	-.242
Your relationship with your work colleagues	-.014	.048	.824	-.032	.134	-.147	.102
Collegiality in the workplace	-.028	.084	.768	-.188	-.055	.006	-.065
The number of interruptions you experience when working	.219	-.282	.355	.123	-.174	.103	.241
Work related stress	-.006	-.006	-.034	.835	-.003	.096	.008
Your workload	-.003	.142	-.137	.675	.109	-.086	.087
Time for family and friends	.015	.099	.107	-.527	.024	.202	.037
The regard that others have for your work	.026	-.059	.042	.059	.762	-.023	.142
Your professionalism	.236	.080	-.028	-.017	.625	.051	.064
Your travel between home and the office	-.021	.034	-.094	-.095	-.044	.568	.229
Your work related travel	.091	-.013	-.105	.044	-.071	.526	.188
The level of managerial control by others over your work	-.164	.012	.179	.016	.173	.474	-.001
Costs relating to your telework activities	.047	-.080	-.037	-.169	.007	.360	.086
The time it takes to get things done	-.167	.067	-.006	.0010	.089	.257	.431
The complexity of your work tasks	-.021	-.048	-.017	.007	.169	.227	.352
Eigenvalue	5.393	2.261	1.759	1.534	1.306	1.154	1.087
Percent of total variance explained by the rotated components	22.470%	9.423%	7.328%	6.393%	5.442%	4.806%	4.531%

Participants were asked to indicate the impact of telework on each item using a five-point scale ranging from "a lot more" (1) to "a lot less" (5). Factors were extracted using Principal Axis Factoring and Promax rotation with Kaiser Normalization. Rotation converged in 7 iterations.

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