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MODELLING AND TESTING THE DEFINITIONS OF TELEWORKING  
WITHIN A LOCAL COUNCIL ENVIRONMENT

KHAWAJA AL-MUSAVAR-UL HAQ

A thesis submitted to the University of Huddersfield  
in partial fulfilment of the requirements for  
the degree of Doctor of Philosophy

The University of Huddersfield

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## Abstract

Teleworking was defined in terms of comprehension: *root definition*, *conceptual definition* and *abstraction definition*. The definitions were subsequently modelled in terms of four theories: socio-factors of teleworking (model 1 of 4), maturity model of teleworking (model 2 of 4), technical factors of teleworking (model 3 of 4) and taxonomy of teleworking (model 4 of 4). The modelling of the definitions of teleworking as stated adds further comprehension to the concept of teleworking.

Teleworking is a socio and technical working practice and so, the research study turned to the socio aspect: there were a number of socio-factors (minor and major) identified as per existing literature. Subsequently, major socio-factors were mapped to a teleworking maturity model in terms of layers, *resource*, *policy* and *connectivity*. The technical aspect of the research study was able to identify and divide factors into *dimensions*, *attributes* and *organisational roles*. The three models (socio, technical and maturity) were brought together in terms of taxonomy of teleworking: an amalgamation of the socio and technical factors of teleworking in addition to three layers of a maturity model.

The research methodology followed a positivist viewpoint with socio-factors measured using 7-point Likert scales. There were a large number of measures for socio-teleworking and so two research methods were adopted to reduce the number to a manageable amount namely: initial questionnaire design and Q-sort study. Following exclusions, a web-based survey was created with the remaining socio-measures of teleworking.

The web-based survey was conducted in terms of a pilot study (at councils in the north of England) before surveying 264 employees at Council-Z (the primary study). Data collected from Council-Z was analysed in terms of confirmatory factor analysis. Theoretical models (factor structures) were created in terms of *resource*, *policy* and *connectivity*. The factor structures of each stated layer were tested for consistency to data.

Four factor structures of resource were identified, A, B, C and D. Factor structure D showed the highest level of convergence of theory to observed data that is, the best-fitting model. Six factor structures of policy were identified, with factor structure C2 the most favourable in terms of exclusion of ambiguities and model-fit statistics. Three factor structures of connectivity were identified and for each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values for good model-fit, factor structure B was also the best fitting model.

In terms of the utility of the study, definitions of teleworking and the modelling of the definitions have improved understanding of the research area. The extensive number of factors of teleworking identified through the theoretical modelling process and the measurements of these have demonstrated improved measurement techniques. The best-fitting models as per the confirmatory factor analyses have broad applicability to other similar organisations, and finally the data from the three best-fitting models can be utilised by Council-Z to introduce informed teleworking initiatives.

In terms of limitations and future work, technical factors were out of scope in this research study. Hence, types of teleworking practices linked to technical factors of teleworking would be future work as would studies of the linkage between the socio-and technical factors. In terms of the taxonomical model empirical validation would be sought of each of the seven major socio-factors in terms of factor structures. This study empirically tested for each of the three layers of the maturity model, as opposed to each of the major socio-factors within the three layers. Furthermore, additional factors may be identifiable through future work, adding to the taxonomy and in turn, the comprehension of teleworking would be enhanced alongside further standardisation of teleworking definitions and measurements.

## **Acknowledgements**

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## Glossary

<b>AMOS</b>	A software package for structural equation modeling inclusive of confirmatory factor analysis. 'IBM SPSS <b>Amos</b> enables you to specify, estimate, assess and present models to show hypothesized relationships among variables. The software lets you build models more accurately than with standard multivariate statistics techniques. Users can choose either the graphical user interface or non-graphical, programmatic interface' (IBM, 2014).
<b>Latent construct</b>	For the purpose of this thesis <b>latent construct</b> is defined as a variable that cannot be directly observed and is measured indirectly with <b>observed variables as per new theory</b> . <b>Latent constructs</b> are new theory ( <b>not</b> as per existing literature) and are highlighted consistently in yellow on the diagrams of Chapter 6 (as applicable). ( <b>C.f. latent factor and latent variable.</b> )
<b>Latent factor</b>	For the purpose of this thesis <b>latent factor</b> is defined as a variable that cannot be directly observed and is measured indirectly with observed variables. As per this thesis there are two types of <b>latent factors: latent construct and latent variable</b> .
<b>Latent variable</b>	For the purpose of this thesis <b>latent variable</b> is defined as a variable that cannot be directly observed and has already been measured indirectly with <b>observed variables as per existing theory</b> . Hence, latent factors that are established as per existing literature are referred to as, <b>latent variables</b> . ( <b>C.f. latent construct and latent variable.</b> )
<b>Model, factor structure, and factor solution</b> (as per Chapters 5 to 7)	For the purpose of this thesis the terms, <b>model, factor structure and factor solution</b> as per Chapters 5 to 7 are used interchangeably. Each of the terms refer to the entire set of measurements variables within a confirmatory factor analysis (CFA) diagram: <b>observed variables, latent factors and measurement errors</b> . The term <b>factor structure</b> refers to alternatives: a model may be created a number of times, each subsequent (and descendent) model with a different number of observed variables and latent factors to the first model. <b>Factor solution</b> is a term that may be utilised when the <b>factor structure</b> is consistent with model-fit that is, a viable or feasible <b>solution</b> .
<b>Observed variable, indicator, and measure</b>	Observed variable is synonymous with the terms, <b>indicator</b> and <b>measure</b> . For example each of the 7-point scale Likert statements of the research study were observed variables and measurements of teleworking. An observed variable as per the confirmatory factor analysis is an <b>indicator</b> of the <b>latent factor</b> that is, the observed variable explains variance of an underlying <b>latent factor</b> .

# Chapter 1: Introduction

## 1.1 History of teleworking

The term *teleworking* was first coined in the 1970s by Nilles (1975. *Cited In*: Bailey and Kurland, 2002, p.383) and as per a clarification and simplified definition, is the usage and utilisation of information communications technology (ICT) to process and complete tasks and work objectives. Teleworking has experienced growth for the European Union (Hardill and Green, 2003, p.217. *Cited In*: Hislop and Axtell, 2007, p.36), and USA and Canada (WorldatWork, 2008. *Cited In*: SonicWall, 2008, p.1), and in terms of statistical data for the USA from 2005 to 2009 (Lister and Harnish, 2011, p.4) and the UK from 2005 to 2010 (CBI, 2010, p.23). Conversely, however, it is also noted that the rates of growth number less than one may expect (Lupton and Haynes, 2000, p.324; Pérez et al., 2005, p.96; Pyöriä, 2011, p.386). Hence, since the term was first coined and given the level of advancement with regards to technology over the last few decades such as a web-based infrastructure, there is an inference and understanding that teleworking practices contain therein limitations to growth. The research study thus seeks to explain why growth of teleworking practices has been slower than may be expected given advances in technology.

### 1.1.1 Ambiguity over definition of teleworking

Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus (Harpaz, 2002, pp.74-5; Pérez et al., 2002, p.276; Sullivan, 2003. *Cited In*: Hislop and Axtell, 2007, p.36; Kowalski and Swanson, 2005, p.237). It is important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Teleworking is defined in terms of the following for a comprehensive definition of teleworking:

- 1) ***root definition,***
- 2) ***conceptual definition and***
- 3) ***abstraction.***

Teleworking was defined in this research primarily to a level of comprehension and which shifts understanding of teleworking, how and to what extent teleworking should be measured. A comprehension of teleworking is provided for the following reasons:

- 1) **To standardise the definition of teleworking,**
- 2) **For consistency in research studies of teleworking,**
- 3) **For consensus over a single, satisfactory and overarching definition of teleworking,**
- 4) **To clarify the research investigation,**
- 5) **To improve the measurement capacity of teleworking (to a standard) via modelling,**
- 6) **To improve research quality, and**

**7) To improve probabilities of data extrapolation that is, the generalisation of research findings to teleworking practices at other or similar organisations.**

### **1.1.2 Under-studied areas**

Understudied areas in teleworking include motivations of teleworking (Bailey and Kurland, 2002, p.383), theory building (Bailey and Kurland, 2002, p.383) and organisational processes (Bailey and Kurland, 2002, p.391). The research study firstly defines teleworking as stated above and the definitions are subsequently modelled in four stages, as listed below:

- 1) Socio-factors of teleworking [Model 1 of 4]**
- 2) Maturity model of teleworking [Model 2 of 4]**
- 3) Technical factors of teleworking [Model 3 of 4]**
- 4) Taxonomy of teleworking [Model 4 of 4]**

The models were developed iteratively and so are inter-related and consistent to Bailey and Kurland (2002, p.391) i.e. the research study was inclusive of theory and organisational processes in terms of socio-factors. A maturity model based to a large extent on the hierarchy of needs as per Maslow (1943) considers motivations of teleworking.

The above is representative of the models of theory. Further to the above, the theory was utilised to develop measurement models of teleworking in relation to the socio-factors of teleworking. The measurement models of teleworking were then tested with confirmatory factor analysis (Chapter 6).

### **1.1.3 Utility of the research study**

The best-fitting measurement model as per the confirmatory factor analyses (namely, factor structure D of resource, factor structure C2 of policy and factor structure B of connectivity), have applicability at other organisations. In other words, there is a number of socio-factor measures confirmed for each of the three layers of teleworking maturity and these measures can be utilised in surveys at other organisations.

Data from the surveys for each of the three best-fitting models can also be utilised by management in terms of an identification of worker perceptions of each layer of teleworking maturity and so, teleworking initiatives can be implemented accordingly. From this it follows that identification can also be made as to which of the three layers needs to be strengthened. Each of the layers can be viewed as concurrent at the micro-level (figure 2.41 on page 88) that is, the layers *resource*, *policy* and *connectivity* are inter-related. Therefore, weak layers as identifiable may be strengthened with improvements in terms of the additional second and third layers. Hence, the models serve as a tool for management in terms of awareness, decision-making and improvement to working practices.

## 1.2 Overview of the thesis

The overview of the thesis is shown in figure 1.1 below and is described below.

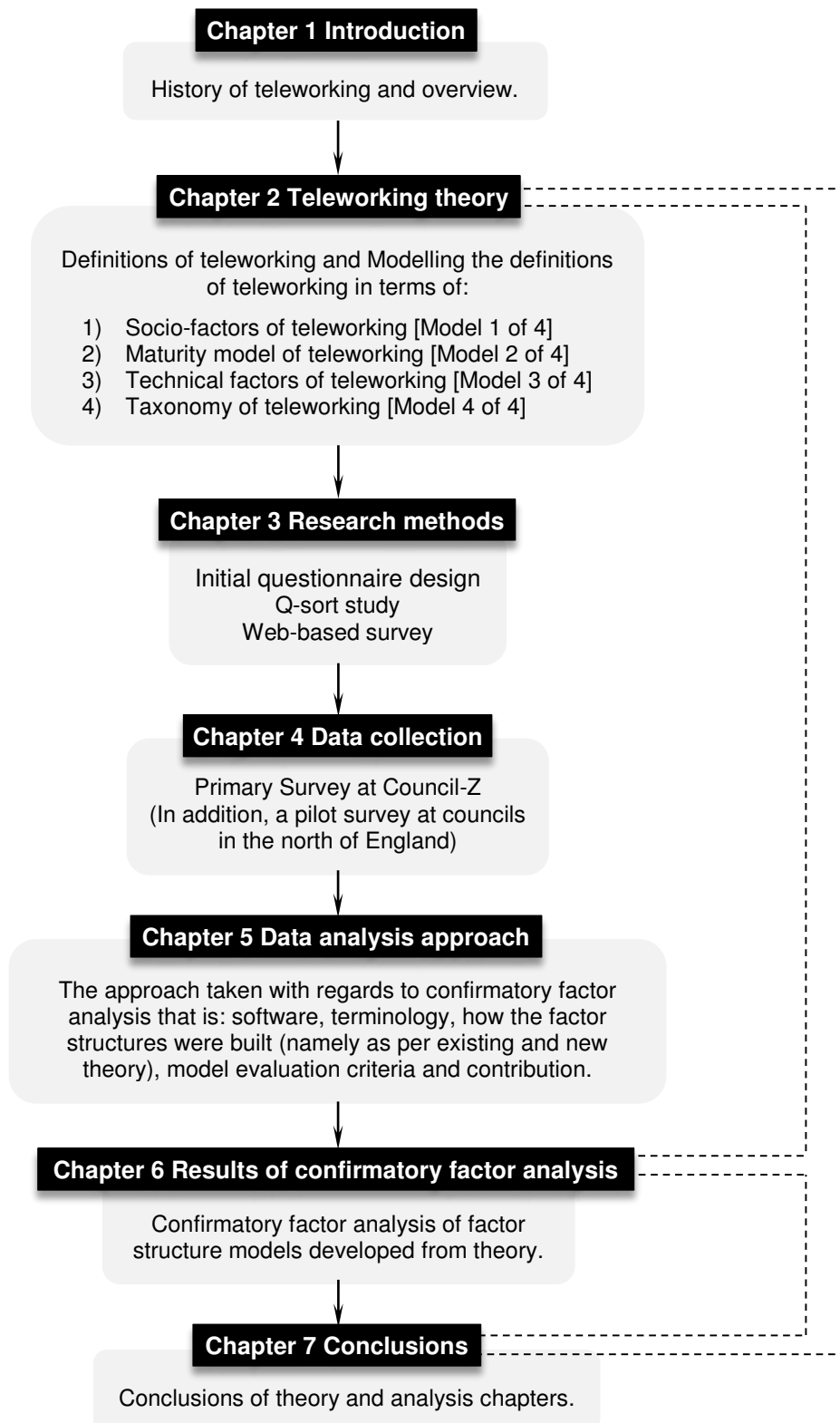


Figure 1.1: Overview of thesis

### **1.2.1 Chapter 1 Introduction**

Teleworking is introduced in terms of **history, ambiguity over the definition of teleworking, understudied areas** and the **utility of the research study**. Furthermore, an **overview of the thesis** is documented.

### **1.2.2 Chapter 2 Teleworking theory**

The definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus. It is important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Teleworking was defined in terms of comprehension via:

- 1) *root definition (indirectness and distance),***
- 2) *conceptual definition and***
- 3) *abstraction definition.***

There were four theoretical models that made sense of the existing literature; each of the four were consistent to the above definitions of teleworking. The four models were:

- 1) **Socio-factors of teleworking****
- 2) **Maturity model of teleworking****
- 3) **Technical factors of teleworking****
- 4) **Taxonomy of teleworking****

### **1.2.3 Chapter 3 Research methods**

In Chapter 3, a positivist approach (Saunders et al., 2012, figure 4.1, p.128) is taken with regards to the research study. A number of quantifiable measures pertaining to socio-factors were identified, and an initial questionnaire design and Q-sort study were utilised to distil and reduce the number of measures further to a feasible quantity for the later survey to participants. Chapter 3 thus discusses the process for identifying and distilling socio-measures of teleworking. In addition, ethical considerations were documented in this chapter too.

### **1.2.4 Chapter 4 Data collection**

In Chapter 4 the results of the primary survey at Council-Z (anonymous) are presented in terms of descriptive statistics. A pilot survey that was also conducted over the research study is summarised in this chapter too. For the Council-Z survey, a number of participants were excluded from the sample and so, the exclusions are summarised and the numbers regarding the sample size documented.

### **1.2.5 Chapter 5 Data analysis approach**

In Chapter 5 the approach taken with regards to confirmatory factor analyses is documented; and these details are pertinent to the development of the factor structure models. This chapter is a documentation of the software used, terminology with regards to consistency of communication of the CFA and how the factor structures were built namely, as per existing and new theory. In addition, the criteria for evaluating factor structures are detailed in this chapter; and potential contribution of factor structures is also provided (the latter in tabular format).

### **1.2.6 Chapter 6 Results of confirmatory factor analysis**

In Chapter 6, models were created with socio-factors and respective socio-measures for each layer of the maturity model namely *resource*, *policy* and *connectivity*; thus there were three types of models. In addition there were a number of models within each layer defined in terms of varying factor structures and labelled accordingly as factor structure A, factor structure B and so on. A sample of 264 participants was brought forward to the confirmatory factor analysis following the data collection (Chapter 4). Data from the primary survey (Council-Z) was analysed in terms of confirmatory factor analysis for each of the model factor structures.

Confirmatory factor analysis of the factors structure models were documented in detail as per the following: *theoretical build of models and factor structures (how they were created from existing and new theory – linkage also to earlier chapter 2)*, and *model evaluation criteria (statistical criteria per an evaluation of each of the models)*. For each layer of the maturity model the best fitting factor structure (model) was documented too.

### **1.2.7 Chapter 7 Conclusions**

In Chapter 7, the theory (Chapter 2) and the confirmatory factor analyses (Chapter 6) were concluded. In terms of theory the following sections were addressed in conclusions:

- 1) Definitions of teleworking**
- 2) Socio-factors of teleworking [Model 1 of 4]**
- 3) Maturity model of teleworking [Model 2 of 4]**
- 4) Technical factors of teleworking [Model 3 of 4]**
- 5) Taxonomy of teleworking [Model 4 of 4]**

In terms of analysis the following sections were addressed in conclusions:

- 1) Resource model in terms of factor structures A, B, C, and D**
- 2) Policy model in terms of factor structures, A, B, C1, C2, C3, and C4**
- 3) Connectivity model in terms of factor structures A, B, and C.**

The utility and limitations of the research study were also documented together with a discussion of future work.

### **1.3 Out of scope of this research study**

#### **1.3.1 Two layers of the maturity model of teleworking [Model 2 of 4]**

There was a linkage between two models as follows: three of the five layers of model 2 (the teleworking maturity model) namely, *resource*, *policy* and *connectivity* were consistent with the three broad categories of model 1 (socio-factors of teleworking). Hence, the three layers of the maturity model were applicable to this research study and hence, utilised. Two of the five layers, namely, *process* and *strategy* were thus, not inclusive; and out of scope for this research study.

#### **1.3.2 Analysis of technical factors of teleworking [Model 3 of 4]**

A survey was conducted with questions pertaining to technical factors (namely, *dimensions*, *attributes* and *organisational roles*) as shown in Appendix F (section two), and although data was collected, **analyses** were out of scope for this research study, in other words:

- 1) the technical questions (as per section 2.1.3.3) was developed at a later stage of the research study, that is, after the pilot study.**
- 2) the onus of the research study over the first two years of study leaned significantly to socio-factors of teleworking. In other words, the technical questions were inclusive to theory for a comprehensive explanation and definition with regards to teleworking.**
- 3) Furthermore, the magnitude of the technical factors of teleworking (this section, 2.1.3.3) in terms of data analysis rendered technical factors future work and thus, out of scope for this research study. For completion of the research study the technical factors were discussed, identified and documented (following sections below).**

However, there was an application of technical factors to the research study as follows. There were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1. For example, to state that there is no content of any kind, physical or electronic (that is participants responded *not applicable* to dimension content of the survey) is an equivalence of not working; and so there cannot be an orientation to work or vice versa. In other words, if you have an orientation to work, you must (at some point and realistically) produce content of some kind (such as physical, verbal and/or electronic). Six participants were excluded as per inconsistency between responses of dimensions *content* and *dimension*, namely that they answered *not applicable* to *content* yet answered with applicability to dimension *orientation*.



Hence, 1) the technical questions of the survey pertaining to the eleven dimensions of teleworking were utilised to identify and exclude data inconsistencies from the sample, and 2) as mentioned above, analysis of the data pertaining to the technical questions is future work.

#### **1.4 Online work**

There are 13 documents online as per this thesis: Haq (2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g, 2013a, 2013b, 2014a, and 2014b) and Haq, Ward and Wilkinson (2012a and 2012b); each document is available online over the three months May to July 2014.

## Chapter 2: Teleworking theory

### 2.1 Review of literature

A summary of the chapter is as follows: the definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus. It is important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Hence, as shown in in figure 2.1 below teleworking was firstly defined.

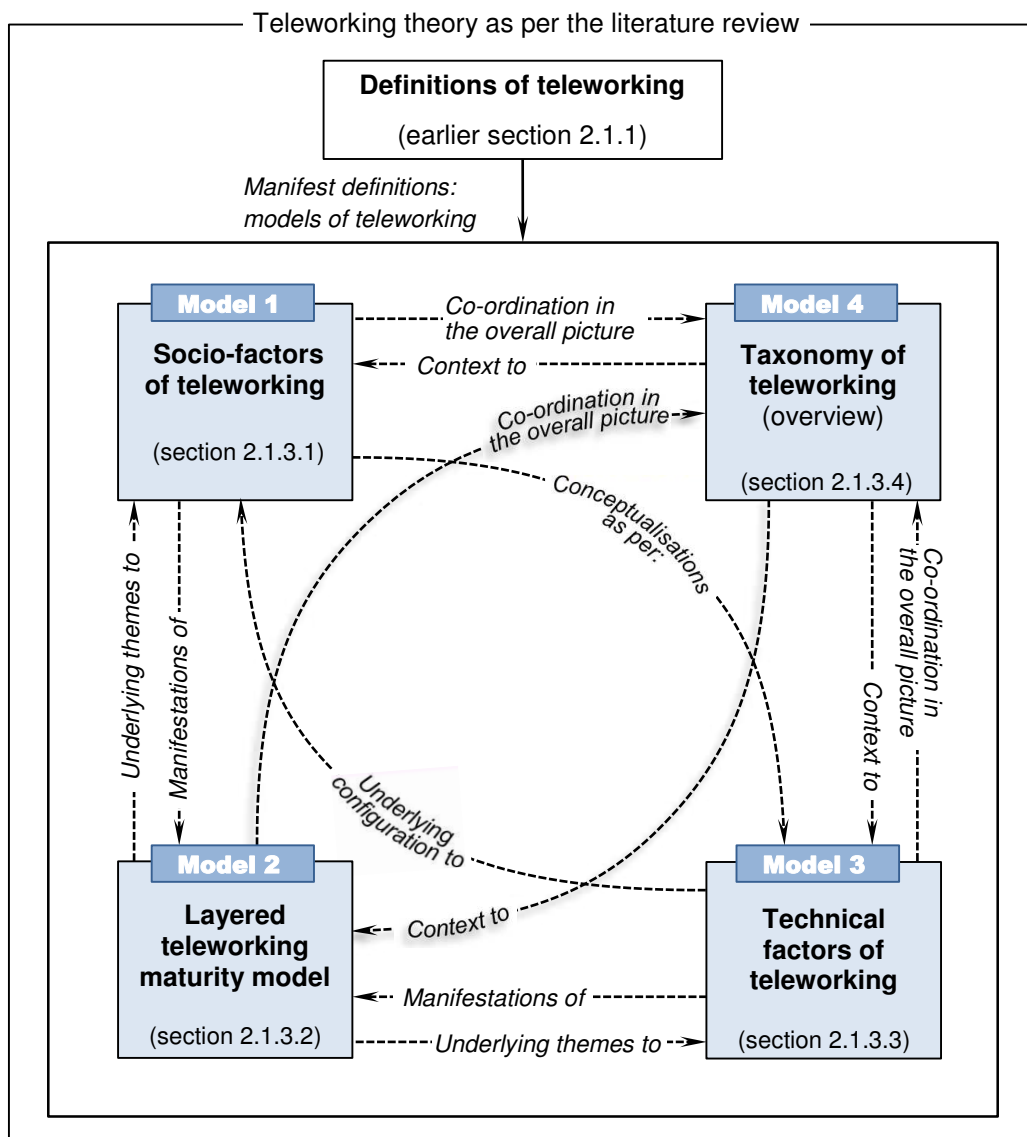


Figure 2.1: Theory of teleworking

The definitions of teleworking were part of a learning process to understand the concept and three types of understanding emerged out of this work namely, the root definition, conceptual definition and abstraction and subsequently following further reading (The Open University, 2005) alignment was identifiable to meanings of technology namely, production technology, product technology and application technology, respectively. As aforementioned definitions of teleworking vary and so, comparison between published literatures is limited. Some may measure teleworking in terms of working at a distance coupled with the number of hours per week ICT and whilst teleworking is measured in some capacity other definitions are excluded outright for example, many workers may telework at a distance yet the dynamics of onsite working with ICT (onsite teleworking) may change and thus warrant further study. This thesis sought to define teleworking comprehension that is to be inclusive of the many facets of teleworking. Facets of teleworking include onsite and offsite work and perceptions of teleworking. A utility out of this work is as follows: that data can be divided according to the different definitions of teleworking and perceptions compared between the groups of data. Thus onsite perceptions can be compared with offsite perceptions. The more definitions that are inclusive of teleworking the more ways in which data of the same study can be divided and analysed; all definitions of teleworking can be asked in a precursor section of a survey for example. Thus a single study can yield a number of results and analyses and the data is more efficiently used as oppose a second and third study each aimed at a different definition and which can become an inefficient means of research and comparisons between the studies difficult to comprehend (as different workers may participate to the first study for example).

Teleworking is defined in terms of the following for a comprehensive definition of teleworking:

- 1) ***root definition (indirectness and distance),***
- 2) ***conceptual definition and***
- 3) ***abstraction.***

The above definitions in terms of comprehension facilitated the development of theoretical models of teleworking and which may have been otherwise hindered by the aforementioned ambiguity as stated earlier. There were four models of the comprehensive definition of teleworking, these are:

- 1) **Socio-factors of teleworking [Model 1 of 4]**
- 2) **Maturity model of teleworking [Model 2 of 4]**
- 3) **Technical factors of teleworking [Model 3 of 4]**
- 4) **Taxonomy of teleworking [Model 4 of 4]**

The linkages and inter-relatedness between the four aforementioned models are as shown in figure 2.1 on page 25; that is, the development of the four models was an iterative process. A summary of each of the models follows below.

Firstly, in terms of the socio-factor model: there were a number of socio-factors identified as per existing literature with regards to teleworking. The factors were grouped in terms of minor and major socio-factors. Subsequently, major socio-factors were identifiably grouped in terms of three broad categories of *resourcing*, *governance* and *networking*. Following this categorisation the three broad categories were identifiably linked to three layers of the teleworking maturity model namely *resource*, *policy* and *connectivity*.

Secondly, in terms of a teleworking maturity model: the first three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity* were consistent with the three broad socio-categories stated above. Thus, the three layers of the maturity model were applicable to this research study and hence utilised. The maturity model provides a context and meaning to the research study in terms of teleworking maturity and development. As mentioned earlier teleworking is a socio-technical working practice and the socio-aspect (in addition to linkages to maturity) was studied as stated above. The research then focused on the technical aspect.

Thirdly, in terms of the technical model: teleworking is currently ambiguously defined and so technical factors (*dimensions*, *attributes* and *organisational roles*) were identified to simplify and clarify the definitions of teleworking. There were 11 dimensions identifiable with two attributes for each dimension. Furthermore, three organisational roles utilising existing literature regarding business, work and employees, were identified as applicable to types of teleworking practices. The three organisational roles identified were **intra**, **inter** and **extra-organisational**. **Although, the technical aspect of teleworking is out of scope for this research study in terms of analysis, data was collected for potential future work. In addition, there were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1 and so, the technical questions of the survey pertaining to the eleven dimensions of teleworking were utilised to identify and exclude data inconsistencies from the sample.**

Fourthly, in terms of the taxonomical model: the above three models were brought together in terms of taxonomy of teleworking. The taxonomy of teleworking is an amalgamation of the following: socio and technical factors of teleworking in addition to the layers of the maturity model. Furthermore, the taxonomy coherently encapsulates this section namely, modelling the definitions of teleworking.

The above summarises the teleworking theory chapter. There were five key outputs of the research created out of the literature review:

- 1) **Definitions of teleworking (section 2.1.1) followed by four models:**
- 2) **Socio-factors of teleworking, (section 2.1.3.1)**
- 3) **Maturity model of teleworking (section 2.1.3.2)**
- 4) **Technical factors of teleworking (section 2.1.3.3)**
- 5) **Taxonomy of teleworking (section 2.1.3.4)**

Each of the parts as shown in figure 2.1 on page 25 is explained in the sections below; beginning with the first section as shown at the top of the diagram namely, definitions of teleworking.

### 2.1.1 Definitions of teleworking

Explanations as per the definitions of teleworking builds on the published work of Haq et al. (2012a and 2012b): the definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus (Harpaz, 2002, pp.74-5; Pérez et al., 2002, p.276; Sullivan, 2003. *Cited In:* Hislop and Axtell, 2007, p.36; Kowalski and Swanson, 2005, p.237). It is important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Teleworking is defined in this research primarily to a level of comprehension; that is, for the reasons as depicted in figure 2.2 below; and listed after the following figure:

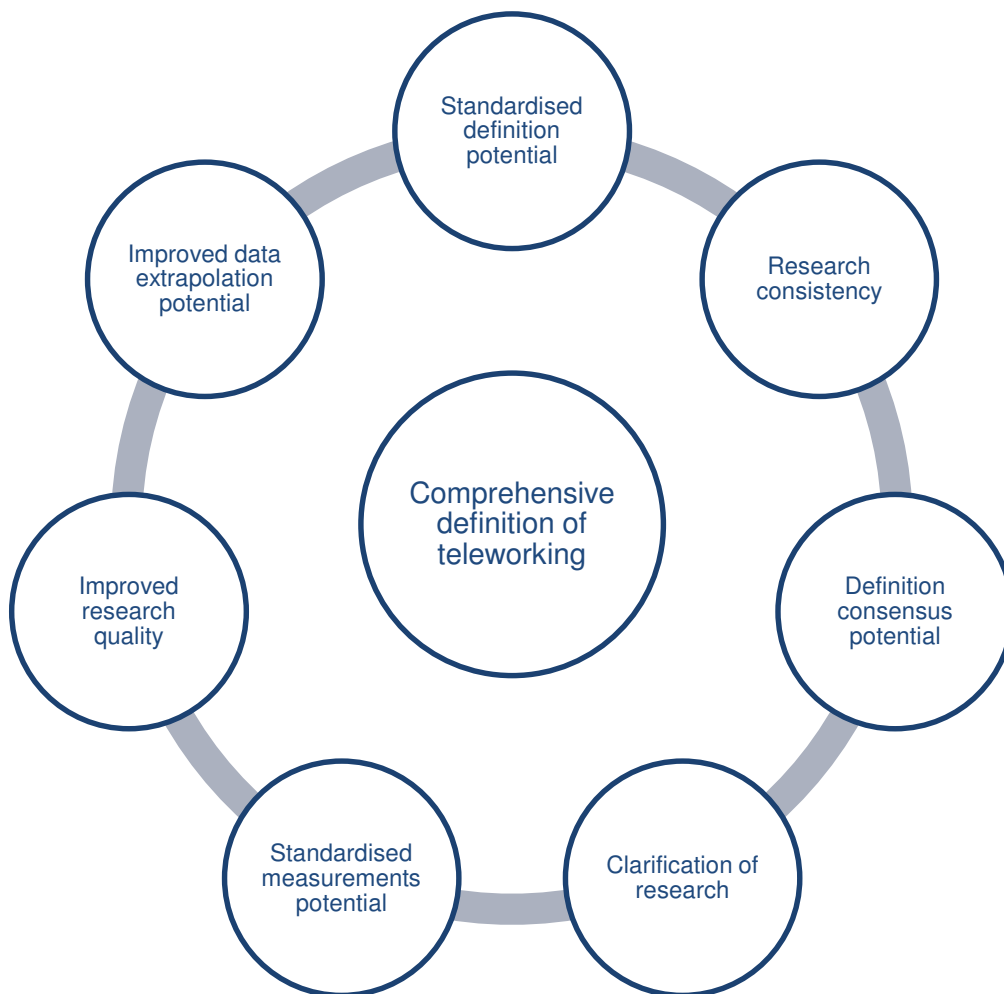


Figure 2.2: Functions of a comprehensive definition of teleworking

- 1) **To standardise the definition of teleworking,**
- 2) **For consistency in research studies of teleworking,**
- 3) **For consensus over a single, satisfactory and overarching definition of teleworking,**
- 4) **To clarify the research investigation,**
- 5) **To improve the measurement capacity of teleworking (to a standard) via modelling,**
- 6) **To improve research quality, and**
- 7) **To improve probabilities of data extrapolation that is, the generalisation of research findings to teleworking practices at other or similar organisations.**

The following sections of this chapter begin with an evaluation of three key definitions before a comprehensive definition of teleworking materialises, namely the summation of the three. The comprehensive definition as per figure 2.2 on page 28 is a pre-requisite for modelling. To define teleworking, an obvious starting point (and as referred to earlier) is the lack of consensus (among researchers) over the definition of teleworking; that is teleworking is ill-defined. This ambiguity has obvious implications in terms of measurement and thus, impacts on the consistency between studies that are carried out by different researchers whom define teleworking differently. The lack of a unified, satisfactory overarching definition of teleworking is a view shared by many authors as per existing literature (to cite a few examples): McCloskey and Igbaria (1998. *Cited In*: Bailey and Kurland, 2002, p.385); Daniels et al. (2001, pp.1153-6); Harpaz (2002, pp.74-5); Wilson and Greenhill (2004, pp.208-9); and Siha and Monroe (2006, p.456). The ambiguity is due to apparent complexities in terms of the three key elements of teleworking as follows:

- 1) **Technology in terms of hardware can be used to varying degrees; a worker may use desktops and tablet PCs or a mixture for example; and**
- 2) **Technology in terms of software can also be used to varying degrees; a worker may use software on their local PC or over a network or a mixture for example.**
- 3) **Technology may be utilised to varying degrees in terms of time; a worker may utilise desktops regularly and tablet PCs irregularly for example, and likewise in terms of software.**

The combinations of 1, 2 and 3 above, over time give rise to varied forms of teleworking and so, there is a difference in terms of the consistency between these forms of teleworking. Thus, comparability of teleworking practices is limited as the underlying definitions vary and so, there is an additional complexity which can hinder a resolution of a clearly defined concept of teleworking. Studies of teleworking link directly to the definition of teleworking as per the above three aforementioned elements; an extrapolation capability is limited as the studies undertaken do not satisfactorily explain technology-based work elsewhere.

In addition, this is compounded further in terms of a) time and b) organisations. For example, a teleworking study at hypothetical Organisation A is repeated at:

- 1) **the same organisation (Organisation A) yet at a different time and so, findings may differ as workers' perceptions and technological skills can change over time.**
- 2) **Organisation B (within the same industry) at the same time and so, findings again may differ as workers' perceptions and technological skills most probably differ to Organisation A.**

As per the above, the capacity to which depth of understanding can be improved across different time periods and organisations is limited. A resolution is to define teleworking in terms of meanings of technology (The Open University, 2005, pp.21-25) namely: production, product and application technologies. There were four meaningful definitions as shown in figure 2.3 on page 31. The first, root meaning is defined in terms of *production technology* (The Open University, 2005, pp.21-25). The second, conceptual meaning is defined in terms of *product technology* (The Open University, 2005, pp.21-25). The third abstraction meaning is defined in terms of *application technology* (The Open University, 2005, pp.21-25). The fourth is an aggregation of the former three namely, a comprehensive definition of teleworking.

The four as shown in figure 2.3 on page 31 are:

- 1) **understanding of the concept of teleworking in terms of its nature,**
- 2) **clarification of teleworking in terms of conceptualisation,**
- 3) **simplification of teleworking; that is, to level of knowledge abstraction, and**
- 4) **comprehensive definition of teleworking.**

To summarise, firstly, understanding is gained from a review of the concept of teleworking at its root form (below section 2.1.1.1). Secondly, out of this base understanding teleworking can be clarified further in terms of conceptualisation (subsequent section 2.1.1.2). Thirdly, out of this clarification teleworking can be simplified in terms of abstraction (later section 2.1.1.3). Fourthly, the three aforementioned definitions comprise a comprehensive definition of teleworking which is measured and modelled (section 2.1.3) in terms of:

- |   |   |                                |
|---|---|--------------------------------|
| <ol style="list-style-type: none"><li>1) <b>socio-factors of teleworking</b></li><li>2) <b>maturity model of teleworking</b></li><li>3) <b>technical factors of teleworking</b></li></ol> | } | <b>taxonomy of teleworking</b> |
|---|---|--------------------------------|

Turning firstly to the root definition of teleworking, the nature of teleworking has a meaning in terms of *production technology* (The Open University, 2005, pp.21-25); in other words, in terms of enablers of teleworking, and this is discussed further in the following section.

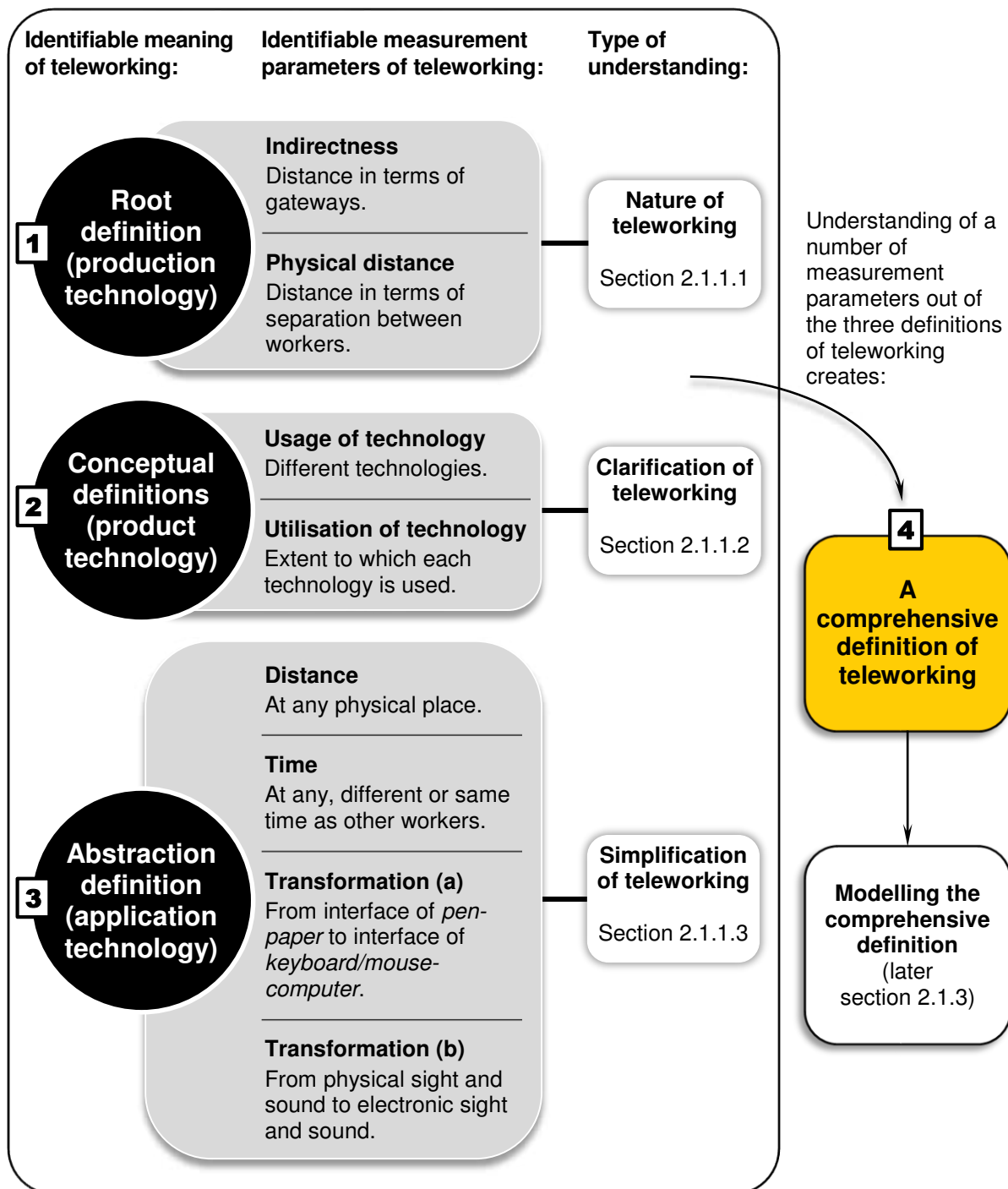


Figure 2.3: Technicalities of teleworking

### 2.1.1.1 Root definition [Nature of teleworking]

The term telework can be broken down into its two distinct parts: 1) *tele* to mean distance and 2) *work* (self-explanatory). Distance here is an outcome of human experience from using technology, but it branches into two translations adding ambiguity to a single overarching and standardised definition of teleworking. The two translations of distance are 1) indirectness, and 2) physical separation as shown in figure 2.4 on page 32.



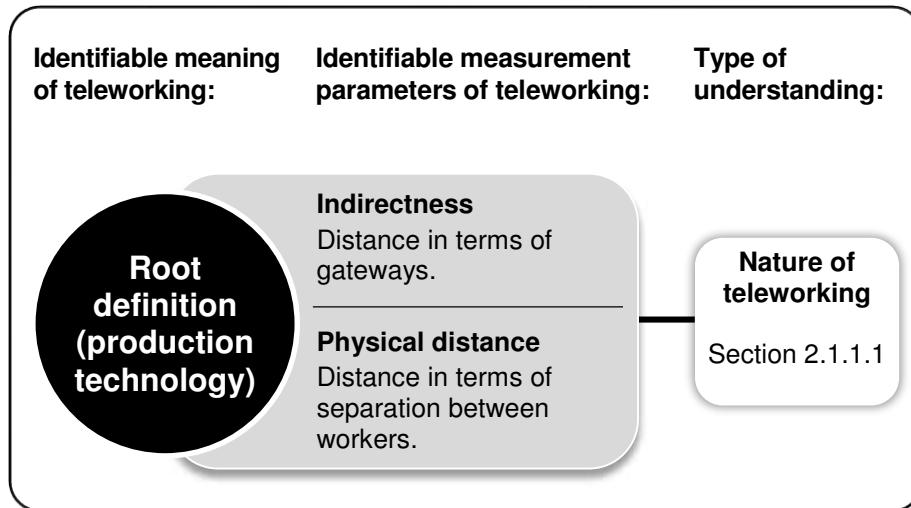


Figure 2.4: Summary of the root definition of teleworking

The two translations are addressed in terms of understanding the nature of teleworking and thereby, in terms of the utility of this approach, enable an identification of measureable aspects of teleworking as illustrated in figure 2.5 below.

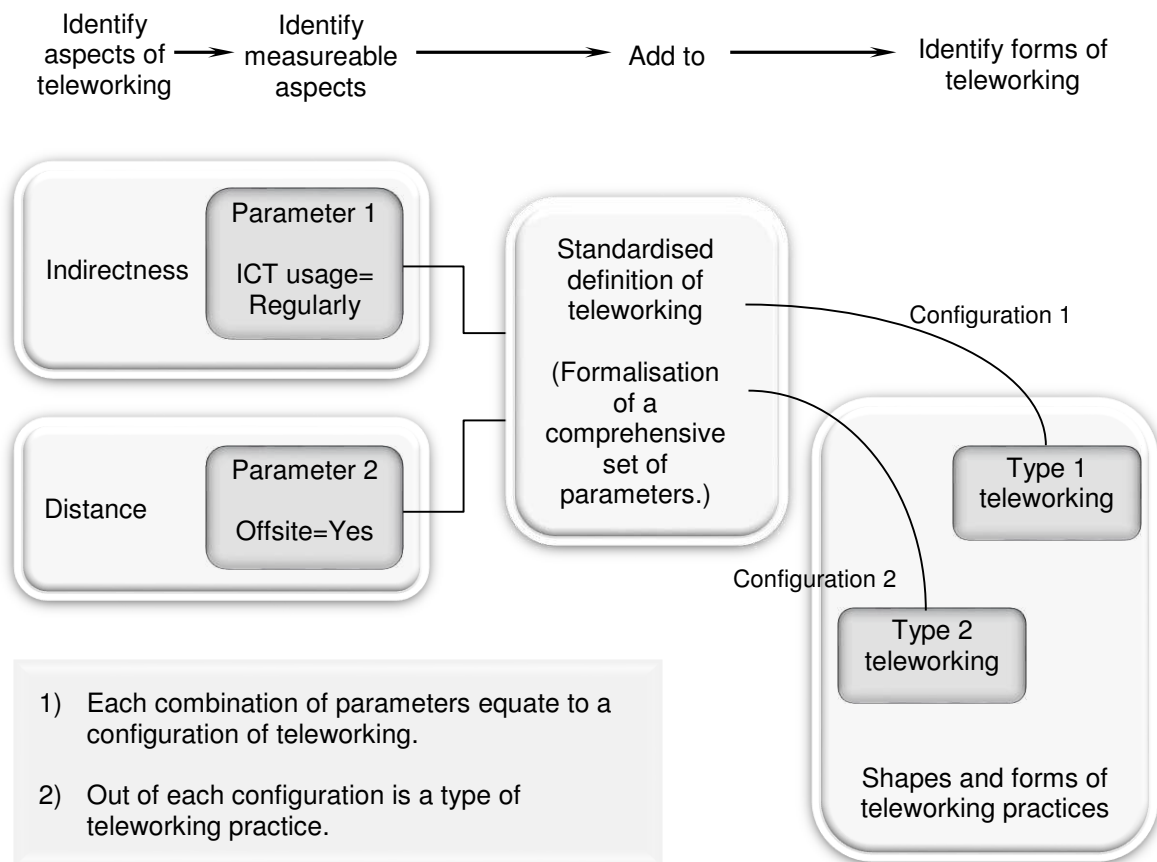


Figure 2.5: Mapping root definition measurement parameters to teleworking practice

#### 2.1.1.1.1 Indirectness

In this section, firstly *indirectness* is put forward as valid criterion for the standardised definition of teleworking. Secondly, the concept of gateways is put forward as a measure of that indirectness. Thirdly, the justification for *indirectness* is illustrated in terms of the impact of flexibility derived out of indirect working.

##### 2.1.1.1.1.1 Introduction [Indirectness]

Indirectness explains all instances of working with communications technology whereby information between source and destination travels through natural and artificial mediums rather than through the former (natural) alone. The telephone is an example of indirectness, whereby communication occurs between workers within close proximity or at a distance yet in each of these scenarios workers would be speaking indirectly independent of physical distance that is via technology.

##### 2.1.1.1.1.2 Gateways [Indirectness]

Technology creates indirectness and so, it follows that, each type of technology used and the number of interactions with each technology (to communicate with a worker at any one time) creates increasing levels of indirectness. As illustrated in figure 2.6 below, usages and interactions with technology are defined in terms of gateways (interfaces or portals) that must first be accessed or used before communication can occur.

Example of accessing Web email in terms of gateways

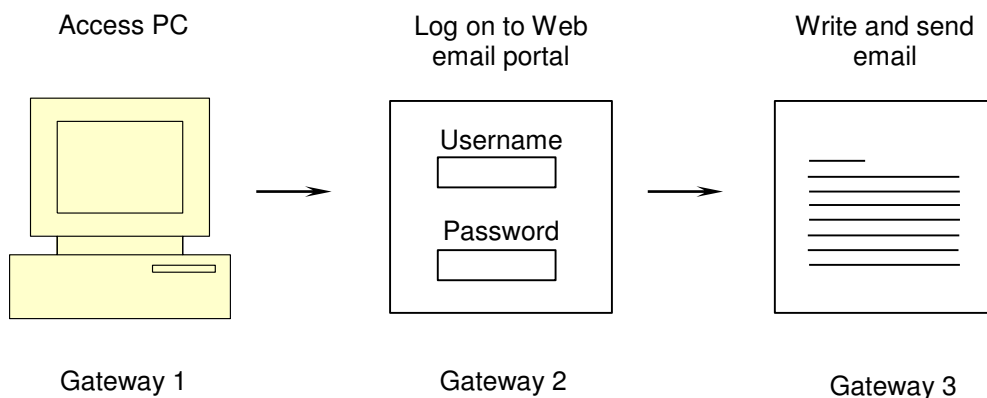


Figure 2.6: *Indirectness* in terms of gateways

*Indirectness* can be measured in terms of the number of technologies (hardware and software) used to initiate communication (see also figure 2.7 on page 34) - and again, to reiterate, irrespective of the notion of physical distance. For example, emailing may require logging onto the personal computer

and again onto a portal interface which then provides access to the emails interface. Remote-working may require an additional security (Lupton and Haynes, 2000, p.325) or gateway compared to workers using technology at the office that is, a username and password may be required for off-site network access. For each type of interaction such as emailing as aforementioned or video conferencing, an interface or gateway is required. Additionally, logging onto the Skype portal interface or logging on to a Virtual Private Network (VPN) are examples too. Levels of *indirectness* have impacts on telework over time and may thus shape a distinct type of teleworking. Hence, *indirectness* is measured in terms of the number of gateways or portals. This measure is inclusive of all forms of teleworking and is integral to the standardised definition of teleworking.

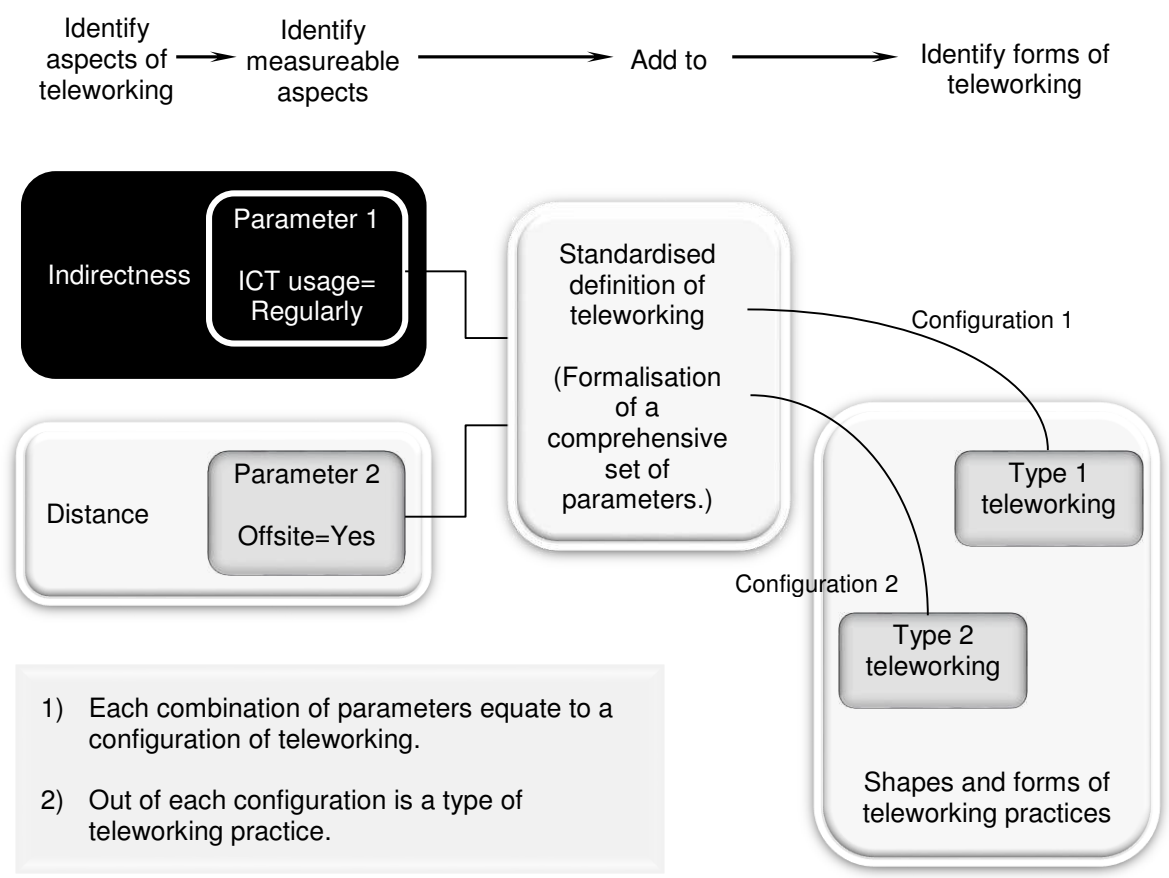


Figure 2.7: Mapping measurement parameter of indirectness to teleworking practice

### 2.1.1.1.1.3 *Indirectness* as a measurement parameter of teleworking

It is important to factor in gateways to the definition of teleworking due to the impact *indirectness* can have in shaping telework over time; should *indirectness* be excluded, the positive impact of flexibility derived from indirect usage of technology would be excluded from measurement too. The validity of *indirectness* as a teleworking measure is illustrated in figure 2.8 on page 35 in terms of the above,

aforementioned flexibility. To explain as per figure 2.8 below: as aforementioned, the number of gateways a user must initially go through before communicating with participants is a measure of indirectness. Fewer gateways may be experienced with communications technology compared to physical working. For example, a worker may travel a distance to arrive at a physical meeting but there is also a number of physical gateways he/she must pass through, such as leaving the home, entering a mode of transport, access to destination buildings (to name a few) before meeting and then incurring the same number of gateways on the return journey.

A graph to show savings of teleworkers in terms of gateways

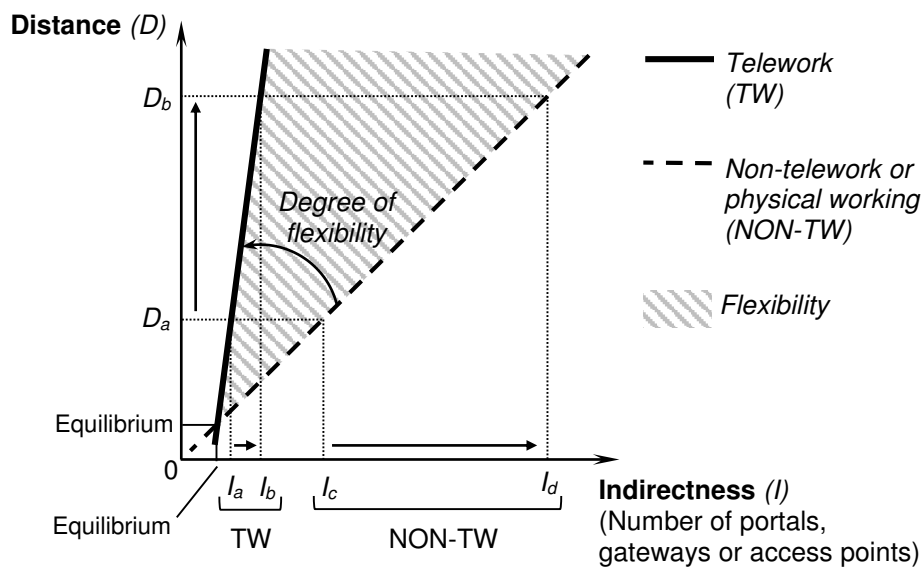


Figure 2.8: Difference between telework and non-telework in terms of indirectness

In regards to the same meeting appointment, a teleworker may only need to log on to his/her PC and also onto Skype before being ready to meet. At a maximum, a teleworker would foreseeably have no more gateways to access, or interface with, compared to physical workers but overall significantly fewer so and therefore the line graph for teleworkers on average is inelastic compared to non-teleworkers.

In terms of figure 2.8 above, if a worker physically travels from a distance  $D_a$  to the organisation or meeting location at distance  $D_b$ , he/she would incur gateways of  $I_d - I_c$  as a non-teleworker. By comparison, online workers would incur gateways (primarily in terms of technology as the physical travel is forgone) of only  $I_b - I_a$  if the meeting is held online. Thus, compared to physical workers there is a significant difference that is the savings to teleworkers who forego restraining forces from physical travel such as commuting related stress, interruptions and/or distractions.

#### 2.1.1.1.1.4 Conclusion [Indirectness]

*Indirectness* is identifiably a parameter of teleworking practice in terms of gateways, portals and access points; each of which can hinder or secure communications between participants. Thus, indirectness is as a defining aspect of teleworking and which needs to be measured independently of, and in addition to physical distance.

#### 2.1.1.1.2 Distance (physical separation)

In this section, firstly the *distance* parameter of teleworking albeit self-explanatory, is explained in the introduction. Secondly, the capabilities of Information and Communications Technology (ICT) are drawn upon to explain and understand the phenomenon of distant working (Lupton and Haynes, 2000, p.323). Thirdly, *distance* is put forward as a valid measurement parameter of teleworking. Fourthly, this validity is illustrated in terms of the flexibility benefit derived out of teleworking; an absence of the *distance* parameter would unnecessarily exclude types of distant-working and impact negatively on the standardised definition of teleworking. Fifthly, and to conclude, *distance* is a relevant parameter to the measurement of teleworking and the absence of this measurement creates a limited comprehension of teleworking and so hinders standardisation of the definition of teleworking.

##### 2.1.1.1.2.1 Introduction [Distance (physical separation)]

Technology has a capability to enable employees to work off-site and at a remote distance from the organisation consistently over time and so remote-working can and does take on a shape and form that is different to working with technology at the organisation, particularly when differences between the two in terms of work environment are important to an understanding of teleworking.

##### 2.1.1.1.2.2 ICT capabilities [Distance (physical separation)]

The capability of technologies to bridge the physical gap between workers of different physical locations is made possible due to 1) technological infrastructure and 2) the fact that electronic communication via cable or wireless is near-instantaneous that is, time lag of communication in all geographical spaces the world over is effectively negligible. This physical phenomenon significantly diminishes sense of distance when working with colleagues of different physical locations and human experience of interaction can consistently be one of proximity or closeness.

##### 2.1.1.1.2.3 Distance as a measurement parameter of teleworking [Distance (physical separation)]

As per figure 2.9 below, it logically follows that exclusion of the parameter of *distance* may also exclude a type of teleworking practice that has taken shape and form out of a set of parameters that includes *distance* and thereby, hindering the capacity to standardised the definition of teleworking. In other words, without a measure of *distance* types of teleworking would be excluded too.

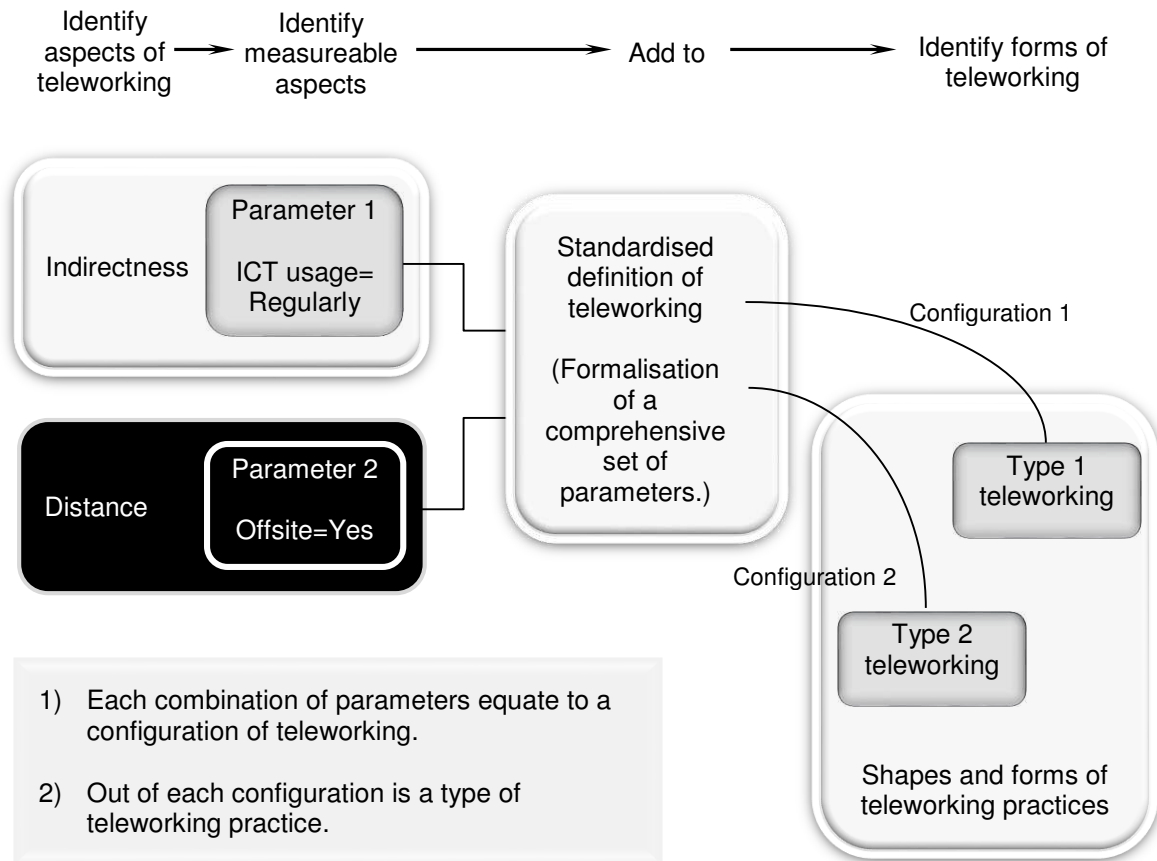


Figure 2.9: Mapping measurement parameter of distance to teleworking practice

The important aspect here is the validity of *distance* as a measurement criterion for the standardised definition of teleworking and this validity is apparent from the flexibility benefit that is derived out of distant working. The flexibility benefit is illustrated in the next section and so, theoretically confirms *distance* as a valid measurement parameter (or criterion) of the standardised definition of teleworking.

#### 2.1.1.1.2.4 Existence of benefits of distant working [Distance (physical separation)]

To work physically over large distances incurs a greater cost in terms of time compared to teleworking; the cost is illustrated in figure 2.10 on page 38: firstly, the angle of the line graph for non-teleworkers is an illustrative average of all modes of transport a worker may choose to adopt to make a journey to a meeting. The key point here is that none of the physical modes of transport enable meetings to take place sooner than if participants simply use information communications technology such as Skype. Therefore, the angles of each of the two lines of the graph differ significantly.

Secondly, to illustrate the aforementioned cost, a worker may meet with other staff members over a large distance and the only way to do this physically is to travel that distance (using a car, train, or plane for example). In terms of figure 2.10 on page 38, if a worker at distance  $D_a$  were to meet with a

worker at distance  $D_b$  for a meeting he/she will only incur a time expenditure of  $t_b - t_a$  if both workers are teleworking. This time expenditure would be significantly greater, that is  $t_d - t_c$ , if they are both non-teleworkers; i.e. physically travelling to the meeting location. Therefore, the former (teleworkers) benefit significantly compared to non-teleworkers in terms of the time cost compared to non-teleworkers. Teleworkers thus have a degree of flexibility regarding the utilisation of time that would otherwise be sacrificed in physical travel of the distance  $D_a$  to  $D_b$ .

A graph to show savings of teleworkers in terms of time

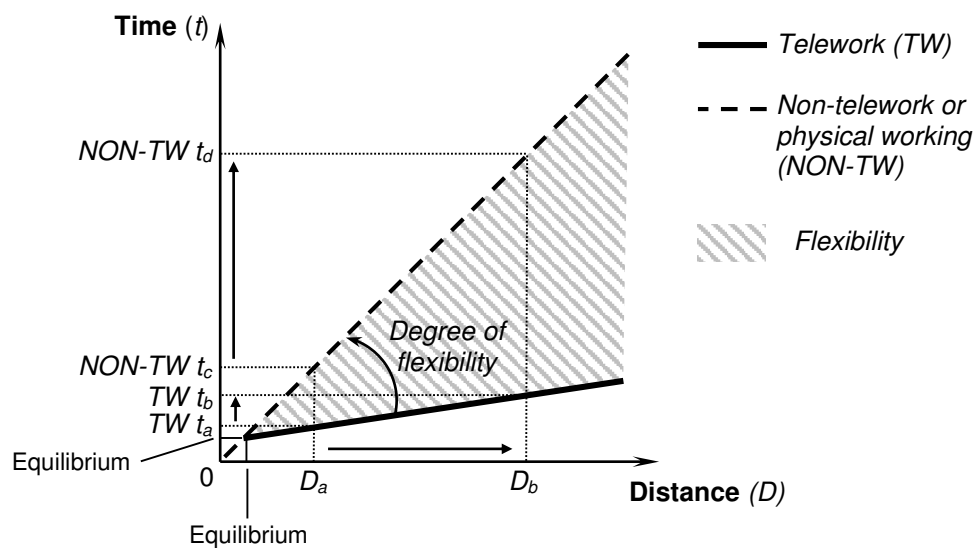


Figure 2.10: Difference between telework and non-telework in terms of time

#### 2.1.1.1.2.5 Conclusions [Distance (physical separation)]

Human interaction via ICT clearly creates a significant margin of benefit for workers. This is built on *production technology* (The Open University, 2005, pp.21-25), and conceptualisations of product technologies (discussed in the next section below) and application technologies (discussed later below). Considering for example flexibility, the margin was shown by the shaded area of flexibility in figure 2.10 above and is significant. This margin suggests a significant difference between teleworkers and non-teleworkers and so distance is a valid parameter for the measurement of teleworking; excluding such a parameter would mean excluding forms, products and applications of distant working, that do feasibly relate to an evaluation of distance for each employee.

The root definition of teleworking has been discussed as an aspect out of which measurement parameters are identifiable. As per figure 2.5 on page 32, linkages to shapes and forms of teleworking practices have been illustrated. The foci of research now shifts to these shapes and forms

of teleworking namely, conceptualisations of teleworking in terms of *product technologies* (The Open University, 2005, pp.21-25). Conceptualisations of teleworking are definitive representations of the shapes and forms of teleworking and out of which further measurement parameters of teleworking could potentially be identifiable (namely, usage and utilisation levels of technology) and put forward to the comprehensive definition of teleworking. The following section adds clarification to teleworking practices.

### 2.1.1.2 Conceptual definitions [Clarification of teleworking]

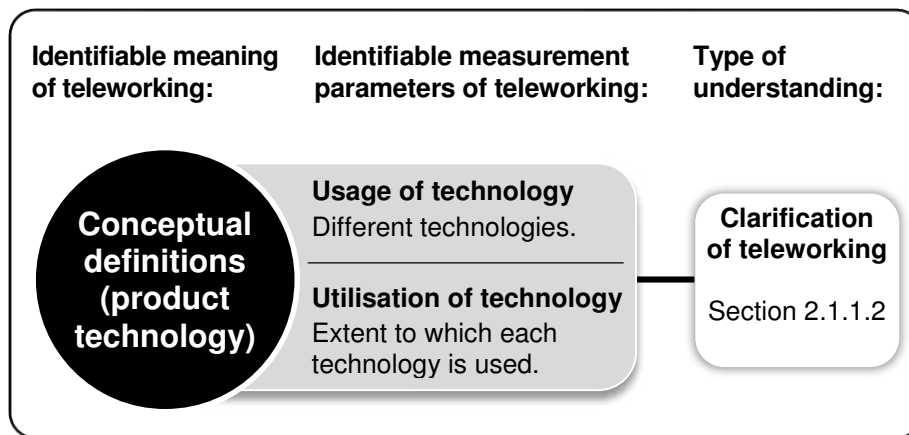


Figure 2.11: Summary of the conceptual definition of teleworking

#### 2.1.1.2.1 Introduction

Conceptualisations of teleworking are definitive representations of the shapes and forms of teleworking that is, *products of technology* (The Open University, 2005, pp.21-25). Hypothetically, usage and utilisation of technology at a consistent or generalisable ratio over time creates a meaningful translation of working practices to users; workers may refer to themselves as mobile workers, telecommuters or nomadic workers for example (as explained later in table 2.1 on page 42). Conceptualisations are an aspect out of which further measurement parameters of teleworking can be identified and put forward to the comprehensive definition of teleworking. To identify conceptualisations:

- 1) **theory of conceptualisation is explained,**
- 2) **conceptualisations are identified,**
- 3) **the extent to which there is a conceptualisation of teleworking that can be spoken of in terms of a representative, unified and overarching concept of all types of teleworking practices is discussed, and finally,**
- 4) **the section is concluded.**



### 2.1.1.2.2 Theory of conceptualisation

Theoretically, out of the flexibility of teleworking practices that is different usages and utilisations of technology and at a fixed or generalisable ratio over time, forms of teleworking practices are most likely to emerge in terms of that usage and utilisation of technology. Teleworking practices begin to take a shape that makes them distinct and distinguishable from each other and unique to the worker – as illustrated in figure 2.12 below.

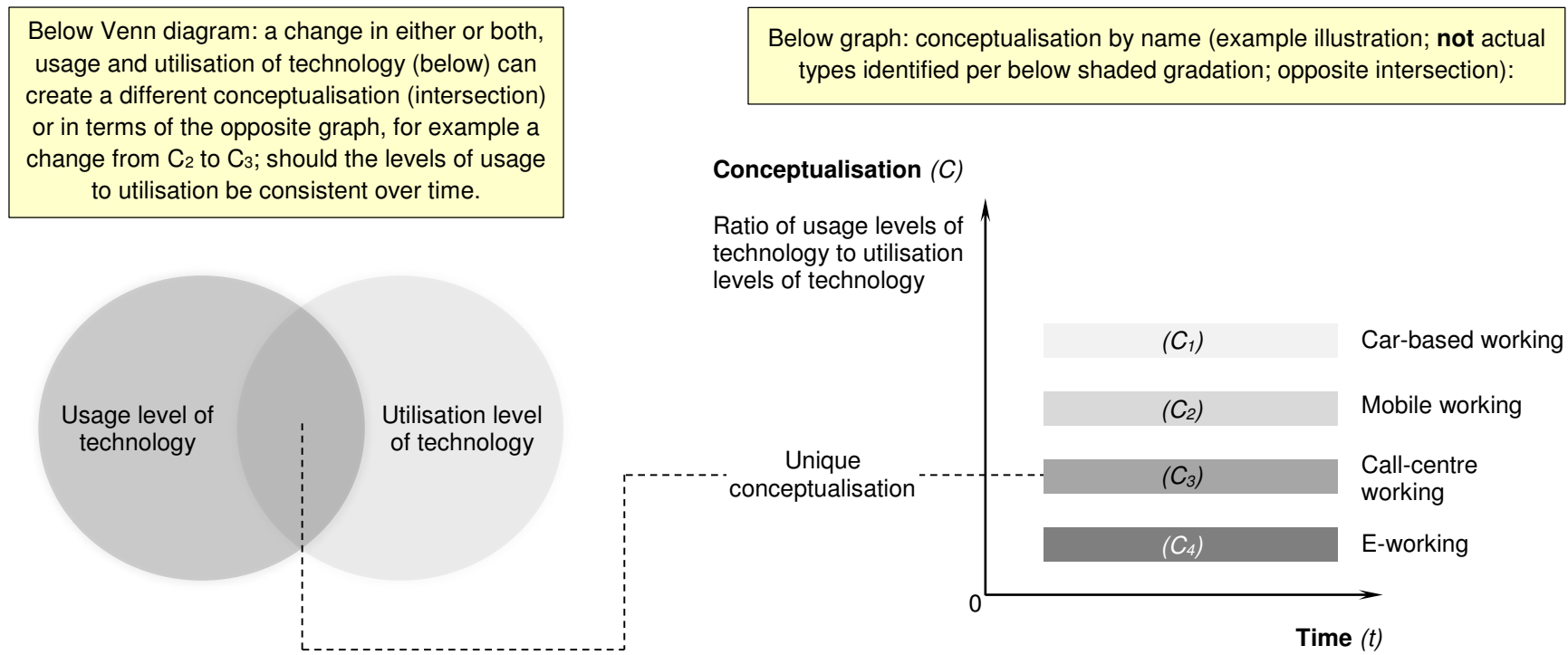


Figure 2.12: Technology intersection in terms of conceptualisation [example illustration]

Each conceptualisation is unfortunately identifiable as part of the same family at the root definition level (see earlier section 2.1.1). In other words the root definition cannot differentiate between the conceptualisations satisfactorily that is, mobile workers can be described in terms of physical distance they travel, yet the same can be said of call centre working should that call centre be situated at a distance from workers. Root definition alone is not a comprehensive definition of teleworking such that the conceptualisations cannot be clearly differentiated from each other consistently over time in terms of measurement parameters. The potential of a single, conceptual definition of telework to define all practical work contexts is considered in the following section. Firstly, the conceptualisations are identified.

#### 2.1.1.2.3 Identification of conceptualisations

A number of concepts have appeared since the term *teleworking* was first coined in the 1970s by Nilles (1975. *Cited In*: Bailey and Kurland, 2002, p.383). Conceptualisations identifiable as per existing literature are shown in table 2.1 on page 42. The term *teleworking* is adopted throughout this thesis as a basis for consistency. Table 2.1 on page 42 is by no means a complete list of conceptualisations (or rather, informal-types of teleworking practices); each is representative of a conceptualisation referred to in journal publications. Additional conceptualisations were found outside of this academic framework for example such as, *flexible workers*, *agile workers* and *work 2.0*. Technology enabled remote-working was conceptualised as inclusive to flexible-working practices (as per discussion with council-Z). Furthermore, the practice of hot-desking and remote working creates an agility for workers (a clarification that emerged out of discussion as per later pilot study, section 4.2), and further discussed as per Allsopp (2010). Work 2.0 describes the capacity of online technology that is, a progression from web sites that were firstly only viewable or read-only as opposed to today's reality whereby websites support interaction via for example online forums, and social media; the latter, a second type of advancement described as 2.0. Hence, 2.0-type technology adds capability to teleworking practices in terms of connectivity between employees for example.

#### 2.1.1.2.4 A representative, unified and overarching concept of all types of teleworking practices

There is a complexity apparent from the list in table 2.1 on page 42, the existence of many conceptualisations is indicative of inconsistencies that limit any use of one concept or collective set of concepts to describe and/or be applicable to all other concepts. A number of characteristics may be identifiable as per the conceptualisations: **type of work, physical location, distance and time (as per earlier section, root definition) and technology (current section) in terms of levels of usage and utilisation** (as illustrated in figure 2.12 above). For example *virtual work* may be defined more so in terms of technology and *electronic cottage* in terms of physical location and technology. As mentioned earlier the concept *teleworking* is used throughout this thesis as a basis for consistency. As illustrated in figure 2.12 on page 40, conceptualisations are formed out of usages and utilisations of technology over time. They are unique teleworking practices, that is they will have characteristics

that set them apart from other conceptualisations. A potentially overarching-type conceptual definition follows after the next table.

#	Conceptualisation (form of teleworking practice) [in alphabetical order; in bold for reading clarity]
1)	<b>'Call centres'</b> (Perez et al., 2004, p.656)
2)	<b>'Car-based working'</b> (Middleton and Cukier, 2006. <i>Cited In:</i> Hislop and Axtell, 2009, p.68)
3)	<b>'Computer-aided home-based work'</b> (Mirchandani, 2000. <i>Cited In:</i> Tietze et al., 2009, table I, p.597)
4)	<b>'Distance office'</b> (UK Parliament, 1995, p.1)
5)	<b>'Distance work'</b> (Di Martino and Wirth, 1990. <i>Cited In:</i> Teo and Lim, 1998, p.253)
6)	<b>'Electronic cottage'</b> (Toffler, 1980, pp.204–17. <i>Cited In:</i> Musson and Tietze, 2004, p.255; Chapman et al., 1995. <i>Cited In:</i> Teo and Lim, 1998, p.253)
7)	<b>'E-work'</b> (Flexibility, 2002)
8)	<b>'Flexiplace'</b> (Goodrich, 1990. <i>Cited In:</i> Teo and Lim, 1998, p.253)
9)	<b>'Home-based teleworking', 'homeworking' and 'working at home'</b> (Daniels et al., 2002, p.1154; Di Martino and Wirth, 1990. <i>Cited In:</i> Teo and Lim, 1998, p.253; Jackson, 1999. <i>Cited In:</i> Tietze and Musson, 2003, p.441; Bryant, 2000. <i>Cited In:</i> Tietze et al., 2009, table I, p.597; Pérez et al., 2002, p.276; Tietze et al., 2002, p.386)
10)	<b>'Hybrid workers'</b> (Halford, 2005. <i>Cited In:</i> Hislop, and Axtell, 2007, p.39)
11)	<b>'IT-supported working from home'</b> (Halford, 2006. <i>Cited In:</i> Tietze et al., 2009, table I, p.597)
12)	<b>'Mobile teleworking'</b> (Axtell et al., 2008, p.902; Daniels et al., 2002, p.1154)
13)	<b>'Mobile work'</b> (Hislop and Axtell, 2009, p.62)
14)	<b>'Multi-location working'</b> (Hislop and Axtell, 2009, p.62)
15)	<b>'Neighbourhood work centres'</b> (Tietze et al., 2002, p.386)
16)	<b>'Nomadic'</b> (UK Parliament, 1995, p.1; Felstead et al., 2005, p.136. <i>Cited In:</i> Hislop, and Axtell, 2007, p.43)
17)	<b>'Remote office work'</b> (Salomon and Salomon, 1984. <i>Cited In:</i> Teo and Lim, 1998, p.253)
18)	<b>'Remote-working'</b> (Pérez et al., 2002, p.276)
19)	<b>'Satellite centres'</b> (Jackson, 1999. <i>Cited In:</i> Tietze and Musson, 2003, p.441; Pérez et al., 2002, p.276)
20)	<b>'Telecenters' and 'Teleworking centers'</b> (Pérez et al., 2005, p.96)
21)	<b>'Telecommuting'</b> (Nilles, 1975. <i>Cited In:</i> Bailey and Kurland, 2002, p.383; Holloway, 2007. <i>Cited In:</i> Tietze et al., 2009, table I, p.597)
22)	<b>'Telecottages'</b> (Daniels et al., 2002, p.1154; UK Parliament, 1995, p.1)
23)	<b>'Teleservice centres'</b> (UK Parliament, 1995, p.1)
24)	<b>'Virtual work'</b> (Schwarz et al., 1999. <i>Cited In:</i> Tietze et al., 2009, p.587)

Table 2.1: Shapes and forms of teleworking practices in terms of conceptualisations

### Virtual work [Example]

The term *virtual* has legitimate connection with non-real/imaginary/non-existing aspects (Wilson and Greenhill, 2004, p.209). The concept *virtual work* would therefore be representative of a distinct separation from reality. An organisation has a number of realities (tangible outputs and experiences) for which *virtual work* as a concept may not fully encapsulate these, certainly in terms of a satisfactory conceptual definition. For example:

- 1) Electronic work has flexibility in terms of shape and form, that is, word processed documents and spreadsheets for example can be printed off on to paper. This output is representative of tangible products of an organisation, albeit produced out of virtual but real, tangible work.
- 2) All output may be viewed as electronic or as tangible products that is, they are available to others as opposed to being held solely in an imagination or virtual state without transition of any kind.
- 3) In addition, virtual work as mentioned earlier has connotations of technology usage and utilisation yet literally excludes conceptual distance; in other words, *virtual work* is assumed to be done, and disregards physical location.

Hence, *virtual work* by conceptual definition is not inclusive of the physical realities that manifest out of communication of the virtual world. Organisations do have physical and tangible realities which are somewhat excluded by (and an assumption of) the definition of *virtual work*.

To conclude, *virtual work* in terms of an over-arching type conceptual definition is limited to a fractional explanation of the wider comprehension of teleworking. Thus, *virtual work* is inconsistent to an over-arching-type conceptual definition for teleworking practices. Two additional examples of conceptualisations namely, electronic cottage and telecommuting have similar failings. Each term is discussed in terms of its overarching type potential and limitations in Appendix A.

#### 2.1.1.2.5 Conclusions [Conceptual definitions]

To conclude, forms of teleworking are hypothetically distinct from each other and there are many in use today; each an example of *product technologies* (The Open University, 2005, pp.21-25). In terms of a collective, single, and unified definition, conceptualising telework is not possible without neglecting the details (and thus measurement) of other work forms and this renders the utility of a conceptual definition redundant at least in terms of a satisfactory, measurement capacity.

To further identify the definitions within all forms of teleworking, an abstraction of teleworking is considered below.

### 2.1.1.3 Abstraction definition [A simplification of teleworking]

Drawing upon the earlier understanding of teleworking at root definition, and its further extension with regards to conceptualised working practices as per distance, time, location, work and technology, a simplification in terms of *application of technology* (The Open University, 2005, pp.21-25) is discussed below. This encapsulates definitions discussed above, through an abstraction definition.

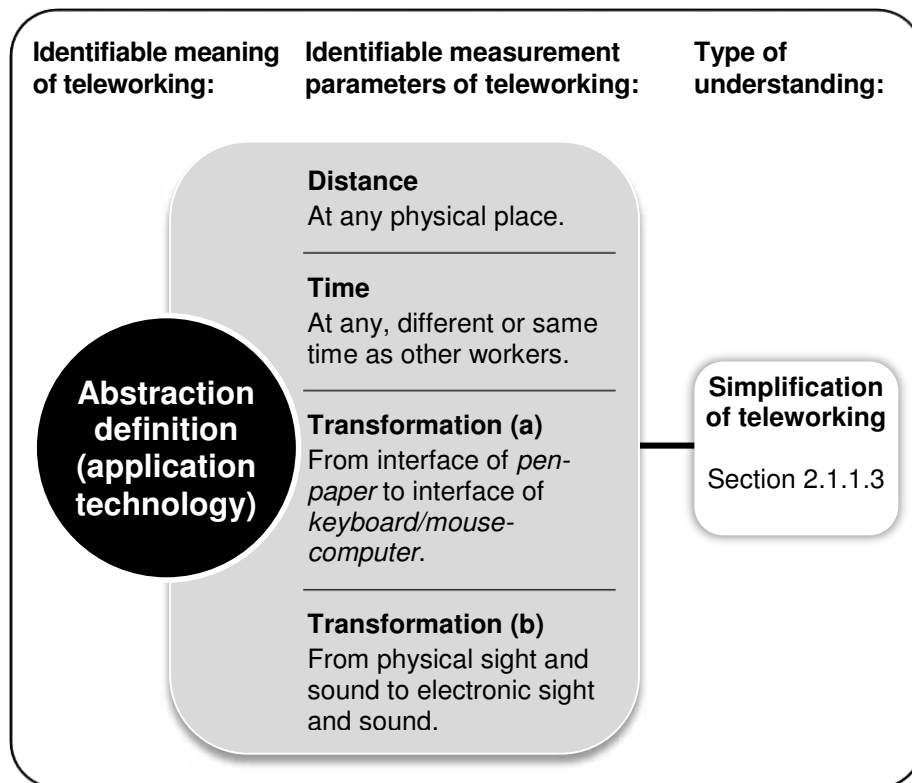


Figure 2.13: Summary of the definition of teleworking in terms of abstraction

#### 2.1.1.3.1 Capability

Electronic capabilities have increased significantly over the last decade due to advancements in hardware and software technologies. Teleworking in today's reality takes physical, human communication and output to a new level of practice and exchange, in terms of the capture (digital recording), storage (hard drive spaces) and network (reach) capabilities, human experience and its environment (sight, sound, place and its global communication).

In terms of distance and time (following discussion regarding the root definition), teleworkers can and do work at: (over page)

- 1) **at any time (albeit against contextual constraints, as highlighted by Axtell et al., 2008, in their paper) and,**
- 2) **out of any place, most notably at a distance from the designated or traditional, office place and space.**

Technological transformation of work has uprooted physical constraints in the sense that travelling to work and face-to-face meetings are no longer the sole platforms out of which employees have continuity in their work lives. Telework is a transformative working practice; an alternative, precedent and/or complementary approach to physical working. Examples of key transformations are listed below; and which supplement an abstraction definition as put forward in following section.

- 1) ***From paper to electronic documentation (from writing to typing), that is, the utilisation of different types of electronic applications for example, word processing, spreadsheets, emailing, forums, and bulletin boards to produce, process or deliver documentation (as opposed to physical delivery of physical letters and paper files for example).***
- 2) ***From physical, sight and sound (verbal and face-to-face communication) to electronic frameworks such as VoIP (Voice over Internet Protocol), video conferencing or streaming video.***

#### 2.1.1.3.2 Abstraction

Teleworking is defined in terms of an abstraction of teleworking, that is, a four-part (a to d) simplification of teleworking with a focus on application of technology:

**'Telework is (a) process, product and/or output of an electronic form; (b) created out of digital environments of space, place and time, (c) with electronic resources and applications (d) to a level of significance over the pre-digital era that is, an equivalence of, or an enhancement or improvement to, physical working.'**

The abstraction above is representative of the elements that are additionally relevant to a study of teleworking and this type of definition is a resource definition out of which models of teleworking can be created, developed and measured (section 2.1.3 below) and then tested (Chapter 6).

Although the above can be said of all persons that may use social media for example over a few days, a teleworker is so-called as per a larger the unit of time (the long term). In other words, consistently using and utilising technology over time defines a person as a teleworker – as stated in earlier section heading 'conceptual definitions' and illustrated in figure 2.12 on page 40. Furthermore, using and utilising technology is a broad definition of teleworking and as stated earlier different usages and utilisations of technology may produce different types of teleworkers. A more precise definition of teleworking can be found as per later section 4.3.1. In the aforementioned section,

technical factors (or dimensions) are used to identify teleworkers from the sample obtained from the survey. In terms of future utility and with larger sample sizes (for example 10,000 participants) data can be divided into types of teleworking for example, those that work off-site compared to those that work on-site with ICT. In addition, data may be divided into regular ICT workers and irregular ICT workers. There are 11 technical dimensions of teleworking; each a means to divide data according to a type of teleworking practice. The dimensions are manifest definitions: distance and time as discussed as per the root definition is manifestly related to onsite and offsite working as per the example given above. There isn't an exclusion of anyone that uses technology over time rather, there are different ways in which to divide the data and this benefits the researcher and provides an analysis potential that would otherwise require additional studies focused on each specific definition of teleworking. In other words, deploying questions regarding the 11 dimensions of teleworking allows a more efficient and effective use of data.

#### 2.1.1.3.3 Conclusions [Abstraction]

It is clear that an abstraction (simplification of teleworking) encapsulates application technology namely that teleworking is a multi-faceted digital viability with varying levels of application on a par with physical working. These facets align to earlier sections in that teleworking, as per production technology (root definition), can potentially take on many different shapes and forms such that there is an emergence of products of technology or types of practices as per conceptualisations (usage and utilisation of technology).

#### 2.1.1.4 Comprehensive definition of teleworking

There were four meaningful definitions as shown in figure 2.3 on page 31. The first, root meaning is defined in terms of *production technology* (The Open University, 2005, pp.21-25). The second, conceptual meaning is defined in terms of *product technology* (The Open University, 2005, pp.21-25). The third abstraction meaning is defined in terms of *application technology* (The Open University, 2005, pp.21-25). The fourth is an aggregation of the former three namely, a comprehensive definition of teleworking. As per the root definition, *indirectness* and physical *distance* were identifiable parameters of teleworking. Out of this *production technology*, conceptualisations and potentially types of teleworking practices were identifiable as *product technologies*. Measurement parameters of product technologies include work, location, distance, time, usages and utilisation of technology. Finally, an *abstraction definition* was put forward that encapsulated definitions in terms of *application technology* defining teleworking as a multi-faceted digital viability that can exist as a working practice on a par with physical working. Additional measurement parameters therefore include software applications (such as emailing, VoIP, word processing, spreadsheets via Web Outlook, Skype, MS Word, and MS Excel, respectively).

The following section concludes this section on the definitions of teleworking.

## 2.1.2 Conclusions [Definitions of teleworking]

The definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus. It was therefore important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Teleworking was defined in terms of meanings pertaining to *root definition* (production technology), *conceptual definition* (product technology) and *abstraction* (application technology). This improved level of comprehension enables standardised modelling of the definitions to be conducted.

*Root meaning* was defined in terms of *indirectness* and *distance*. Firstly, *indirectness* was identifiable a parameter of teleworking practice in terms of gateways, portals and access points; each of which can hinder or secure communications between participants. Secondly, human interaction via ICT and at a physical distance from the employer site was discussed and shown to clearly create a significant margin of benefit for workers. This margin was a sufficient benefit in terms of distance that *distance* was seen as a valid measurement parameter of teleworking as excluding it would mean excluding forms (or products) and applications of *distant working* from measurement too.

*Conceptual* meaning was defined in terms of shapes and forms or types of teleworking practices that have emerged over time. Forms of teleworking are hypothetically distinct from each other and there are many which co-exist today; each an example of *product technologies* (The Open University, 2005, pp.21-25). In terms of a collective, single, and unified definition, conceptualising telework is not possible without neglecting the details (and thus measurement) of other work forms and thus renders the utility of a conceptual definition redundant at least in terms of a satisfactory, measurement capacity. To further identify the elements within all forms of teleworking, an abstraction of teleworking was considered.

*Abstraction* meaning was defined in terms of an encapsulation and simplification of teleworking; more so in terms of application technology: teleworking as a multi-faceted digital viability with varying levels of application on a par with physical working. The facets align to earlier sections that is, teleworking as per production technology (root definition) enables teleworking to potentially take on many different shapes and forms such that there is an emergence of product technologies or types of practices as per conceptualisations (usage and utilisation of technology).

Teleworking was therefore defined in terms of *root definition*, *conceptual definition* and *abstraction* to a level of comprehension such that models of the definitions can be developed and standardised and ambiguity over the definition can be removed. Modelling of the definitions of teleworking now follows in the sections below. There were four models: firstly, a model of socio-factors of teleworking (in addition to example measures of the socio-factors); secondly, a maturity model of teleworking; thirdly, a model of technical factors of teleworking; and fourthly, a taxonomical model of teleworking.



### 2.1.3 Modelling the definitions of teleworking

Teleworking is a socio-technical working practice and so, to measure the comprehensive definition of teleworking four inter-related models as shown in figure 2.14 below were created. The models are summarised in terms of a six-step process as follows after figure 2.14 and explained in the sections after the aforementioned diagram:

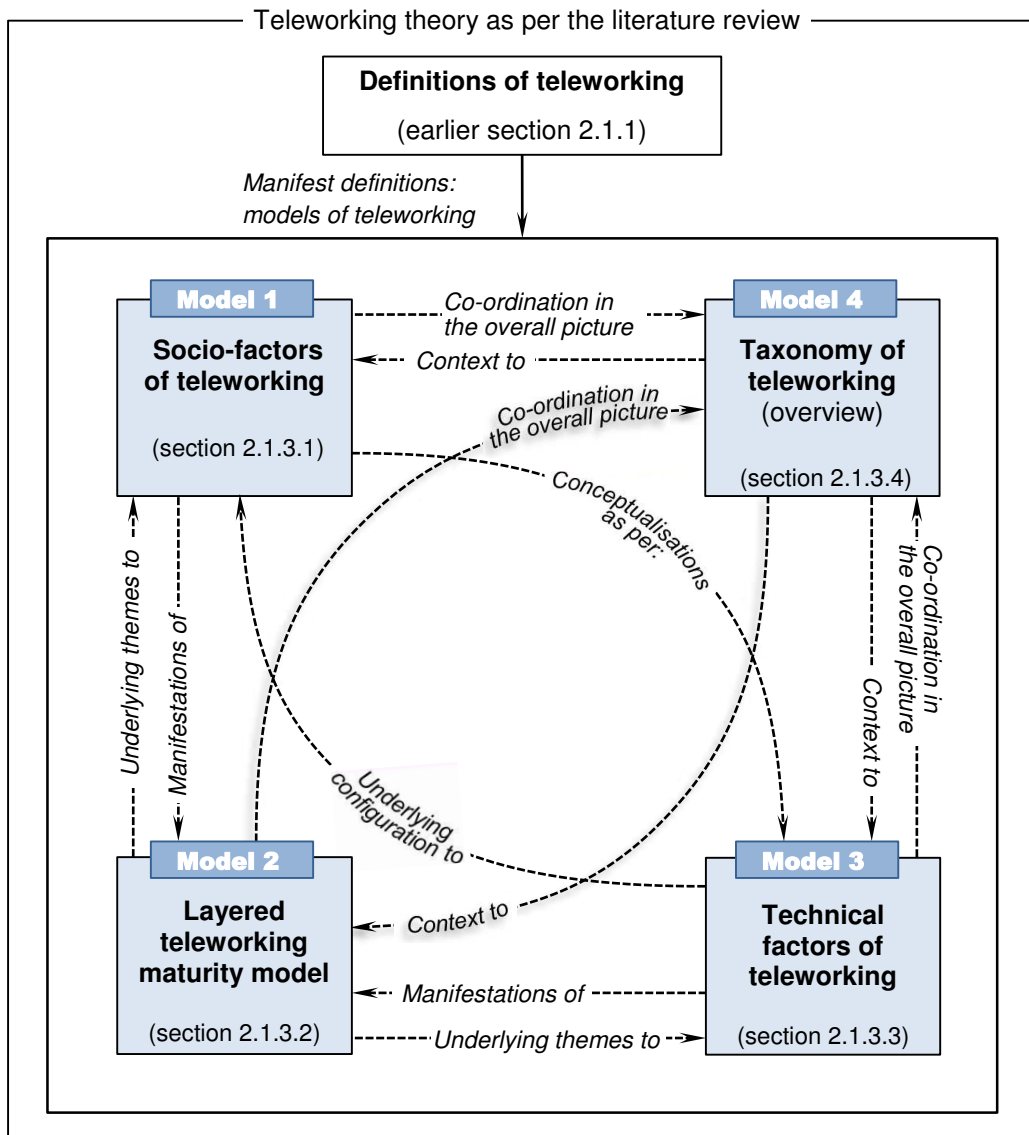


Figure 2.14: Theory of teleworking: modelling the definitions of teleworking

The aforementioned process is as follows:

**Firstly, the factors pertaining to the socio and technical were identified.**

**Secondly, a process of simplification followed whereby the identified socio-factors were distilled into two categories, major and minor. Major and minor factors are together, the model socio-factors of teleworking.**

**Thirdly, major socio-factors were further distilled that is, into three broader categories.**

**Fourthly, the three broader categories were identifiably consistent with the first three layers of the teleworking maturity model. Hence, teleworking can be modelled and explained coherently in terms of the maturity model.**

**Fifthly, technical factors were distilled into categories of dimensions and attributes. These categories together are the technical-model of teleworking.**

**Sixthly, and furthermore, the three models (socio, technical and maturity) were identifiably brought together as a fourth model: a taxonomy of teleworking. The taxonomy is representative of an overview and co-ordination of the aforementioned three: socio, technical, and maturity.**

**Seventhly, the four models (socio, technical, maturity and taxonomy) and how they inter-relate are shown diagrammatically in figure 2.14 on page 48.**

The first of the four models follows in the section below.

#### *2.1.3.1 Socio-factors of teleworking*

Explanations as per the socio-factors of teleworking also builds on the published work of Haq et al. (2012a and 2012b) and follows below.

##### *2.1.3.1.1 Manifest definitions: socio-model of teleworking*

In terms of the meanings of technology (The Open University, 2005, pp.21-25) the socio-model of teleworking is more strongly linked to product technology (as opposed to production technology) that is, mapping to the earlier discussion with regards to conceptualisations of teleworking (section 2.1.1.2) as opposed to root definition (section 2.1.1.1). In other words, socio-model of teleworking is matters pertaining to perception over nature, respectively. Thus, the socio-model had evolved in terms of how workers may perceive the impacts of teleworking (and which may lead to those conceptualisations as discussed earlier). This model is an indirect measure of conceptualised definitions of teleworking. There were a number of measures identifiable as per literature with regards to how workers perceive usage and utilisation of technology. In addition application technology (The

Open University, 2005, pp.21-25) as defined in terms of abstraction earlier (section 2.1.1.3) also links to perceptions that is, how technology is used in the workplace impacts on the perceptions of workers. For example, workers with limited access to technology and thus its application, may perceive teleworking as a hindrance to work (or resistance factor to completing work objectives).

In order to make sense of the teleworking literature and derive models (and subsequently measurements) of teleworking, four key stages of work followed with regards to the socio element of teleworking namely:

- 1) **Identification of socio-factors (Haq, 2012a, and 2012b);**
- 2) **Distilling of those socio-factors (Haq, 2012a, and 2012b) into minor and major categories,**
- 3) **Further distillation of the major socio-factors into three broad categories; and finally:**
- 4) **Mapping of the three broad categories to layers of the maturity model.**

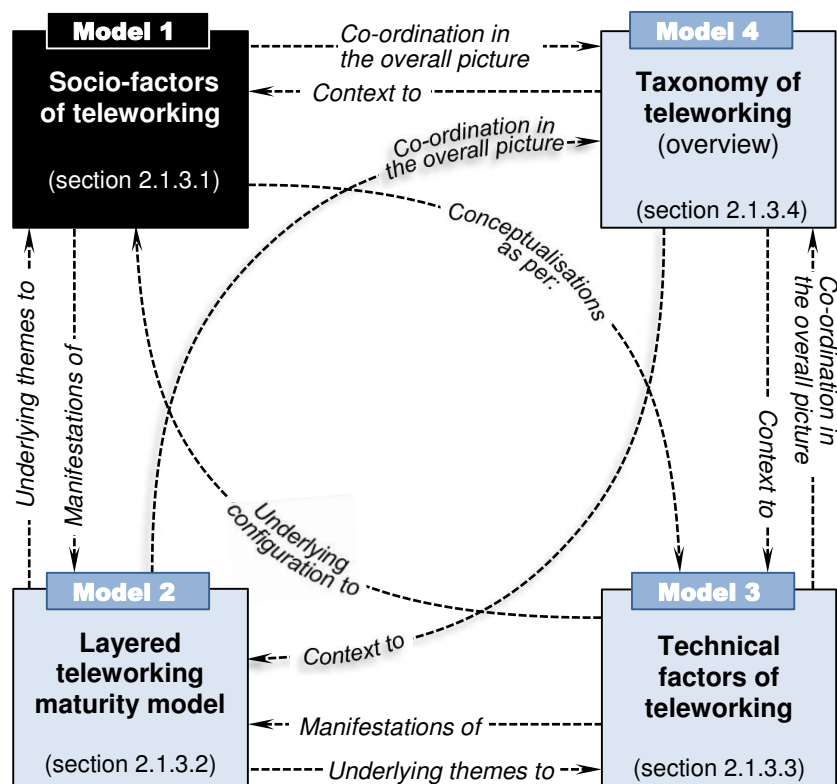


Figure 2.15: Socio-factors (modelling the comprehensive definition of teleworking)

#### 2.1.3.1.2 Identification of socio-factors

In order to make sense of the literature, eighty-eight (88) socio-factors were identified from existing literature; each and every socio-factor with linkages to teleworking. The minor socio-factors are as

shown in Haq (2012a, and 2012b); and listed across six tables: table 2.2 on page 52 to table 2.7 on page 57. Each of the identified socio-factors are representative of potential measurements (socio-measures) of teleworking (as per later analysis – Chapter 6).

#### 2.1.3.1.3 Categorisation of the socio-factors

To further clarify and simplify the work thus far, socio-factors were divided into two, *minor* and *major*:

##### 1) **Minor socio-factors (table 2.2 on page 52 to table 2.7 on page 57)**

Firstly, minor socio-factors (referred to as *latent factors* in the analysis chapter later in this thesis) equate to potential indirect measurements with regards to teleworking. For this reason the term *minor socio-factors* in this chapter is used interchangeably with term *measures*. The minor socio-factors are as shown listed across six tables:

- 1) table 2.2 on page 52
- 2) table 2.3 on page 53
- 3) table 2.4 on page 54
- 4) table 2.5 on page 55
- 5) table 2.6 on page 56; and
- 6) table 2.7 on page 57.

##### 2) **Major socio-factors (table 2.8 on page 58)**

Secondly, there were seven *major* socio-factors, that is underlying themes or groupings of minor socio-factors. The groupings of minor socio-factors to the seven major socio-factors are as shown in table 2.8 on page 58. In other words, an overarching-type consistency in terms of subject matter was identifiable across a number of minor socio-factors. Thus, the minor socio-factors were grouped together as an explanation of larger themed major socio-factors.

Minor socio-factor:	Citations:
1) <b>Absenteeism, Unscheduled leave or Sick leave</b>	Bricknell (1996. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Fawcner (2000), Frolick et al. (1993. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Harpaz (2002, p. 78), IVC and CTA (2011), Meadows (2007. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Teo and Lim (1998, p. 259), Washington-based Employment Policy Foundation (2004. <i>Cited In:</i> IVC and CTA, 2011).
2) <b>Autonomy and control</b>	Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Bailyn, 1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Bélanger (1999. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Burns (1979. <i>Cited In:</i> Alexander et al, 2010, p. 507), Daniels et al. (2001, Table I, p. 1152), Davenport and Pearlson, 1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Dimitrova (2003. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 385), Fairweather (1999. <i>Cited In:</i> Tietze and Musson, 2003, p. 442), Fletcher and Bailyn (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Halford (2005. <i>Cited In:</i> Tietze et al, 2009, p. 595), Harpaz (2002, p. 75), Hill et al. (2003. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Jenkins (2004. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 385), Kurland and Bailyn (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Musson and Tietze (2004, p. 260), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Sennett (1998. <i>Cited In:</i> Musson and Tietze, 2004, p. 254), Sennett (1998. <i>Cited In:</i> Tietze and Musson, 2003, p. 442), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Teo and Lim (1998, p. 256), Tietze and Musson (2003, p. 441).
3) <b>Availability of space</b>	Forlano (2008. <i>Cited In:</i> Hislop and Axtell, 2009, p. 61), Holm and Kendall (2008. <i>Cited In:</i> Hislop and Axtell, 2009, p. 61), Pérez et al. (2004, p. 661).
4) <b>Availability of technology</b>	Alexander et al. (2010, p. 520), Dugal and Roy (2002. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Forlano (2008. <i>Cited In:</i> Hislop and Axtell, 2009, p. 61), Fulk (2001. <i>Cited In:</i> Hislop and Axtell, 2007, p. 36), Hislop and Axtell (2009, p. 69), Holm and Kendall (2008. <i>Cited In:</i> Hislop and Axtell, 2009, p. 61), Pérez et al. (2005, p. 98), Pettigrew and Fenton (2000. <i>Cited In:</i> Hislop and Axtell, 2007, p. 36), Sánchez, et al. (2006, p. 205).
5) <b>Career prospects</b>	Ahmadi et al. (2000. <i>Cited In:</i> Baard and Thomas, 2010, p. 1), Baard and Thomas (2010, p. 6), Collins (2005. <i>Cited In:</i> Tietze et al, 2009, p. 592), Daniels et al. (2001, Table I, p. 1152), Duxbury et al. (1987. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Greenhill and Wilson (2006, p. 385), Harpaz (2002, p. 76, p. 77), Reilly (2001. <i>Cited In:</i> Tietze and Musson, 2003, p. 441), Teo and Lim (1998, p. 258), Tietze et al. (2002, p. 395), Webster (1996. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 213).
6) <b>Centralised structure</b>	Harpaz (2002, p. 78).
7) <b>Collective representation</b>	Daniels et al. (2001, Table I, p. 1152).
8) <b>Commitment to job</b>	Teo and Lim (1998, p. 255).
9) <b>Commitment to organisation</b>	Harpaz (2002, p. 76), Igbaria and Guimaraes (1999. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Tietze and Musson (2003, p. 441).
10) <b>Community and Society</b>	Allenby and Richards (2005. <i>Cited In:</i> Allenby et al, 2005, p. 1035), Clean Air Council (2003. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Daniels et al. (2001, Table I, p. 1152), Harpaz (2002, p. 79), US Department of Transportation (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238).
11) <b>Commuting Mileage</b>	Baard and Thomas (2010, p. 7), Daniels et al. (2001, Table I, p. 1152), Kitamura et al. (1990. <i>Cited In:</i> Popuri and Bhat, 2002, p. 1), Koening et al. (1996. <i>Cited In:</i> Alexander et al, 2010, p. 506), Mokhtarian (1990. <i>Cited In:</i> Popuri and Bhat, 2002, p. 1), Mokhtarian (2000. <i>Cited In:</i> Popuri and Bhat, 2002, p. 1), Mokhtarian et al. (1995. <i>Cited In:</i> Mannering and Mokhtarian, 1995, pp.49-50), Moss and Townsend (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1035), Pendyala et al. (1991. <i>Cited In:</i> Alexander et al, 2010, p. 506).
12) <b>Commuting Stress</b>	Harpaz (2002, p. 76), Huws (1993. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 382), Tietze and Musson (2003, p. 441).
13) <b>Commuting time and expense</b>	Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Bailyn (1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Davenport and Pearlson (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Di Martino and Wirth (1990. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 382), Di Martino and Wirth (1990. <i>Cited In:</i> Teo and Lim, 1998, p. 260), Di Martino and Wirth (1990. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Fletcher and Bailyn (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Huws (1993. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Huws et al. (1990. <i>Cited In:</i> Teo and Lim, 1998, p. 260), IVC and CTA (2011), Kurland and Bailyn (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Papalexandris and Kramar (1997. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 382), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Teo and Lim (1998, p. 260), Tung et al. (1995. <i>Cited In:</i> Teo and Lim, 1998, p. 260), Ward and Shabha (2001. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 382), Ward and Shabha (2001. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211).
14) <b>Company image</b>	Harpaz (2002, p. 78), Pérez et al. (2005, pp.107-8), Teo and Lim (1998, p. 259).
15) <b>Compensation to employees</b>	Robèrt and Börjesson (2006, p. 521).

Table 2.2: Minor socio-factors identified as per existing literature [1 of 6]

Minor socio-factor:	Citations:
16) Competitiveness	Powell and Dent-Micallef, (1997. <i>Cited In:</i> Pérez et al, 2005, p. 98).
17) Contract and rights	Harpaz (2002, p. 78, p. 79).
18) Cost of new performance measures	Daniels et al. (2001, p. 1152), Jackson and van der Wielen (1998. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Teo and Lim (1998, p. 259).
19) Cost of roads	Clean Air Council (2003. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Harpaz (2002, p. 79), Teo and Lim (1998, p. 256, p. 262).
20) Costs (in general)	Allenby and Roitz (2003. <i>Cited In:</i> Allenby et al, 2005, p. 1034), AT&T (2002. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Cisco (2009. <i>Cited In:</i> IVC and CTA, 2011), Conner (2003. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Harpaz (2002, p. 74, p. 76), Hesse and Grantham (1991. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Hill et al. (1998. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Pérez et al. (2005, p. 110), Roitz et al. (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1034), Siha and Monroe (2006, p. 471), Teo and Lim (1998, p. 253).
21) Co-workers	Becker et al. (1994. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Collins (2005. <i>Cited In:</i> Tietze et al, 2009, p. 592), Ducharme and Martin (2000. <i>Cited In:</i> Golden, 2007, p. 1645), Duxbury and Neufeld (1999. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Golden (2007. <i>Cited In:</i> Tietze et al, 2009, p. 592), Hitlan et al. (2006. <i>Cited In:</i> Golden, 2007, p. 1645), Igbaria and Guimaraes (1999. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Teo and Lim (1998, p. 258), Tietze et al. (2006. <i>Cited In:</i> Tietze et al, 2009, p. 592).
22) Creativity and knowledge transfer	Hall and Richter (1990. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Kraut et al. (1990. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393).
23) Customer service, Time to delivery	Duxbury and Neufeld (1999. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393, Kowalski and Swanson (2005. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Morgan (2004. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Shekhar (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 2).
24) Decentralised structure	Harpaz (2002, p. 79).
25) Disabled workers	Allenby et al. (2005, p. 1036), Harpaz (2002, p. 78), Kepczyk (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Matthes (1992. <i>Cited In:</i> Bailey and Kurland, 2002, p. 384), Matthes (1992. <i>Cited In:</i> Perez et al, 2004, p. 656), Patrickson (2002. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Wilson and Greenhill (2004, p. 211).
26) Disruptions	Allenby and Roitz (2003. <i>Cited In:</i> Allenby et al, 2005, p. 1034), Allenby et al. (2005, p. 1035), Daniels et al. (2001, Table I, p. 1152), Daniels et al. (2001. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), IVC and CTA (2011), Roitz et al. (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1034).
27) Distractions and interruptions	Daniels et al. (2001, Table I, p. 1152), Duxbury and Neufeld (1999. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Hartman et al. (1992. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Manning (1985. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393).
28) Effectiveness	Watad and Paterson (2010).
29) Efficiency	Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Baily (1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Bélanger (1999. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Davenport and Pearlson (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Fletcher and Baily (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Harpaz (2002, p. 77), Hill et al. (2003. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Kurland and Baily (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386).
30) Energy consumption	Allenby et al. (2005, p. 1035), Clean Air Council (2003. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Harpaz (2002, p. 74, p. 76), Mokhtarian et al. (1995. <i>Cited In:</i> Mannering and Mokhtarian, 1995, p. 50), Moss and Townsend (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1035).
31) Entrepreneurial activity	Daniels et al. (2001, Table I, p. 1152).
32) Environment	Arnfolk (2002. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Bernardino and Ben-Akiva (1996. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330), Bernardino et al. (1993. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330), Harpaz (2002, p. 76), Mahmassani et al. (1993. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330), Moss and Townsend (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1035), Robèrt (2000, 2005. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Siha and Monroe (2006, p. 471), Sullivan et al. (1993. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330), U.S. Department of Transportation (1993. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Yen and Mahmassani (1997. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330), Yen et al. (1994. <i>Cited In:</i> Mamdoohi et al, 2006, p. 330).
33) Explicit knowledge	Watad and Paterson (2010).

Table 2.3: Minor socio-factors identified as per existing literature [2 of 6]

	Minor socio-factor:	Citations:
34)	Exploitation of teleworkers	Greenhill and Wilson (2006, p. 380), Hadden and Silverstone, (1993. <i>Cited In:</i> Tietze and Musson, 2003, p. 442).
35)	Global Competitiveness	Conner (2003. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Kowalski and Swanson (2005, p. 238).
36)	Health and safety	Greenhill and Wilson (2006, p. 382).
37)	Health and well-being	Baard and Thomas (2010, p. 7), Musson and Tietze (2004. <i>Cited In:</i> Tietze et al, 2009, p. 591).
38)	Identity of teleworkers	Brocklehurst (2001. <i>Cited In:</i> Pérez et al, 2005, p. 99), Harpaz (2002, p. 76), Kaufmann (2002. <i>Cited In:</i> Hislop and Axtell, 2007, p. 44), Mirchandani (1998. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 216), Reilley (2001. <i>Cited In:</i> Tietze and Musson, 2003, p. 441), Sennett (1998. <i>Cited In:</i> Musson and Tietze, 2004, p. 254), Tietze et al. (2002, p. 395).
39)	Income	Felstead and Jewson (1996. <i>Cited In:</i> Tietze et al, 2002, p. 385), Gerson and Kraut (1988. <i>Cited In:</i> Tietze et al, 2002, p. 385), Mayhew and Quinlan (1998. <i>Cited In:</i> Tietze et al, 2002, p. 385), Webster (1996. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 213), Wilsker (2008. <i>Cited In:</i> Baard and Thomas, 2010, p. 3).
40)	Insurance issues	Kepczyk (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 3).
41)	Investment costs: in general (with regards to teleworking)	Daniels et al. (2001, Table I, p. 1152), GSA (2006. <i>Cited In:</i> Sener and Bhat, 2009, p. 2), Lupton and Haynes (2000, p. 325), Mannering and Mokhtarian (1995, p. 50), Teo and Lim (1998, p. 259), Wilson and Greenhill (2004, p. 211).
42)	Isolation	Ahmadi et al. (2000. <i>Cited In:</i> Baard and Thomas, 2010, p. 1), Baruch (2000. <i>Cited In:</i> Hislop and Axtell, 2011, p. 43), Bussing (1998. <i>Cited In:</i> Harpaz, 2002, p. 77), Cascio (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 243), Connelly (1995. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 243), Daniels et al. (2001, Table I, p. 1152), Fawkner (2000), Greenhill and Wilson (2006, p. 383, p. 385), Hislop and Axtell (2011, p. 54), Mann and Holdsworth (2003. <i>Cited In:</i> Hislop and Axtell, 2011, p. 43), Mann et al. (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 243), Pérez et al. (2005, p. 97), Reilley (2001. <i>Cited In:</i> Tietze and Musson, 2003, p. 441), Reinsch (1997. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 243), Tietze et al. (2002, p. 395), Watad and Paterson (2010).
43)	Job satisfaction	Chapman et al. (1995. <i>Cited In:</i> Golden, 2007, p. 1642), Collins (2005. <i>Cited In:</i> Tietze et al, 2009, p. 592), Golden and Veiga (2005. <i>Cited In:</i> Golden, 2007, p. 1642), Hamilton et al. (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Huws (1993. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Igbaria and Guimaraes (1999. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Martinez-Sanchez et al. (2008. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), McCloskey and Igbaria (1998. <i>Cited In:</i> Golden, 2007, p. 1642), Musson and Tietze (2004. <i>Cited In:</i> Tietze et al, 2009, p. 591), Pratt (1993. <i>Cited In:</i> Harpaz, 2002, p. 78), Siha and Monroe (2006, p. 471), Teo and Lim (1998, p. 255).
44)	Knowledge creation: Combination [Explicit to Explicit]	Watad and Paterson (2010).
45)	Knowledge creation: Externalisation [Tacit to Explicit]	Watad and Paterson (2010).
46)	Knowledge creation: Internalisation [Explicit to Tacit]	Watad and Paterson (2010).
47)	Knowledge creation: Socialisation [Tacit into Tacit]	Becker et al. (1994. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Daft and Lengel (1986. <i>Cited In:</i> Golden, 2007, p. 1645), Leonard and Sensiper (1998. <i>Cited In:</i> Watad and Paterson, 2010), Pérez et al. (2005, p. 110), Sánchez, et al. (2006, p. 205), Short et al. (1976. <i>Cited In:</i> Golden, 2007, p. 1645), Tietze and Musson (2003, p. 441), Watad and Paterson (2010).
48)	Loyalty	Baard and Thomas (2010, p. 6), Kurland and Egan (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Teo and Lim (1998, p. 255).
49)	Managerial support	Ahmadi et al. (2000. <i>Cited In:</i> Baard and Thomas, 2010, p. 1), Harpaz (2002, p. 77), Lupton and Haynes (2000, p. 325), Nilles (1998. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 239), Ruppel and Harrington (1995. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 239).

Table 2.4: Minor socio-factors identified as per existing literature [3 of 6]

<b>Minor socio-factor:</b>	<b>Citations:</b>
50) <b>Marginalisation, discrimination or inequality</b>	Allenby et al. (2005, pp.1035-1036), Bryant (2000. <i>Cited In:</i> Tietze et al, 2009, p. 592), Felstead and Jewson (1996. <i>Cited In:</i> Tietze et al, 2002, p. 385), Gerson and Kraut (1988. <i>Cited In:</i> Tietze et al, 2002, p. 385), Hadden and Silverstone, (1993. <i>Cited In:</i> Tietze and Musson, 2003, p. 442), Harpaz (2002, p. 79), Mayhew and Quinlan (1998. <i>Cited In:</i> Tietze et al, 2002, p. 385), Phizacklea and Wolkowitz (1995. <i>Cited In:</i> Tietze et al, 2009, p. 593).
51) <b>Monitoring</b>	Pérez et al. (2005, p. 99).
52) <b>Morale</b>	Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Baard and Thomas (2010, p. 6), Bailyn, 1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Davenport and Pearlson, 1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Fletcher and Bailyn (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Hamilton et al. (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), IVC and CTA (2011), Kurland and Bailyn (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Lupton and Haynes (2000, p. 326), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Martinez-Sanchez et al. (2008. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Pitt-Catsoupes and Marchetta (1991. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Teo and Lim (1998, p. 255), Tietze and Musson (2003, p. 441).
53) <b>Motivation</b>	Daniels et al. (2001, Table I, p. 1152), Lupton and Haynes (2000, p. 326), Pratt (1993. <i>Cited In:</i> Harpaz, 2002, p. 78), Wilson and Greenhill (2004, p. 211).
54) <b>National economy</b>	Kowalski and Swanson (2005, p. 238).
55) <b>Older workforce</b>	AARP (2002. <i>Cited In:</i> Allenby et al, 2005, p. 1036), Allenby et al. (2005, pp.1035-1036), Harpaz (2002, p. 78), The Conference Board (2002. <i>Cited In:</i> Allenby et al, 2005, p. 1036).
56) <b>Over-availability</b>	Greenhill and Wilson (2006, p. 385), Harpaz (2002, p. 77), Wilson and Greenhill (2004, p. 212).
57) <b>Over-working</b>	Baard and Thomas (2010, p. 7), Daniels et al. (2001, Table I, p. 1152), Fawkner (2000), Greenhill and Wilson (2006, p. 380), Musson and Tietze (2004, p. 256).
58) <b>Policy and agreement</b>	Duxbury and Neufeld (1999. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Hartman et al. (1992. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393), Hislop and Axtell (2009, p. 69), Manning (1985. <i>Cited In:</i> Bailey and Kurland, 2002, p. 393).
59) <b>Pollution</b>	Clean Air Council (2003. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Daniels et al. (2001, Table I, p. 1152), Handy and Mokhtarian (1995. <i>Cited In:</i> Bailey and Kurland, 2002, p. 384), Handy and Mokhtarian (1996. <i>Cited In:</i> Perez et al, 2004, p. 656), Harpaz (2002, p. 79), Lupton and Haynes (2000, p. 327), Mokhtarian et al. (1995. <i>Cited In:</i> Manner and Mokhtarian, 1995, pp.49-50), Novaco et al. (1991. <i>Cited In:</i> Bailey and Kurland, 2002, p. 384), Novaco et al. (1991. <i>Cited In:</i> Perez et al, 2004, p. 656), Popuri and Bhat (2002, p. 1), US Department of Transportation (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Wilson and Greenhill (2004, p. 211).
60) <b>Pool of candidates</b>	Harpaz (2002, p. 74), Kowalski and Swanson (2005. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Morgan (2004. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Shekhar (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 2).
61) <b>Productivity</b>	AT&T (2002. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Baard and Thomas (2010, p. 6), Bailey and Kurland (2002, p. 393), BT (n.d. <i>Cited In:</i> TelCoa, 2007), Cisco (2009. <i>Cited In:</i> IVC and CTA, 2011), Collins (2005. <i>Cited In:</i> Tietze et al, 2009, p. 592), Daniels et al. (2001, Table I, p. 1152), Duxbury and Neufeld (1999. <i>Cited In:</i> Bailey and Kurland, 2002, p. 391), Duxbury et al. (1987. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Duxbury et al. (1998. <i>Cited In:</i> Bailey and Kurland, 2002, p. 391), Harpaz (2002, p. 77), Hesse and Grantham (1991. <i>Cited In:</i> Harpaz, 2002, p. 78), Hesse and Grantham (1991. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Hill et al. (1998. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), IVC and CTA (2011), Kinsman (1989. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Lupton and Haynes (2000, p. 326), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Murray et al. (1997. <i>Cited In:</i> Lupton and Haynes, 2000, p. 326), Pérez et al. (2005, p. 110), Schramm (2010, p. 152), Siha and Monroe (2006, p. 471), Siha and Monroe (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 1), Teo and Lim (1998, p. 253, p. 258), Tietze and Musson (2003, p. 441), Venkatesh and Vitalari (1992. <i>Cited In:</i> Alexander et al, 2010, p. 508).
62) <b>Public transportation pressure</b>	Harpaz (2002, p. 79).
63) <b>Recruitment potential / capability</b>	Baruch (2003. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Conner (2003. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Di Martino and Wirth (1990. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Fawkner (2000), Goodrich (1990. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Heneman and Greenberger (2002. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Ingham (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), IVC and CTA (2011), Kowalski and Swanson (2005. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Lupton and Haynes (2000, p. 326), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Manochehri and Pinkerton (2003. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 238), Morgan (2004. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Pratt (1984. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Robert Half International (n.d. <i>Cited In:</i> TelCoa, 2007), Shekhar (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 2).

Table 2.5: Minor socio-factors identified as per existing literature [4 of 6]



	Minor socio-factor:	Citations:
64)	Relocation costs	Daniels et al. (2001, Table I, p. 1152), Fawkner (2000), IVC and CTA (2011), Lupton and Haynes (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i>
65)	Retention	AT&T (2002. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> AT&T (n.d. <i>Cited In: TelCoa, 2007).</i> Baruch (2003. <i>Cited In: Baard and Thomas, 2010, p. 2).</i> Daniels et al. (2001, Table I, p. 1152), Duxbury et al. (1987. <i>Cited In: Wilson and Greenhill, 2004, p. 211).</i> Heneman and Greenberger (2002. <i>Cited In: Baard and Thomas, 2010, p. 2).</i> Igbaria and Guimaraes (1999. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Ingham (2006. <i>Cited In: Baard and Thomas, 2010, p. 2).</i> IVC and CTA (2011), Johnson (2004. <i>Cited In: Baard and Thomas, 2010, p. 3).</i> Kinsman (1989. <i>Cited In: Wilson and Greenhill, 2004, p. 211).</i> Lupton and Haynes (2000, p. 326), Lupton and Haynes (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i>
66)	Road accidents	Clean Air Council (2003. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Harpaz (2002, p. 79), US Department of Transportation (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i>
67)	Security concerns	Henderson (1995. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Kepczyk (1999. <i>Cited In: Baard and Thomas, 2010, p. 3).</i> Lupton and Haynes (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Pérez et al. (2005, pp.108-109), Teo and Lim (1998, p. 260).
68)	Selection, training and support costs	Daniels et al. (2001, p. 1152), Harpaz (2002, p. 78), IVC and CTA (2011), Kepczyk (1999. <i>Cited In: Baard and Thomas, 2010, p. 3).</i> Lupton and Haynes (2000, p. 327), Salmon et al. (2000. <i>Cited In: Pérez et al, 2005, p. 110).</i> Watad and DiSanzo (2000. <i>Cited In: Watad and Paterson, 2010).</i> Watad and Paterson (2010), Wilson and Greenhill (2004, p. 211).
69)	Space sharing privacy	Axtell et al. (2008, p. 904, 908), Zalesny and Farace (1987. <i>Cited In: Teo and Lim, 1998, p. 258).</i>
70)	Staff turnover	Golden (2007, p. 1649), Teo and Lim (1998, p. 259), Washington-based Employment Policy Foundation (2004. <i>Cited In: IVC and CTA, 2011).</i>
71)	Staffing flexibility	Daniels et al. (2001, Table I, p. 1152), Duxbury et al. (1987. <i>Cited In: Wilson and Greenhill, 2004, p. 211).</i> Kinsman (1989. <i>Cited In: Wilson and Greenhill, 2004, p. 211).</i>
72)	Strategic alliances	Watad and Paterson (2010).
73)	Stress	Bailey and Kurland (2002, p. 393), Felstead and Jewson (1996. <i>Cited In: Tietze et al, 2002, p. 385).</i> Gerson and Kraut (1988. <i>Cited In: Tietze et al, 2002, p. 385).</i> Hayden (2007. <i>Cited In: Baard and Thomas, 2010, p. 4).</i> IVC and CTA (2011), Martinez-Sanchez et al. (2008. <i>Cited In: Baard and Thomas, 2010, p. 1).</i> Mayhew and Quinlan (1998. <i>Cited In: Tietze et al, 2002, p. 385).</i> Teo and Lim (1998, p. 255), Tietze et al. (2002, p. 395).
74)	Supervisor-employee	Daniels et al. (2001, Table I, p. 1152), Dimitrova (2003. <i>Cited In: Greenhill and Wilson, 2006, p. 385).</i> Greenhill and Wilson (2006, p. 380), Halford (2005. <i>Cited In: Tietze et al, 2009, p. 595).</i> Jenkins (2004. <i>Cited In: Greenhill and Wilson, 2006, p. 385).</i> Teo and Lim (1998, p. 258, p. 259), Wilson and Greenhill (2004, p. 211).
75)	Surveillance	Brocklehurst (2001. <i>Cited In: Musson and Tietze, 2004, p. 260).</i> Dennison (1990. <i>Cited In: Musson and Tietze, 2004, p. 260).</i> Dimitrova (2003. <i>Cited In: Greenhill and Wilson, 2006, p. 385).</i> Fairweather (1999. <i>Cited In: Musson and Tietze, 2004, p. 260).</i> Fairweather (1999. <i>Cited In: Tietze and Musson, 2003, p. 442).</i> Jenkins (2004. <i>Cited In: Greenhill and Wilson, 2006, p. 385).</i> Musson and Tietze (2004, p. 260), Rifkin (1995. <i>Cited In: Musson and Tietze, 2004, p. 260).</i> Sennett (1998, p. 59. <i>Cited In: Musson and Tietze, 2004, p. 253).</i> Sennett (1998. <i>Cited In: Tietze and Musson, 2003, p. 442).</i> Tietze and Musson (2003, p. 451).
76)	Tax issues	Greenhill and Wilson (2006, p. 382).
77)	Team-working and collaboration	Bibby (2003. <i>Cited In: Wilson and Greenhill, 2004, p. 213).</i> Harpaz (2002, p. 77), Lupton and Haynes (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Pérez et al. (2005, p. 98), Sánchez, et al. (2006, p. 205, p. 211).
78)	Teleworking friendly jobs	Sánchez, et al. (2006, p. 205).
79)	Time management	Bailey and Kurland (2002, p. 393).
80)	Traffic congestion	Allenby et al. (2005, p. 1035), Bernardino and Ben-Akiva (1996. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i> Bernardino et al. (1993. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i> Clean Air Council (2003. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Daniels et al. (2001, Table I, p. 1152), Handy and Mokhtarian (1995. <i>Cited In: Bailey and Kurland, 2002, p. 384).</i> Handy and Mokhtarian (1996. <i>Cited In: Perez et al. 2004, p. 656).</i> Mahmassani et al. (1993. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i> Mokhtarian (1998. <i>Cited In: Alexander et al, 2010, p. 506).</i> Novaco et al. (1991. <i>Cited In: Bailey and Kurland, 2002, p. 384).</i> Novaco et al. (1991. <i>Cited In: Perez et al, 2004, p. 656).</i> Popuri and Bhat (2002, p. 1), Sener and Bhat (2009, p. 1), Sullivan et al. (1993. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i> US Department of Transportation (2000. <i>Cited In: Kowalski and Swanson, 2005, p. 238).</i> Wilson and Greenhill (2004, p. 211), Yen and Mahmassani (1997. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i> Yen et al. (1994. <i>Cited In: Mamdoohi et al, 2006, p. 330).</i>

Table 2.6: Minor socio-factors identified as per existing literature [5 of 6]

Minor socio-factor:	Citations:
81) Trust	Davenport and Pearlson (1998. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 239), Halford (2005. <i>Cited In:</i> Tietze et al, 2009, p. 595), Harrington and Ruppel (1999. <i>Cited In:</i> Golden, 2007, p. 1648), Kurland and Egan (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Lupton and Haynes (2000. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 239), Mirchandani (1998. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 217), Pérez et al. (2005, p. 109), Sennett (1998. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 216), Tietze and Musson (2003, p. 441), Wilson and Greenhill (2004, p. 211).
82) Utilisation of resources: space savings	Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Bailyn, 1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Baruch (2003. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Brown and O'Hara (2003. <i>Cited In:</i> Hislop and Axtell, 2007, p. 36), Daniels et al. (2001, Table I, p. 1152), Davenport and Pearlson (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Duxbury et al. (1987. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Egan (1997. <i>Cited In:</i> Bailey and Kurland, 2002, p. 383), Fawkner (2000), Felstead et al. (2003. <i>Cited In:</i> Hislop and Axtell, 2007, p. 36), Fletcher and Bailyn (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Goodrich (1990. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Hardill and Green (2003. <i>Cited In:</i> Hislop and Axtell, 2007, p. 36), Harpaz (2002, p. 78), Heneman and Greenberger (2002. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), Hislop and Axtell (2007, p. 36), Ingham (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 2), IVC and CTA (2011), Kinsman (1989. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 211), Kowalski and Swanson (2005, p. 238), Kurland and Bailyn (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Lam et al. (1995. <i>Cited In:</i> Teo and Lim, 1998, p. 258), Lupton and Haynes (2000, p. 325), Pérez et al. (2004, p. 658), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Robèrt and Börjesson (2006, p. 542), Schramm (2010, p. 152), Sener and Bhat (2009, p. 2), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Tietze and Musson (2003, p. 441), Tung et al. (1995. <i>Cited In:</i> Teo and Lim, 1998, p. 258).
83) Utilisation of resources: tools	Sánchez, et al. (2006, p. 211), Thomas et al. (2007. <i>Cited In:</i> Watad and Paterson, 2010).
84) Women work force: prospects	Adam and Green (1998. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 383), Alvesson and Willmott (2002. <i>Cited In:</i> Musson and Tietze, 2004, p. 255), Greenhill and Wilson (2006, pp. 382-383), Johnson (2004. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Musson and Tietze (2004, p. 256), Perrons (2003, p. 66. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 380), Tietze et al. (2009, p. 599), Webster (1996. <i>Cited In:</i> Wilson and Greenhill, 2004, p. 213), Wilson and Greenhill (2004, p. 211), Wilson and Greenhill (2004. <i>Cited In:</i> Tietze et al, 2009, p. 593).
85) Workforce in rural or remote areas	Daniels et al. (2001, Table I, p. 1152), Kepczyk (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Patrickson (2002. <i>Cited In:</i> Baard and Thomas, 2010, p. 3).
86) Workforce regarding: parents or family care role	Daniels et al. (2001, Table I, p. 1152), Fawkner (2000), Harpaz (2002, p. 78), Kepczyk (1999. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Mannering and Mokhtarian (1995, p. 50), Patrickson (2002. <i>Cited In:</i> Baard and Thomas, 2010, p. 3).
87) Working atmosphere	Bélanger (1999. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522), Hill et al. (2003. <i>Cited In:</i> Robèrt and Börjesson, 2006, p. 522).
88) Work-Life Balance	Andrews and Bailyn (1993. <i>Cited In:</i> Musson and Tietze, 2004, p. 255), Apgar (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Baard and Thomas (2010, p. 6), Bailyn (1988. <i>Cited In:</i> Tietze et al, 2002, p. 386), Baines (2002. <i>Cited In:</i> Hislop and Axtell, 2009, p. 70), Baines and Gelder (2003. <i>Cited In:</i> Hislop and Axtell, 2007, p. 48), Baruch (2000. <i>Cited In:</i> Hislop and Axtell, 2007, p. 48), Daniels et al. (2001, Table I, p. 1152), Daniels et al. (2001. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 383), Davenport and Pearlson, 1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Fawkner (2000), Fletcher and Bailyn (1996. <i>Cited In:</i> Musson and Tietze, 2004, p. 255), Fletcher and Bailyn (1996. <i>Cited In:</i> Tietze et al, 2002, p. 386), Greenhill and Wilson (2006, p. 385), Hamilton et al. (2006. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Harpaz (2002, pp.75-77), Hayden (2007. <i>Cited In:</i> Baard and Thomas, 2010, p. 4), Hill et al. (1998. <i>Cited In:</i> Golden, 2007, p. 1645), Hislop and Axtell (2009, p. 70), Huws (1993. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 383), Igbaria and Guimaraes (1999. <i>Cited In:</i> Kowalski and Swanson, 2005, p. 242), Kaufmann (2002. <i>Cited In:</i> Hislop and Axtell, 2007, p. 44), Kurland and Bailyn (1999. <i>Cited In:</i> Tietze et al, 2002, p. 386), Madsen (2003. <i>Cited In:</i> Perez et al, 2004, p. 656), Martinez-Sanchez et al. (2008. <i>Cited In:</i> Baard and Thomas, 2010, p. 3), Olson-Buchanan (2007. <i>Cited In:</i> Tietze et al, 2009, p. 594), Perrons (2003, p. 69. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 380), Reilly (2001. <i>Cited In:</i> Tietze et al, 2002, p. 386), Roitz et al. (2004. <i>Cited In:</i> Allenby et al, 2005, p. 1035), Shamir and Salomon (1985. <i>Cited In:</i> Bailey and Kurland, 2002, pp.383-384), Siha and Monroe (2006, p. 471), Silver (1993. <i>Cited In:</i> Tietze and Musson, 2003, p. 444), Stanworth (1998. <i>Cited In:</i> Tietze et al, 2002, p. 386), Sturgeon (1996. <i>Cited In:</i> Greenhill and Wilson, 2006, p. 383), Teo and Lim (1998, p. 255), Tietze and Musson (2003, p. 441), Tietze and Musson (2005. <i>Cited In:</i> Hislop and Axtell, 2007, p. 48), Tietze et al. (2002, p. 395).

Table 2.7: Minor socio-factors identified as per existing literature [6 of 6]

<p><b>Major socio-factor 1) Resilience</b></p> <ol style="list-style-type: none"> <li>1) Availability of space</li> <li>2) Competitiveness</li> <li>3) Costs (in general)</li> <li>4) Customer service and time to delivery</li> <li>5) Disruptions</li> <li>6) Effectiveness</li> <li>7) Efficiency</li> <li>8) Global competitiveness</li> <li>9) Productivity</li> <li>10) Utilisation of resources: space savings</li> <li>11) Utilisation of resources: tools</li> </ol>	<p><b>Major socio-factor 5) Sustainability</b></p> <ol style="list-style-type: none"> <li>1) Commuting mileage</li> <li>2) Commuting stress</li> <li>3) Commuting time and expense</li> <li>4) Cost of roads</li> <li>5) Energy consumption</li> <li>6) Environment</li> <li>7) Pollution</li> <li>8) Public transportation pressure</li> <li>9) Road accidents</li> <li>10) Traffic congestion</li> </ol>
<p><b>Major socio-factor 2) Personalisation</b></p> <ol style="list-style-type: none"> <li>1) Distractions and interruptions</li> <li>2) Health and well-being</li> <li>3) Job satisfaction</li> <li>4) Morale</li> <li>5) Motivation</li> <li>6) Over-working</li> <li>7) Stress</li> <li>8) Time management</li> </ol>	<p><b>Major socio-factor 6) Representation</b></p> <ol style="list-style-type: none"> <li>1) Autonomy and control</li> <li>2) Collective representation</li> <li>3) Commitment to job</li> <li>4) Commitment to organisation</li> <li>5) Company image</li> <li>6) Creativity and knowledge transfer</li> <li>7) Explicit knowledge</li> <li>8) Identity of teleworkers</li> <li>9) Knowledge creation: combination [explicit to explicit]</li> <li>10) Knowledge creation: externalisation [tacit to explicit]</li> <li>11) Knowledge creation: internalisation [explicit to tacit]</li> <li>12) Knowledge creation: socialisation [tacit into tacit]</li> <li>13) Loyalty</li> <li>14) Over-availability</li> <li>15) Staffing flexibility</li> </ol>
<p><b>Major socio-factor 3) Flexibility</b></p> <ol style="list-style-type: none"> <li>1) Absenteeism, unscheduled leave or sick leave</li> <li>2) Availability of technology</li> <li>3) Career prospects</li> <li>4) Disabled workers</li> <li>5) Entrepreneurial activity</li> <li>6) Income</li> <li>7) Investment costs: in general</li> <li>8) Relocation costs</li> <li>9) Selection, training and support costs</li> <li>10) Older workforce</li> <li>11) Pool of candidates</li> <li>12) Recruitment potential / capability</li> <li>13) Retention</li> <li>14) Staff turnover</li> <li>15) Strategic alliances</li> <li>16) Teleworking friendly jobs</li> <li>17) Women work force: prospects</li> <li>18) Workforce in rural or remote areas</li> <li>19) Workforce regarding: parents or family care role</li> </ol>	<p><b>Major socio-factor 7) Culture</b></p> <ol style="list-style-type: none"> <li>1) Centralised structure</li> <li>2) Community and society</li> <li>3) Compensation to employees</li> <li>4) Co-workers</li> <li>5) Decentralised structure</li> <li>6) Exploitation of teleworkers</li> <li>7) Isolation</li> <li>8) Managerial support</li> <li>9) Supervisor-employee</li> <li>10) Team-working and collaboration</li> <li>11) Trust</li> <li>12) Working atmosphere</li> <li>13) Work-life balance</li> </ol>
<p><b>Major socio-factor 4) Regulation</b></p> <ol style="list-style-type: none"> <li>1) Contract and rights</li> <li>2) Cost of new performance measures</li> <li>3) Health and safety</li> <li>4) Insurance issues</li> <li>5) Marginalisation, discrimination or inequality</li> <li>6) Monitoring</li> <li>7) National economy</li> <li>8) Policy and agreement</li> <li>9) Security concerns</li> <li>10) Space sharing privacy</li> <li>11) Surveillance</li> <li>12) Tax issues</li> </ol>	<p><b>Distillation of minor to major socio-factors</b></p> <p>The distillation as shown in this table 2.8 follows after the eighty-eight (88) minor socio-factors (table 2.2 on page 52 to table 2.7 on page 57) were distilled into seven categories of major socio-factors as shown.</p>

Table 2.8: Minor to major socio-factors

Hence the seven major socio-factors are as follows:

- 1) **Resilience**
- 2) **Personalisation**
- 3) **Flexibility**
- 4) **Regulation**
- 5) **Sustainability**
- 6) **Representation**
- 7) **Culture**

The list of minor and major socio-factors are potential measurements of teleworking. The measurement capacity of teleworking is considered in the following section 2.1.3.1.4.

#### 2.1.3.1.4 Development of socio-factors [potential measures of teleworking]

The socio-factors of teleworking (minor and major) refer to potential measurement capacity of teleworking, specifically an indirect measure of teleworking in terms of human perceptions. Perceptions of teleworking can be telling of success and maturity of development of this type of working practice. For example, successful implementations of teleworking would be consistent with positive perceptions for each measure of teleworking (that is, each of the socio-factors).

##### 2.1.3.1.4.1 Simplification and aggregation

Following the categorisation of minor to major socio-factors as shown in table 2.8 on page 58, the former (minor socio-factors) were further grouped **within** the major socio-factor. In other words, the minor socio-factors were reduced down further in terms of two identifiable types of grouping of minor socio-factors (within those major socio-factors):

- 1) ***Simplification***: If minor socio-factor A1 shares a consistency in measure with a number of additional identifiable and closely linked minor socio-factors say, A2 and A3, then a measure of A1 would also be indicative of a measure of A2 and A3 and hence these would be distilled into one measure. Thus, identification of A1 type minor socio-factors follow in the sections below.
- 2) ***Aggregation***: If a grouping of minor socio-factors was indicative of a new minor socio-factor, for example minor socio-factors A4, A5 and A6 collectively explain a new minor socio-factor A7, then these factors would be aggregated into one socio-factor A7.

In each of the sections below, simplification and aggregation (as described above) pertains specifically to minor socio-factors within the major socio-factor area. **However, in addition to the above, minor socio-factors may also feasibly link with minor socio-factors belonging to different major socio-factors, and this degree of overlap between major socio-factors is addressed in the later section 2.1.3.1.5 (on page 83).**

For this stage of the research, example measures were identified as per the simplification and aggregation **within** each of the seven aforementioned major socio-factors (as opposed to across major socio-factors). **For the sake of completeness:**

- 1) each of the example measures of *resilience* is explained fully: a) literally and b) in terms of a diagrammatic illustration. Thereafter:**
- 2) for each of the six remaining major socio-factors (*personalisation, flexibility, regulation, sustainability, representation and culture*) example measures are explained by a) summary and b) diagrammatic illustration.**

The following section follows with a diagrammatic illustration of major socio-factor *resilience* as a whole that is, inclusive of a number of minor socio-factors that were identifiable as per existing teleworking literature. Following the diagrammatic illustration of *resilience*, three example minor socio-factors (and potential measures) are explained in full namely, *innovation, use of resources* and *performance*.

2.1.3.1.4.2 Resilience [Major socio-factor]

# Resilience

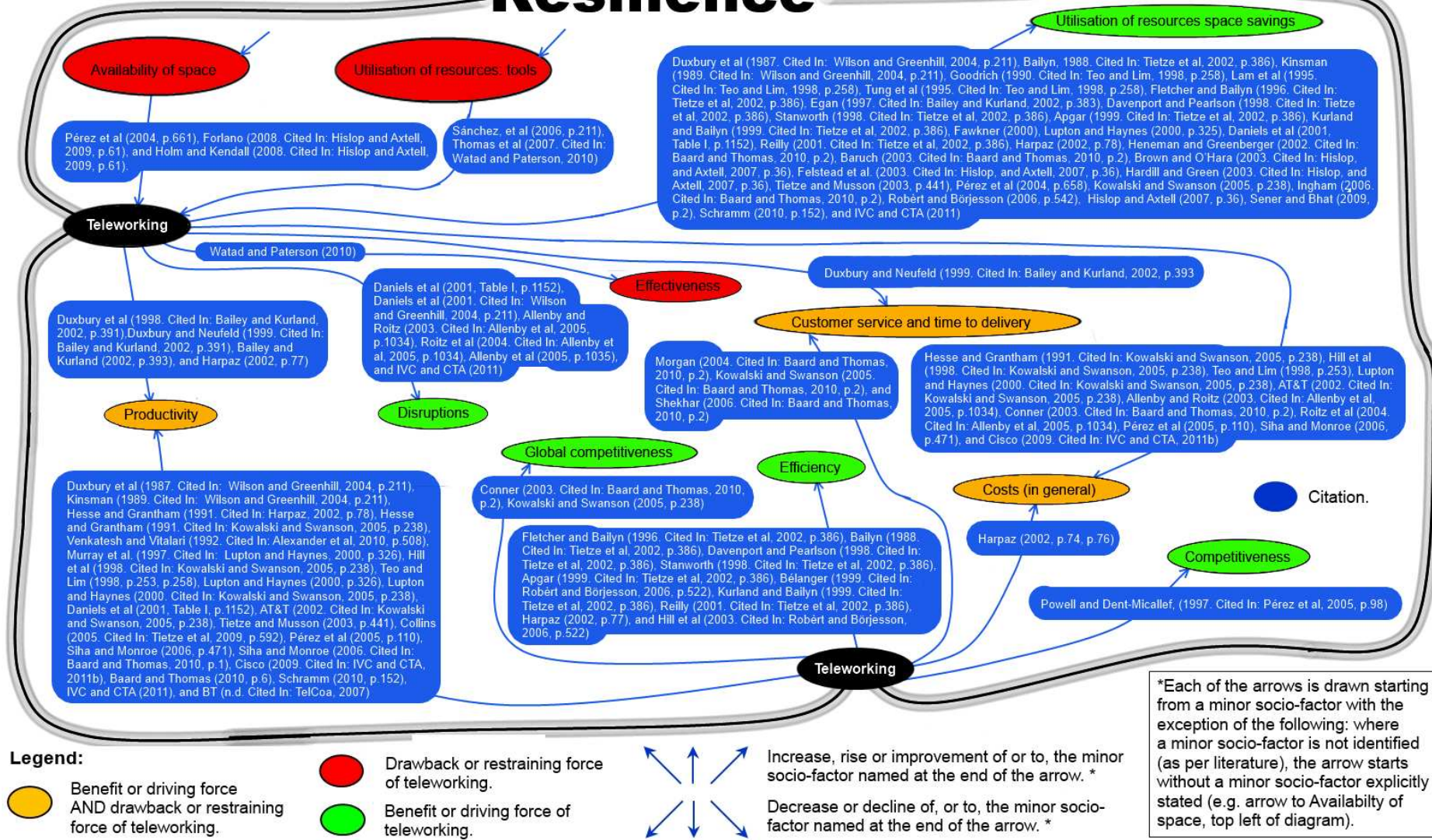


Figure 2.16: Minor socio-factors grouped in terms of resilience (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *resilience* is as shown on the preceding page in figure 2.16 (on page 61); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.2.1 Summary table of simplification and aggregation

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *resilience*, three example minor socio-factors (and potential measures) namely, *innovation*, *use of resources* and *performance* follow in terms of simplification or aggregation (as stated earlier). A summary is as shown in table 2.9 below.

	Examples of minor socio-factors identifiable within <i>resilience</i>	Type of grouping
1	Innovation	Aggregation
2	Use of resources	Simplification
3	Performance	Aggregation

Table 2.9: Minor socio-factors identifiable within major socio-factor *resilience*

The first of the three minor socio-factors stated in the above table is *innovation*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.16 (on page 61).

2.1.3.1.4.2.2 Resilience: innovation [Aggregated minor socio-factor; example 1 of 3]

There is a number of minor socio-factors of earlier figure 2.16 (on page 61) that can be identifiably linked to innovation in terms of an aggregate-type grouping of the minor socio-factors as shown illustrated in figure 2.17 below.

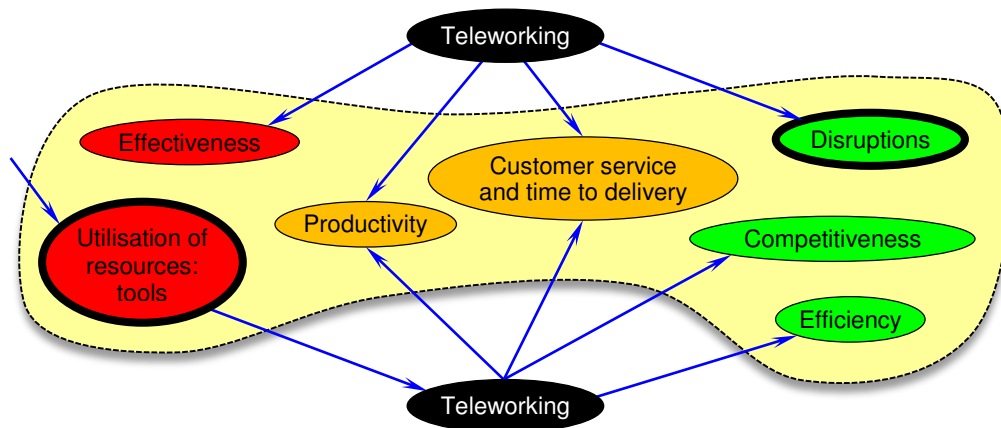


Figure 2.17: Grouping of minor socio-factors corresponding to *innovation*

The above diagram illustrates the socio-factors that indirectly explain innovation. There is a number of measurements as per existing literature (highlighted in thick ovals and circles in the figure above) that are consistent with the above grouping of minor socio-factors: innovation is an improvement to working practices and more often than not, a positive consequence of implementation of technology that is if applied to a satisfactory level for example, see Bateman et al. (2002, p.225) with regards to their measures of innovation; and which identifiably overlap with later, major socio-factor *flexibility*: the degree of overlap with later major-socio factor *flexibility* (where technology is inclusive) is addressed in terms of the overlap of major socio-factors in later section 2.1.3.1.5 (on page 83) as mentioned earlier.

To continue with the example, the proposition here is that in the context of resilience and in terms of implications, innovation translates as an improvement and enhancement in productivity levels and effectiveness for example the public can communicate matters more easily via email and council website infrastructures. Quality overall is above levels preceding technology.

Furthermore, the organisation can be more resilient via a reduction in disruptions for example, the usage of web-based technology during winter months whereby adverse weather conditions (Allenby et al., 2005, p.1035; and Daniels et al., 2001, table I, p.1152) may cause commuting difficulties thus, front line services can remain operational to a degree higher than without technology. Furthermore, power cuts or other kinds of disruptions such as bugs, technological errors, and disconnections can hinder innovation and are a context of measurements of innovation as per Bateman et al. (2002, p.225) that is, measurements are taken in terms of the level of technical support. Teleworking is a technological innovation regarding working practices and so, innovation (as proposed in terms of the aggregation above) is a potential measure linked to resilience of an organisation.

2.1.3.1.4.2.3 Resilience: use of resources [Simplified minor socio-factor; example 2 of 3]

There is a number of minor socio-factors of earlier figure 2.16 (on page 61) that can be identifiably linked to *use of resources* in terms of a simplification-type grouping of the minor socio-factors as shown illustrated in figure 2.18 below.

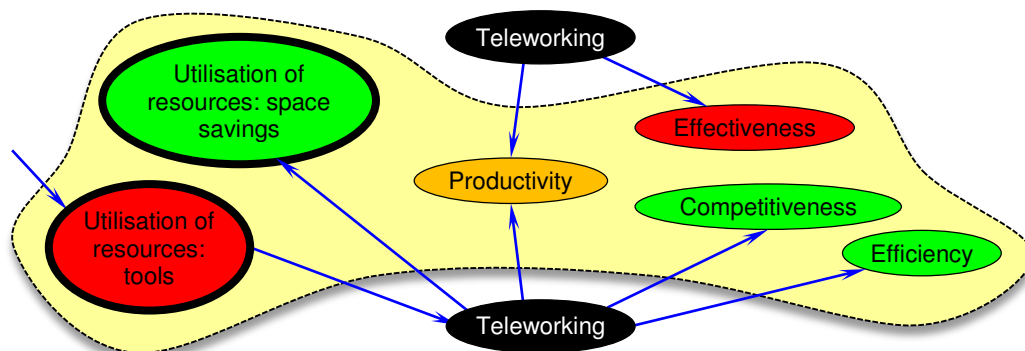


Figure 2.18: Grouping of minor socio-factors corresponding to *use of resources*



There is a number of measurements as per existing literature (highlighted in thick ovals and circles in the figure above) that are consistent with the above grouping of minor socio-factors: *use of resources* as per Bateman et al. (2002, p.225) is measured in terms of inhibitors and utilisation and the two types of measures are consistent with teleworking literature where highlighted in thick ovals or circles in figure 2.18 on page 63. The wider grouping of minor socio-factors as depicted above are identifiably impacted by inhibitors to or utilisation of, use of resources. For example, higher levels of resource utilisation would hypothetically impact positively on efficiency and effectiveness that is, simply more is done with less. In addition, productivity levels (as per the public and private sector) or competitiveness (as per the private sector) should improve. Should the technology that is available to employees be difficult to learn and or there is limited training to develop skills of the workforce and foreseeably, the impact of the aforementioned minor socio-factors would conversely be negative. Thus, teleworking literature is simplified into a grouping as shown in the figure 2.18 on page 63 further supported by measures identified as per Bateman et al. (2002, p.225).

2.1.3.1.4.2.4 *Resilience: performance [Aggregated minor socio-factor; example 3 of 3]*

There is a number of minor socio-factors of earlier figure 2.16 (on page 61) that can be identifiably linked to performance in terms of an aggregation-type grouping of the minor socio-factors as shown illustrated in figure 2.19 below.

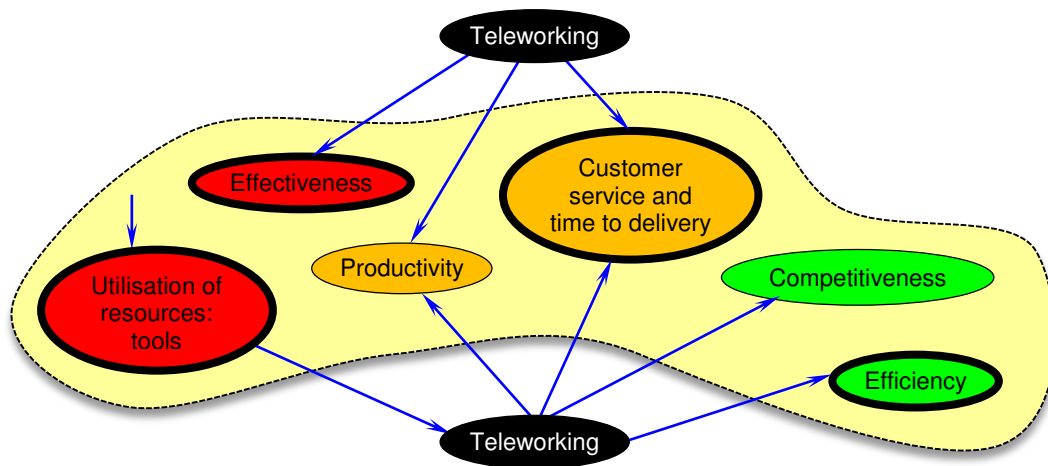


Figure 2.19: Grouping of minor socio-factors corresponding to *performance*

There is a number of measurements as per existing literature (highlighted in thick ovals and circles in the figure above) that are consistent with the above grouping of minor socio-factors: performance can hypothetically be measured in terms of 1) throughput and 2) output and in terms of the quality (Becker et al., 1996. Cited In: Belanger, 2001, p.174). Improvements in effectiveness (Ellis and Shockley-Zalabak, 2001, p.390; and Wang, 2011, p.331), efficiency (Wang, 2011, p.331) and timeliness

(Becker et al., 1996. *Cited In*: Belanger, 2001, p.174) would be consistent with improvement in performance.

Indeed, improvements in performance would understandably be reflected also by an improvement in skills of the workforce (Bateman et al., 2002, p.224) for example, utilisation of resources in terms of tools or rather, making the most out of technological tools (Sánchez, et al., 2006, p.211; and Thomas et al., 2007. *Cited In*: Watad and Paterson, 2010) via say, training, self-efficacy (Wang, 2011, p.330; and Neufeld and Fang, 2005, p.1046) or self-development. On reflection, the above minor-socio-factors together would impact on productivity and competitiveness. Thus the latter two minor socio-factors would be inclusive to the definition and measurement of performance and thus grouped as per the figure above.

Additional minor-socio-factors such as *intrinsic motivation* (Kuvaas, 2007, table AI, p.396) may also factor into performance; *motivation* is consistent with the major socio-factor of *personalisation* (following section) with the overlap between major socio-factors addressed in the later section 2.1.3.1.5 (on page 83).

2.1.3.1.4.3 Personalisation [Major socio-factor]

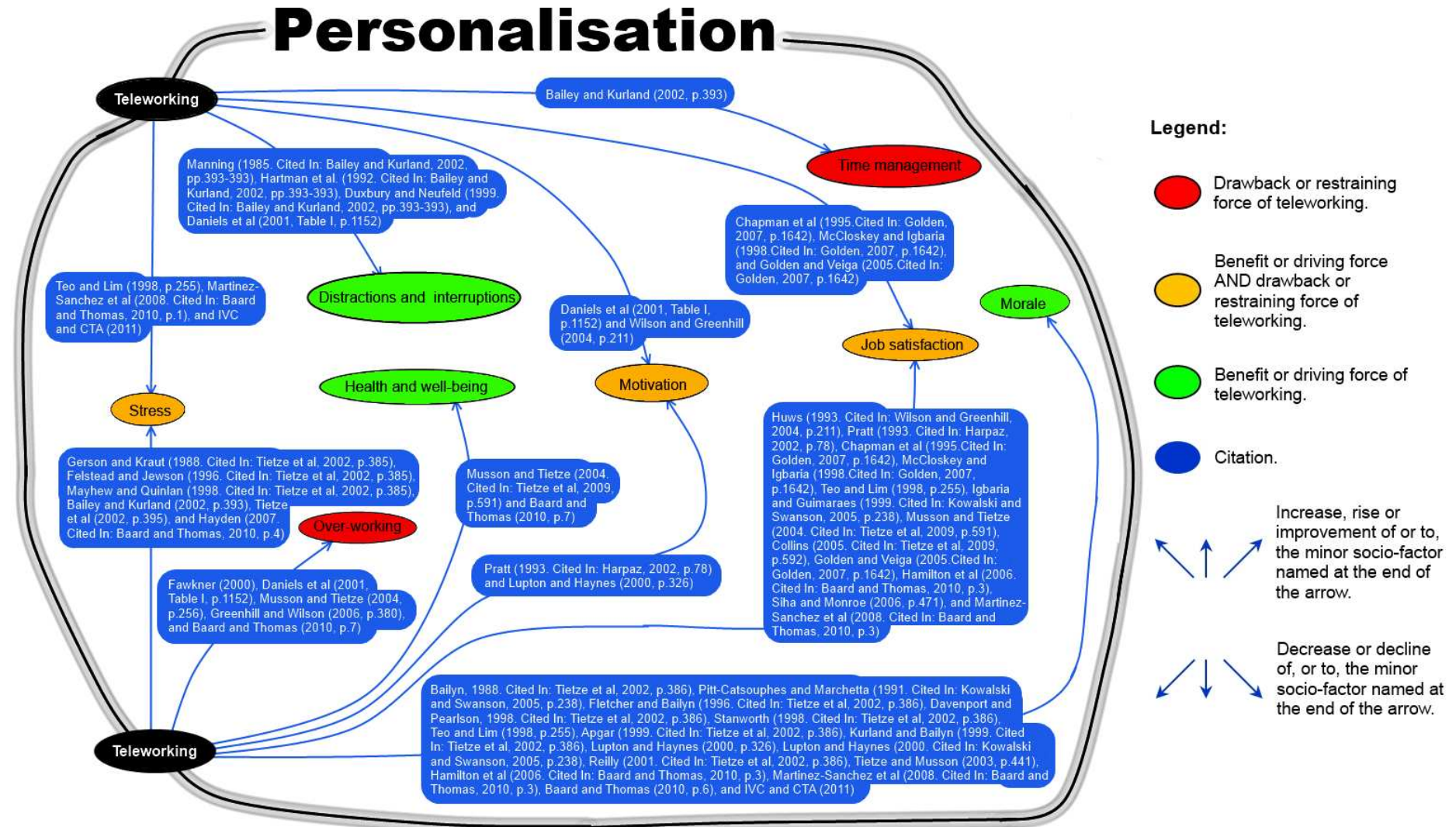


Figure 2.20: Minor socio-factors grouped in terms of personalisation (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *personalisation* is as shown on the preceding page in figure 2.20 (on page 66); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.3.1 Summary table of simplification and aggregation

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *personalisation*, three example minor socio-factors (and potential measures) namely, *work pressure*, *job satisfaction* and *stress* follow in terms of simplification or aggregation. A summary is as shown in table 2.10 below.

	Examples of minor socio-factors identifiable within <i>personalisation</i>	Type of grouping
1	Work pressure	Aggregation
2	Job satisfaction	Simplification
3	Stress	Simplification

Table 2.10: Minor socio-factors identifiable within major socio-factor *personalisation*

The first of the three minor socio-factors stated in the above table is *work pressure*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.20 (on page 66).

2.1.3.1.4.3.2 Personalisation: work pressure [Aggregated minor socio-factor; example 1 of 3]

There is a number of minor socio-factors of earlier figure 2.20 (on page 66) that can be identifiably linked to *work pressure* in terms of an aggregation-type grouping of the minor socio-factors as shown illustrated in figure 2.21 below.

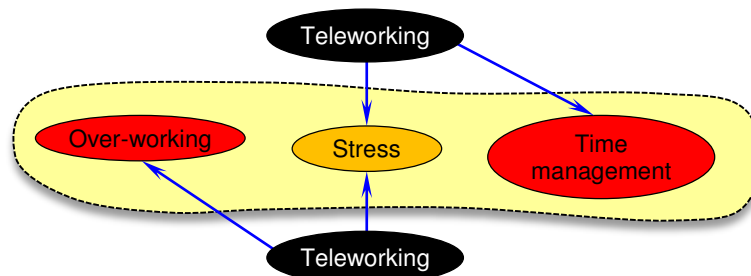


Figure 2.21: Grouping of minor socio-factors corresponding to *work pressure*

Example measurements as per Konzelmann et al. (2006, p.566) regarding work pressure in terms of time, working very hard and pressures are considered to be consistent to the aggregation as per the above diagram.

#### 2.1.3.1.4.3.3 Personalisation: job satisfaction [Simplified minor socio-factor; example 2 of 3]

There is a number of minor socio-factors of earlier figure 2.20 (on page 66) that can be identifiably linked to *job satisfaction* in terms of a simplification-type grouping of the minor socio-factors as shown illustrated in figure 2.22 below.

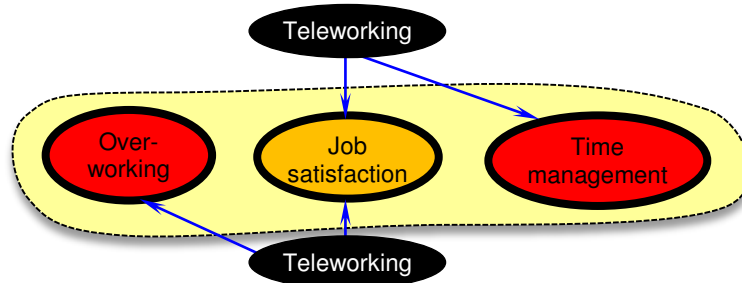


Figure 2.22: Grouping of minor socio-factors corresponding to *job satisfaction*

Example measurements of job satisfaction as per Babakus et al. (2003, p.283); Morganson et al. (2010, p.584); and Wang (2011, p.331) are consistent with minor socio-factor job satisfaction and over-working and time management, or as per Morganson et al. (2010, p.584); and Wang (2011, p.331) in terms of work schedule (as highlighted in thick ovals or circles as per the above diagram). Additionally, the simplification extends outside the grouping above, that is to major socio-factor *flexibility* in terms of minor socio-factor, *income* (job satisfaction in terms of pay as per Babakus et al. (2003, p.283). This overlap between major socio-factors is addressed in the later section 2.1.3.1.5 (on page 83).

#### 2.1.3.1.4.3.4 Personalisation: stress [Simplified minor socio-factor; example 3 of 3]

There is a number of minor socio-factors from figure 2.20 (on page 66) that can be identifiably linked to *stress* in terms of a simplification-type grouping of the minor socio-factors as shown in figure 2.23 below.

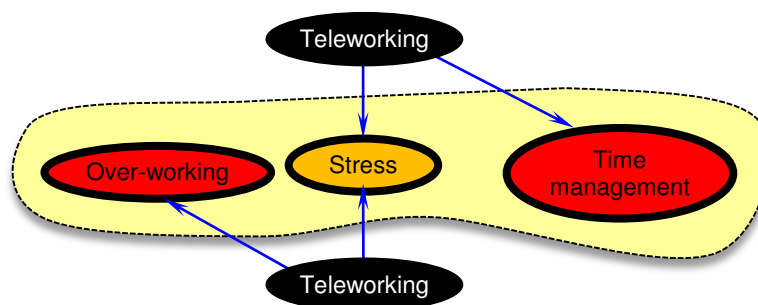


Figure 2.23: Minor socio-factors corresponding to *stress*

Measurements of stress as per Zhao and Rashid (2010, pp.39-40) are consistent with the minor socio-factors depicted in the diagram above, shown highlighted in thick ovals or circles.

2.1.3.1.4.4 Flexibility [Major socio-factor]

Legend:

- Yellow circle: Benefit or driving force AND drawback or restraining force of teleworking.

# Flexibility

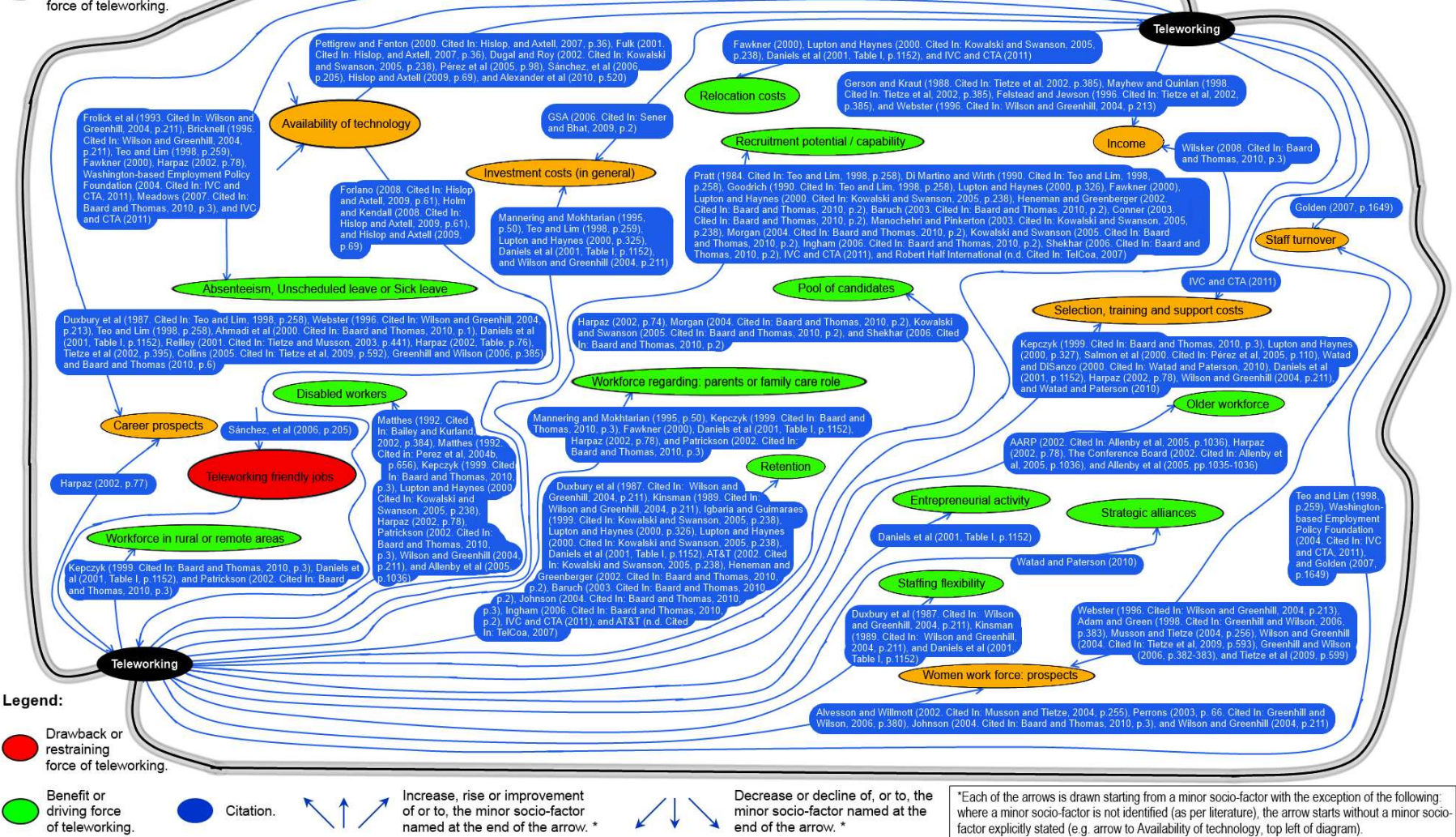


Figure 2.24: Minor socio-factors grouped in terms of flexibility (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *flexibility* is as shown on the preceding page in figure 2.24 (on page 69); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.4.1 Summary table of simplification

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *flexibility*, two example minor socio-factors (and potential measures) namely, *turnover* and *career prospects* follow in terms of simplification. A summary is as shown in table 2.11 below.

	Examples of minor socio-factors identifiable within <i>flexibility</i>	Type of grouping
1	Turnover	Simplification
2	Career prospects	Simplification

Table 2.11: Minor socio-factors identifiable within major socio-factor *flexibility*

The first of the two minor socio-factors stated in the above table is *turnover*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.24 (on page 69).

2.1.3.1.4.4.2 Flexibility: turnover [Simplified minor socio-factor; example 1 of 2]

There is a number of minor socio-factors of earlier figure 2.24 (on page 69) that can be identifiably linked to *turnover* in terms of an simplification-type grouping of the minor socio-factors as shown in figure 2.25 below.

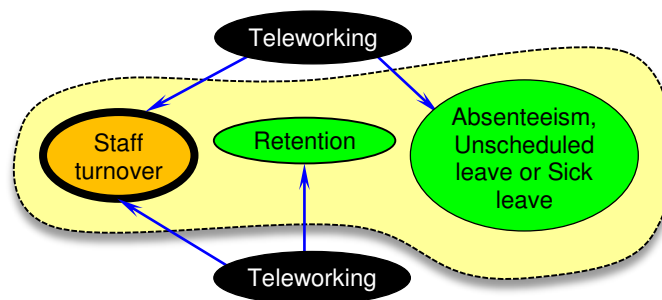


Figure 2.25: Grouping of minor socio-factors corresponding to *turnover*

Measurement of turnover as per Martínez-Sánchez et al. (2008, p.19) is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.

2.1.3.1.4.4.3 Flexibility: career prospects [Simplified minor socio-factor; example 2 of 2]

There is a number of minor socio-factors of earlier figure 2.24 (on page 69) that can be identifiably linked to *career prospects* in terms of an simplification-type grouping of the minor socio-factors as shown illustrated in figure 2.26 below.

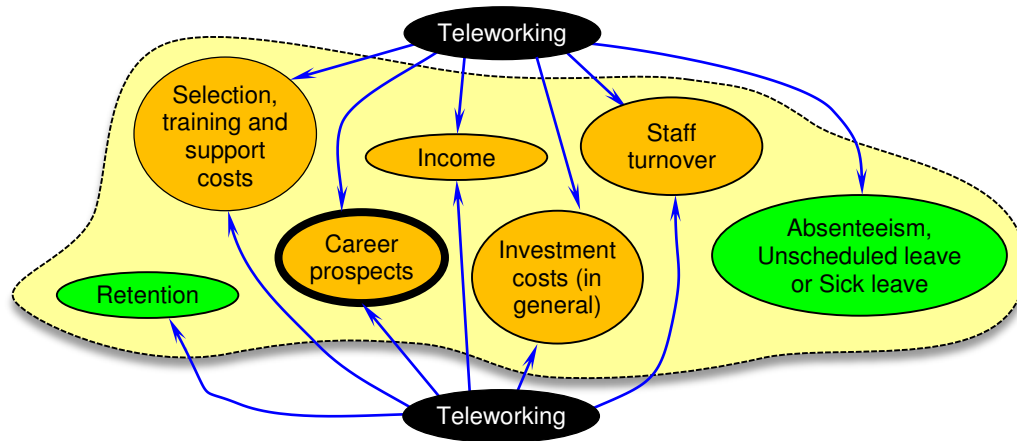


Figure 2.26: Grouping of minor socio-factors corresponding to *career prospects*

Measurement of *career development* as per Teo et al. (1999, table 1, p.40) is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.



2.1.3.1.4.5 Regulation [Major socio-factor]

# Regulation



**Legend:**

Drawback or restraining force of teleworking.

Benefit or driving force AND drawback or restraining force of teleworking.

Benefit or driving force of teleworking.

Increase, rise or improvement of or to, the minor socio-factor named at the end of the arrow. \*

Decrease or decline of, or to, the minor socio-factor named at the end of the arrow. \*

Citation.

\*Each of the arrows is drawn starting from a minor socio-factor with the exception of the following: where a minor socio-factor is not identified (as per literature), the arrow starts without a minor socio-factor explicitly stated (e.g. arrow to Policy and agreement, bottom left of diagram).

Figure 2.27: Minor socio-factors grouped in terms of regulation (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *regulation* is as shown on the preceding page in figure 2.27 (on page 72); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.5.1 Summary table of aggregation

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *regulation*, two example minor socio-factors (and potential measures) namely, *information systems* and *goal-oriented appraisal* follow in terms of aggregation. A summary is as shown in table 2.11 on page 70.

	Examples of minor socio-factors identifiable within <i>regulation</i>	Type of grouping
1	Information systems	Aggregation
2	Goal-oriented appraisal	Aggregation

Table 2.12: Minor socio-factors identifiable within major socio-factor *regulation*

The first of the two minor socio-factors stated in the above table is *information systems*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.27 (on page 72).

2.1.3.1.4.5.2 Regulation: information systems [Aggregated minor socio-factor; example 1 of 2]

There is a number of minor socio-factors of earlier figure 2.27 (on page 72) that can be identifiably linked to *information systems* in terms of an aggregation-type grouping of the minor socio-factors as shown in figure 2.28 below.

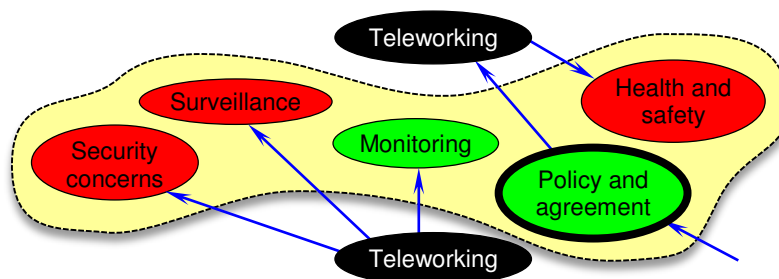


Figure 2.28: Grouping of minor socio-factors corresponding to *information systems*

Measurement of information systems as per Curry and Moore (2003, p.107) namely, documentation of, and access to, policies, processes and procedures for information systems, is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.

2.1.3.1.4.5.3 Regulation: goal-oriented appraisal [Aggregated minor socio-factor; example 2 of 2]

There is a number of minor socio-factors of earlier figure 2.27 (on page 72) that can be identifiably linked to *goal-oriented appraisal* in terms of an aggregation-type grouping of the minor socio-factors as shown illustrated in figure 2.29 below.

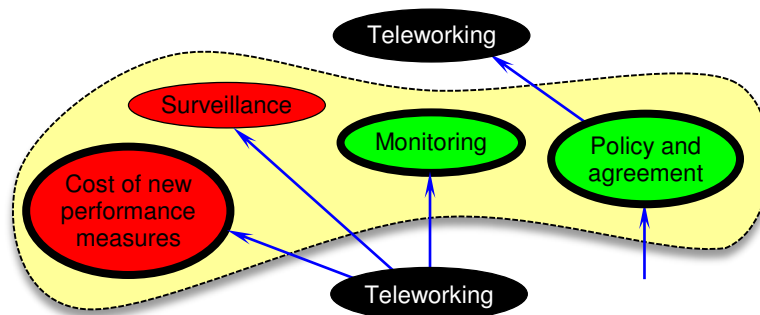


Figure 2.29: Grouping of minor socio-factors corresponding to *goal-oriented appraisal*

Measurement of *goal-oriented appraisal* as per Huang and Cullen (2001, p.35) namely, in terms of establishment and monitoring of performance goals, is consistent with the minor socio-factors shown highlighted in thick ovals or circles in the above diagram.

2.1.3.1.4.6 Sustainability [Major socio-factor]

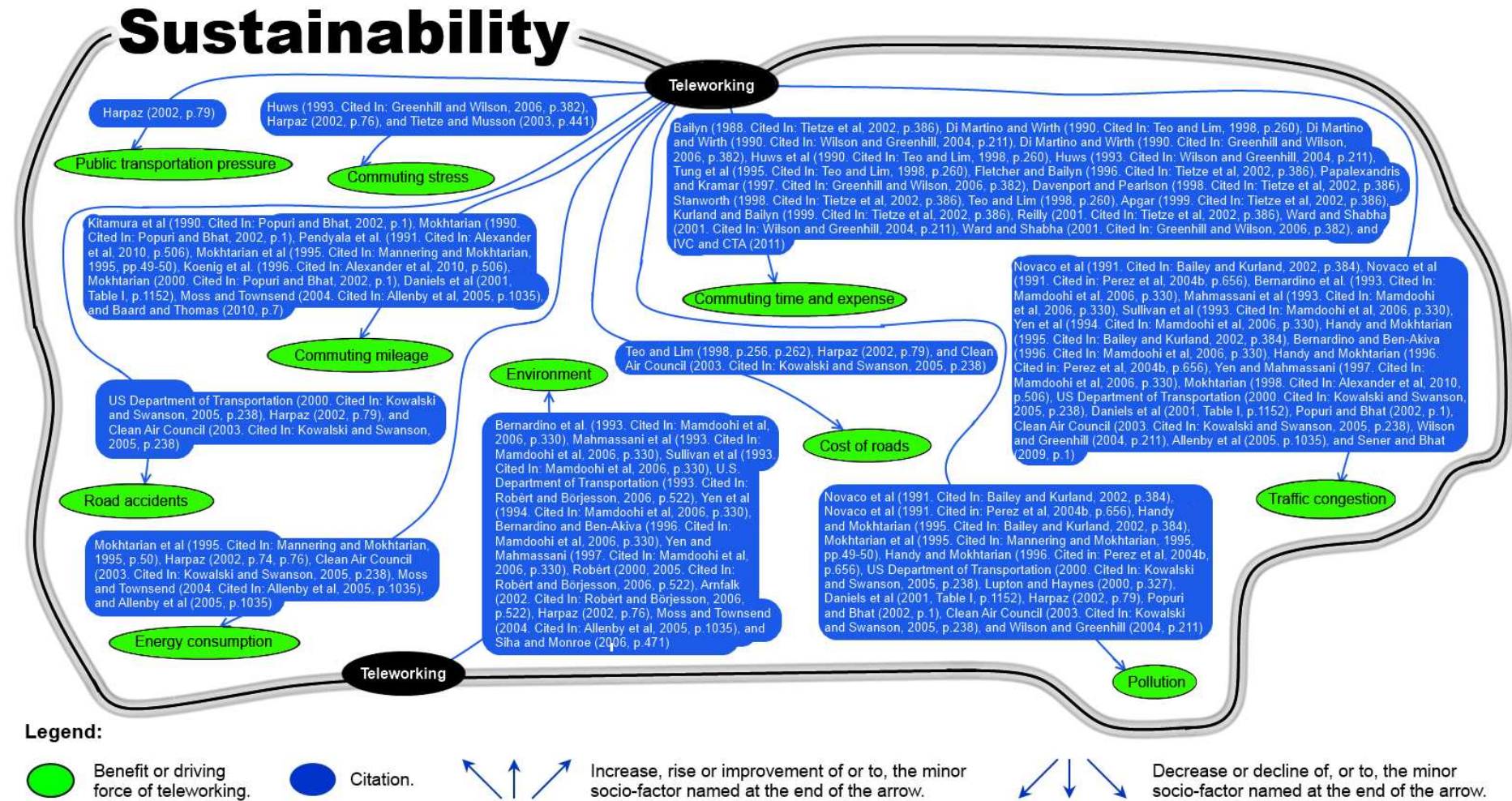


Figure 2.30: Minor socio-factors grouped in terms of sustainability (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor *sustainability* is as shown on the preceding page in figure 2.30 (on page 75); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.6.1 Summary table of simplification

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *sustainability*, two example minor socio-factors (and potential measures) namely, *commuting and pollution* follow in terms of simplification. A summary is as shown in table 2.13 below.

	Examples of minor socio-factors identifiable within <i>sustainability</i>	Type of grouping
1	Commuting	Simplification
2	Pollution	Simplification

Table 2.13: Minor socio-factors identifiable within major socio-factor *sustainability*

The first of the two minor socio-factors stated in the above table is *information systems*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.30 (on page 75).

2.1.3.1.4.6.2 Sustainability: commuting [Simplified minor socio-factor; example 1 of 2]

There is a number of minor socio-factors of earlier figure 2.30 (on page 75) that can be identifiably linked to *commuting* in terms of an simplification-type grouping of the minor socio-factors as shown in figure 2.31 below.

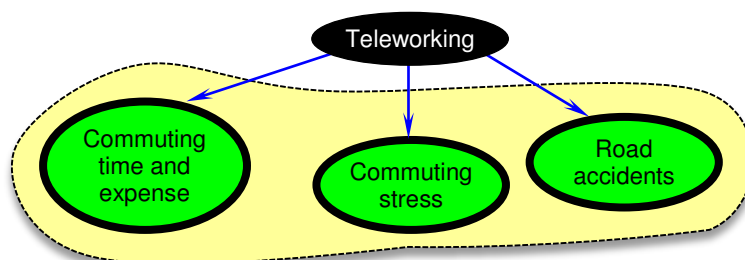


Figure 2.31: Grouping of minor socio-factors corresponding to *commuting*

Measurement in terms of perceptions of *cognitive and affective commute strain* (Kluger, 1998, p.155) in terms of concerns such as accidents and *commute enjoyment* (Kluger, 1998, p.155) in terms of

impact on productivity, and time to relax and think, is consistent with the minor socio-factors shown highlighted in thick ovals or circles in the above diagram.

2.1.3.1.4.6.3 Sustainability: pollution [Simplified minor socio-factor; example 2 of 2]

There is a number of minor socio-factors of earlier figure 2.30 (on page 75) that can be identifiably linked to *pollution* in terms of an simplification-type grouping of the minor socio-factors as shown in figure 2.32 below.

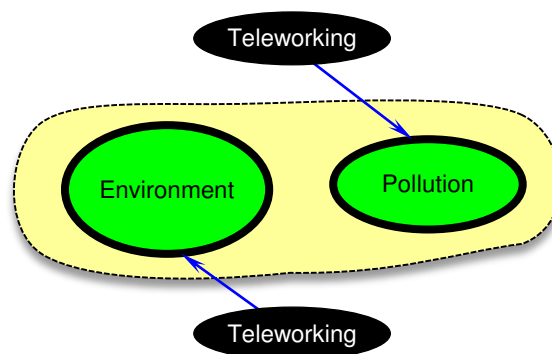


Figure 2.32: Grouping of minor socio-factors corresponding to *pollution*

Measurement as per Mannering and Mokhtarian (1995, p.65, p.68) in terms of willingness to reduce commuting to improve air pollution is consistent with the minor socio-factors shown highlighted in thick ovals or circles in the above diagram.

2.1.3.1.4.7 Representation [Major socio-factor]

# Representation

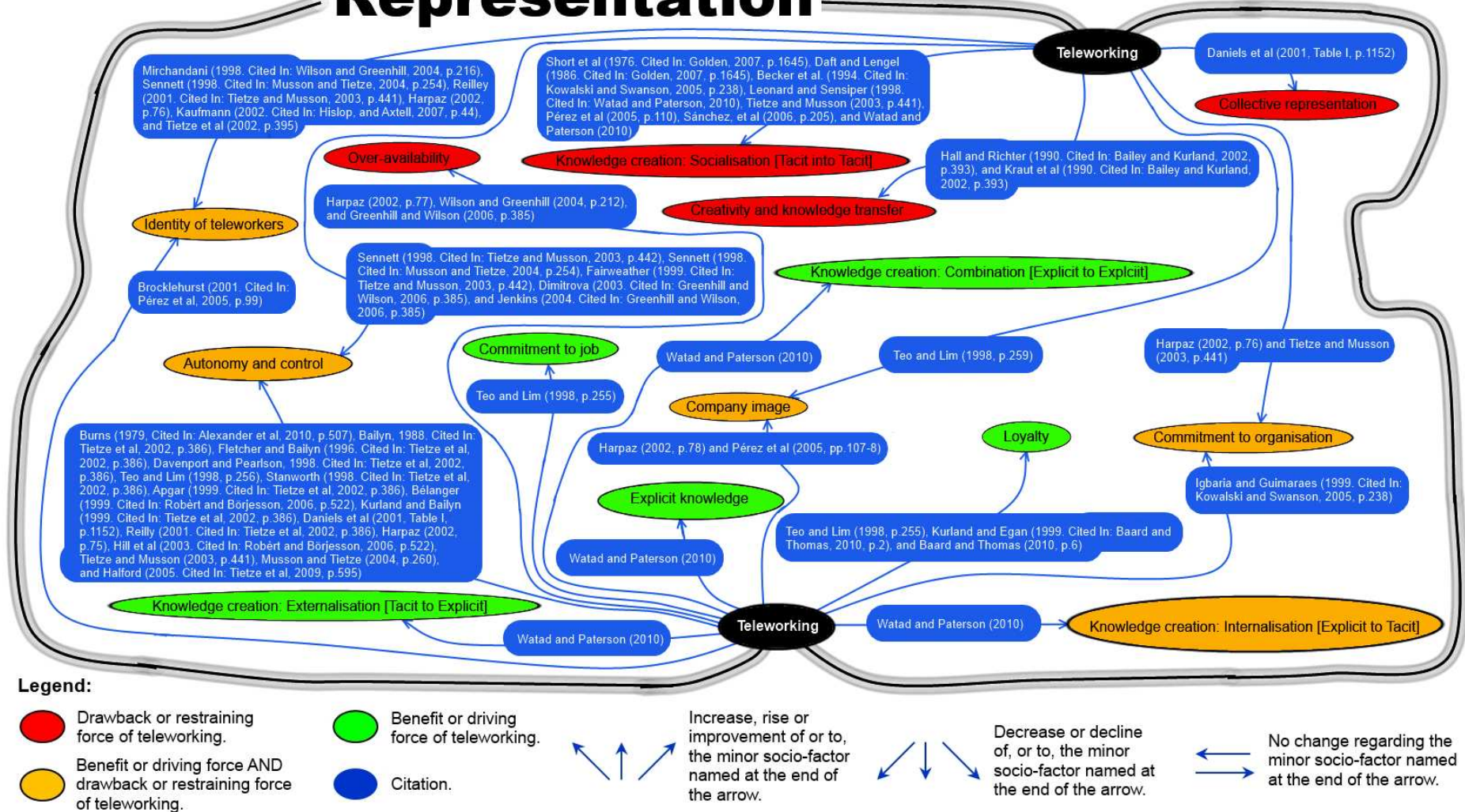


Figure 2.33: Minor socio-factors grouped in terms of representation (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *representation* is as shown in figure 2.33 (on page 78); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.7.1 Summary table of simplification

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *representation*, two example minor socio-factors (and potential measures) namely, *autonomy orientation and affective organisational commitment* follow in terms of simplification. A summary is as shown in table 2.14 below.

	Examples of minor socio-factors identifiable within <i>representation</i>	Type of grouping
1	Autonomy and control	Simplification
2	Commitment to organisation	Simplification

Table 2.14: Minor socio-factors identifiable within major socio-factor *representation*

The first of the two minor socio-factors stated in the above table is *autonomy orientation*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.33 (on page 78).

2.1.3.1.4.7.2 Representation: autonomy and control [Simplified minor socio-factor; example 1 of 2]

There is a number of minor socio-factors of earlier in figure 2.33 (on page 78) that can be identifiably linked to *autonomy and control* in terms of a simplification-type grouping of the minor socio-factors as shown in figure 2.34 below.

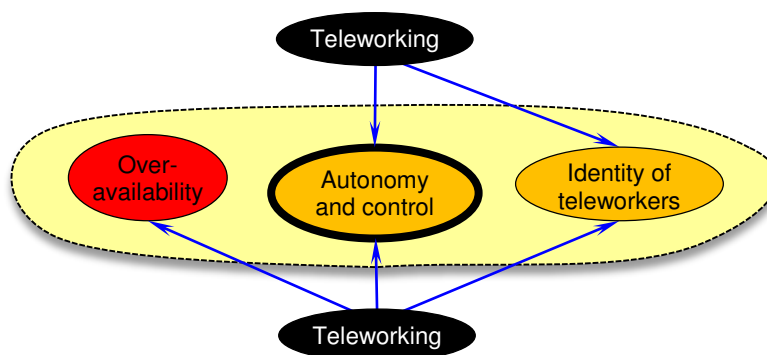


Figure 2.34: Grouping of minor socio-factors corresponding to *autonomy and control*



Measurement of autonomy orientation as per Kuvaas (2007, table AI, p.397) is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.

2.1.3.1.4.7.3 Representation: commitment to organisation [Simplified minor socio-factor; example 2 of 2]

There is a number of minor socio-factors of earlier in figure 2.33 (on page 78) that can be identifiably linked to *commitment to organisation* in terms of a simplification-type grouping of the minor socio-factors as shown illustrated in figure 2.35 below.

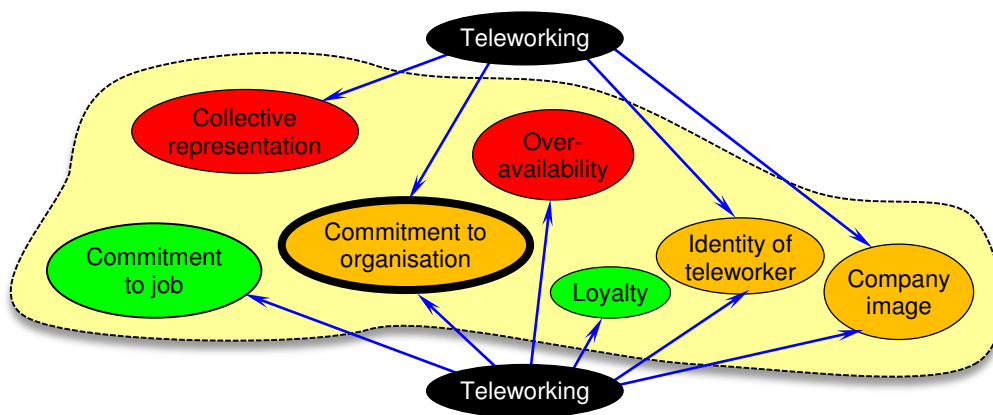


Figure 2.35: Grouping of minor socio-factors corresponding to *commitment to organisation*

Measurement of affective organisational commitment as per Meyer and Allan (1997. *Cited In:* Kuvaas, 2007, p.383 and table AI, p.397) in terms of belongingness to an organisation is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.

2.1.3.1.4.8 Culture [Major socio-factor]

Legend:



Increase, rise or improvement of or to, the minor socio-factor named at the end of the arrow.



Decrease or decline of, or to, the minor socio-factor named at the end of the arrow.

Legend:

● Citation

● Drawback or restraining force of teleworking.

● Benefit or driving force AND drawback or restraining force of teleworking.

● Benefit or driving force of teleworking.

# Culture

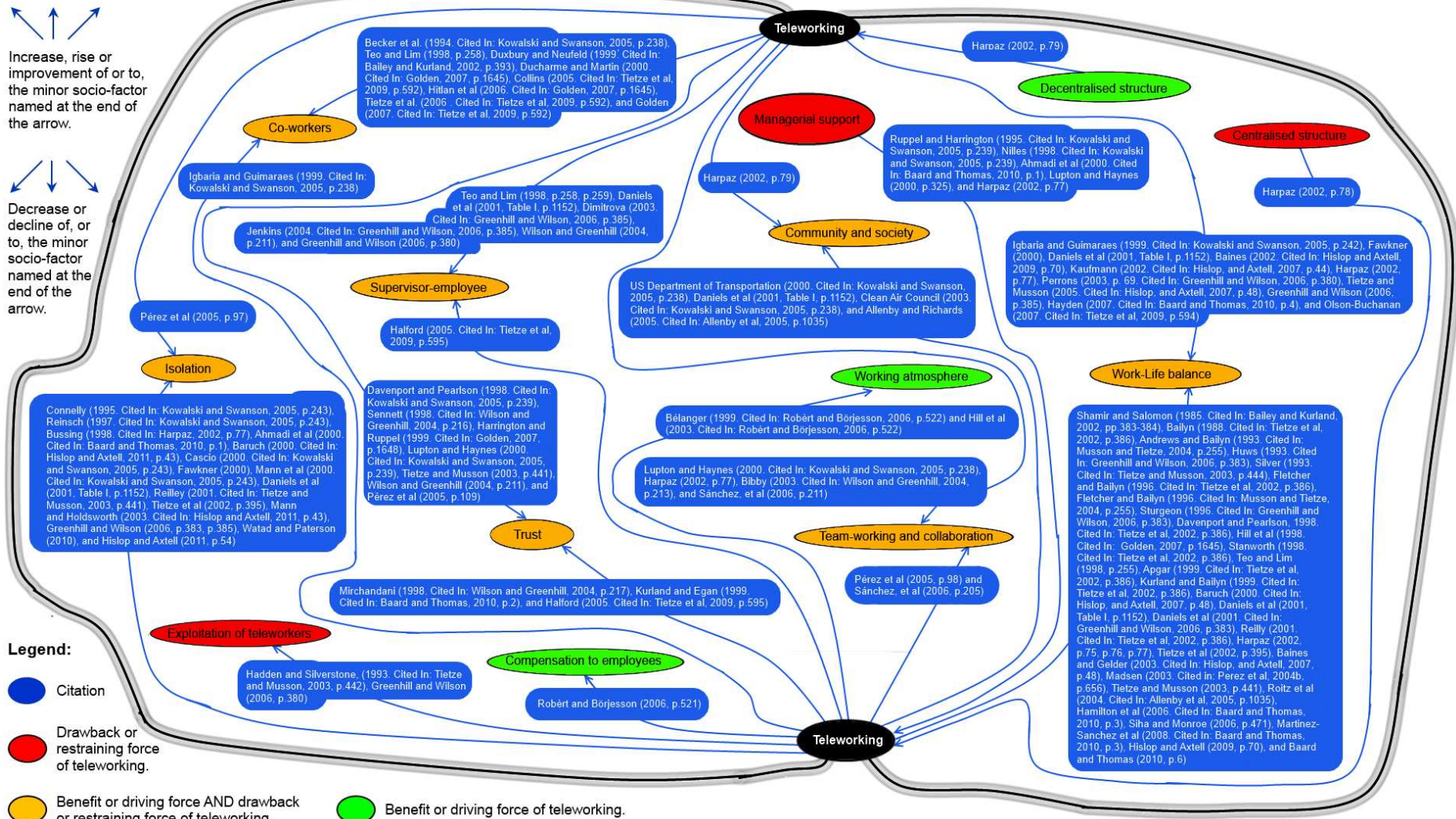


Figure 2.36: Minor socio-factors grouped in terms of culture (Haq, 2012a, and 2012b)

Minor socio-factors of underlying theme and major socio-factor, *culture* is as shown on the preceding page in figure 2.36 (on page 81); and the minor socio-factors in the diagram are cited as per existing teleworking literature (highlighted in blue).

2.1.3.1.4.8.1 Summary table of simplification and aggregation

Following the categorisation of minor to major socio-factors as shown in the diagram, the former (minor socio-factors) were further grouped **within** the major socio-factor. For major socio-factor *culture*, two example minor socio-factors (and potential measures) namely, 1) *team-working and collaboration*, and 2) *work relationships* follow in terms of simplification and aggregation. A summary is as shown in table 2.15 below.

	Examples of minor socio-factors identifiable within <i>culture</i>	Type of grouping
1	Team-working and collaboration	Simplification
2	Work relationships	Aggregation

Table 2.15: Minor socio-factors identifiable within major socio-factor *culture*

The first of the two minor socio-factors stated in the above table is *team working and collaboration*, as follows below. To note: each of the diagrams of the following section is consistent with the legend as shown in earlier figure 2.36 (on page 81).

2.1.3.1.4.8.2 Culture: team-working and collaboration [Simplified minor socio-factor; example 1 of 2]

There is a number of minor socio-factors of earlier in figure 2.36 (on page 81) that can be identifiably linked to *team-working and collaboration* in terms of a simplification-type grouping of the minor socio-factors as shown in figure 2.37 below.

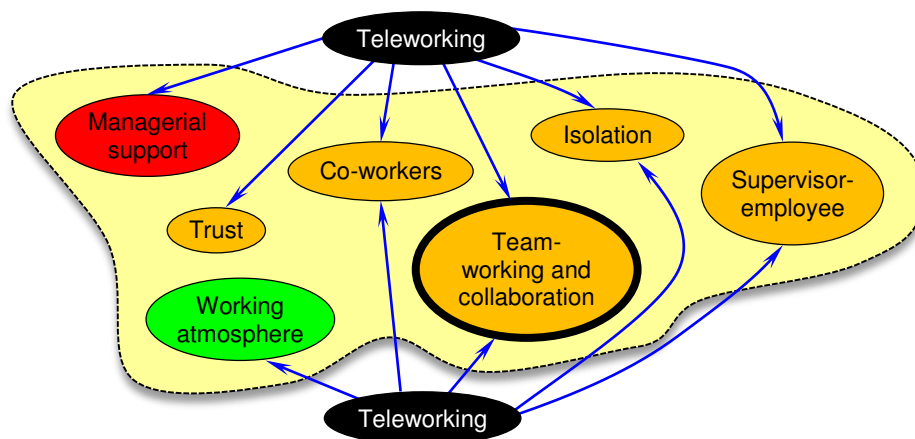


Figure 2.37: Grouping of minor socio-factors corresponding to *team-working and collaboration*

Measurement of team synergy as per Bateman et al. (2002, pp.223-4) in terms of sense of purpose, communication, and value to other parts of the organisation is consistent with the minor socio-factor shown highlighted in thick oval in the above diagram.

2.1.3.1.4.8.3 Culture: work relationships [Aggregated minor socio-factor; example 2 of 2]

There is a number of minor socio-factors of earlier in figure 2.36 (on page 81) that can be identifiably linked to *work relationships* in terms of an aggregation-type grouping of the minor socio-factors as shown in figure 2.38 below.

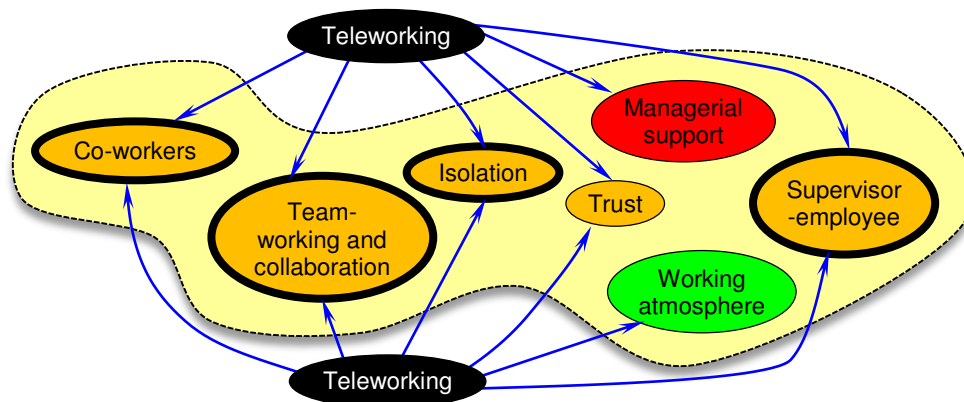


Figure 2.38: Grouping of minor socio-factors corresponding to work relationships

Measurements as per Shu and Chuang (2011, table III, p.32) in terms of interaction and connectedness with people and colleagues via web-based technology (aggregated collectively as minor socio-factor, *maintaining relationships*) is consistent with the minor socio-factors shown highlighted in thick ovals or circles in the above diagram.

2.1.3.1.5 The overlap between major socio-factors (three identifiable and broad socio-categories)

In addition to minor and major socio-categories, broader level categories can be defined. To explain identification of broader level categories, there are a number of minor socio-factors that have linkages to major socio-factors outside of their own major theme. That is, aggregation or simplification may extend beyond the primary major socio-factor boundaries. In other words, minor socio-factors of different major socio-factors may have linkages. Examples of such linkages between major socio-factors (noted in earlier sections) include the following and are a basis for higher level aggregation or broader level categories:

- 1) Minor socio-factor *innovation* of major socio-factor *resilience* has a linkage also to major socio-factor *flexibility* in terms of minor socio-factor *availability of technology*. In other words, innovation would be impacted by the level of technology that exists within an organisation.

- 2) Minor socio-factor *use of resources* of major socio-factor *resilience* has a linkage also to major socio-factor *flexibility* in terms of minor socio-factor *availability of technology*. In other words, use of resources would be impacted by the level of technology that exists within an organisation.
- 3) Minor socio-factor *performance* of major socio-factor *resilience* has a linkage also to major socio-factor *flexibility* in terms of minor socio-factor *selection, training and support costs*. In other words, performance is dependent on the level of skills of the workforce.
- 4) Minor socio-factor *job satisfaction* of major socio-factor *personalisation* has a linkage also to major socio-factor *flexibility* in terms of minor socio-factor *income*. In other words, job satisfaction is measured in terms of pay and salaries in addition to work responsibilities.

Hence, out of the seven major socio-factors, three broad categories were identifiable namely: *resourcing, governance* and *networking*. The identification is based on a level of consistency between major socio-factors as explained in table 2.16 below and as illustrated in figure 2.39 on page 85.

#	Major socio-factors	Broad categories (higher level theme)	Explanation (see also figure 2.39 on page 85)
1	Resilience	Resourcing	Identification innovation and use of resources in addition to career prospects and job satisfaction are indicative of technological and human resource capacities. Hence, resourcing of resourcing of an organisation (as illustrated in figure 2.39 on page 85) is identifiable over the three opposite major socio-factors
2	Personalisation		
3	Flexibility		
4	Regulation	Governance	Resourcing capacities of an organisation are governed by rules, agreements and procedures. For example, resourcing capacities in terms of flexibility in working (telecommuting and self-development) and reduction in an organisation's carbon footprint must be formalised and adhered to in terms of established procedures and contractual agreements. Thus, governance is identified as an underlying and higher level theme to opposite major socio-factors.
5	Sustainability		
6	Representation	Networking	Work relationships in terms of the networks between employees within an organisation is consistent over the opposite major socio-factors (and minor socio-factors as illustrated in figure 2.39 on page 85). Thus, networking is identified as a higher level theme.
7	Culture		

Table 2.16: Seven major socio-factors by three underlying themes or broad categories

The example minor socio-factors as per the earlier sections were utilised in figure 2.39 below to illustrate the overlap or linkage between major socio-factors; and three broad categories were identifiable namely: *resourcing*, *governance* and *networking*.

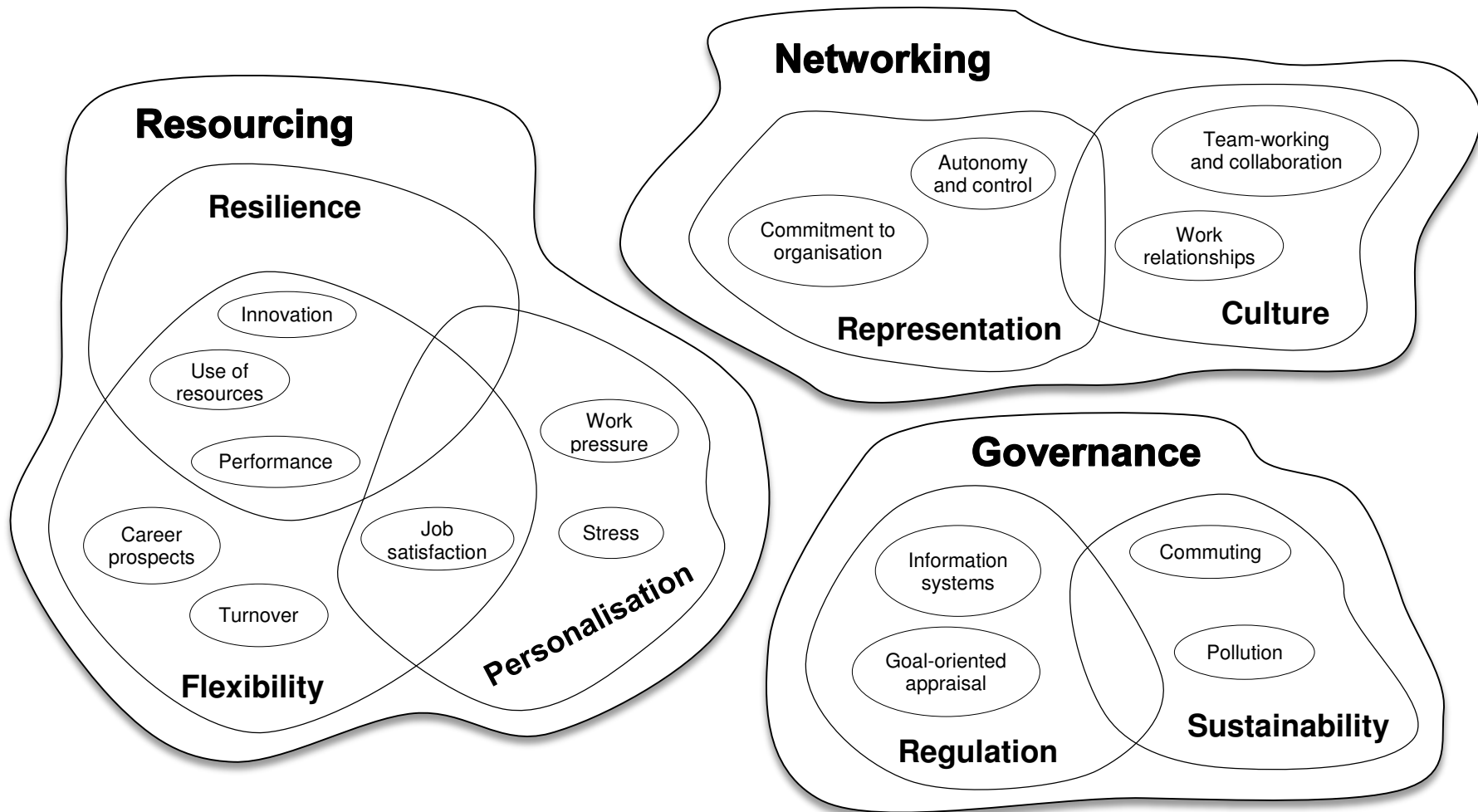


Figure 2.39: Three broad categories of major socio-factors

### 2.1.3.1.6 Mapping of the three broad socio-categories to layers of the maturity model

The three broad categories *resourcing*, *governance* and *networking* as per earlier table 2.16 on page 84 follow an identifiable consistency to three of five layers of a teleworking maturity model (section 2.1.3.22.1.3.2 below). The consistency is as shown in table 2.17 below.

Mapping of socio-categories to layers of maturity			
#	Broad categories of major socio-factors	Layers of the capability maturity model	Explanation
1	Resourcing	Resource layer	Self-explanatory.
2	Governance	Policy layer	Policy follows a consistency to governance that is, procedures, rules and agreements are created, developed and followed in terms of policy and method of governance over issues as applicable to an organisation.
3	Networking	Connectivity layer	Networking and work relationships as per earlier sections is consistent to the level to which an organisation has connectivity.

Table 2.17: Mapping of three broad socio-categories to three teleworking maturity layers

Hence, the research study is conducted in terms of a teleworking maturity model. Research methods (Chapter 3) divide the data into the three layers and, after the data collection (Chapter 4), analyses (the analysis approach is documented in Chapter 5) were conducted for each layer of the model (Chapter 6).

### 2.1.3.1.7 Conclusions [Socio-factors of teleworking]

There were a number of socio-factors identified as per existing literature with regards to teleworking. The factors were grouped in terms of minor and major socio-factors. Subsequently, major socio-factors were identifiably grouped in terms of three broad categories of resourcing, governance and networking. Following this categorisation, the three broad categories were identifiably linked to three layers of the teleworking maturity model namely, resource, policy and connectivity. The research now turns to the maturity model as explained in the following section.

### 2.1.3.2 Teleworking maturity model

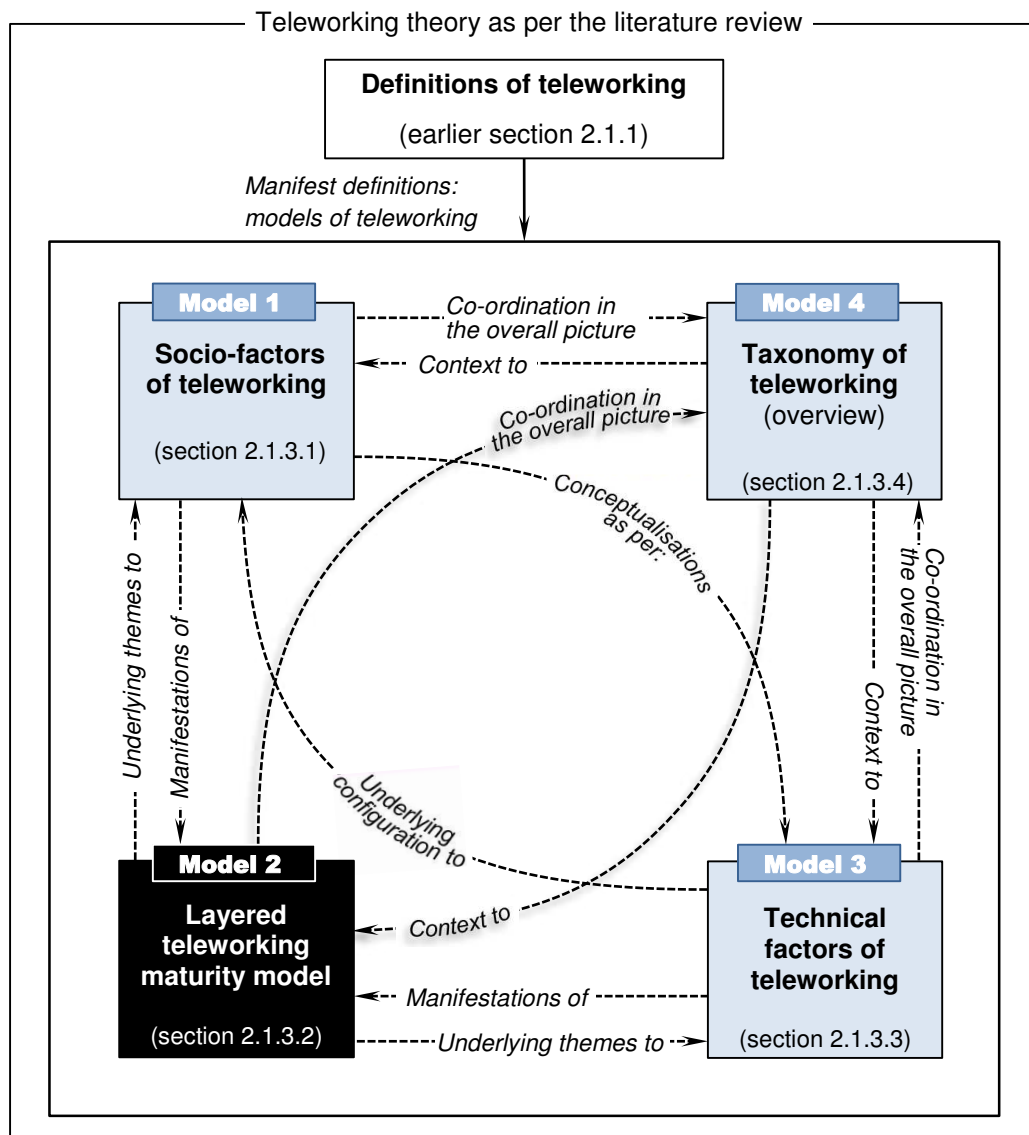


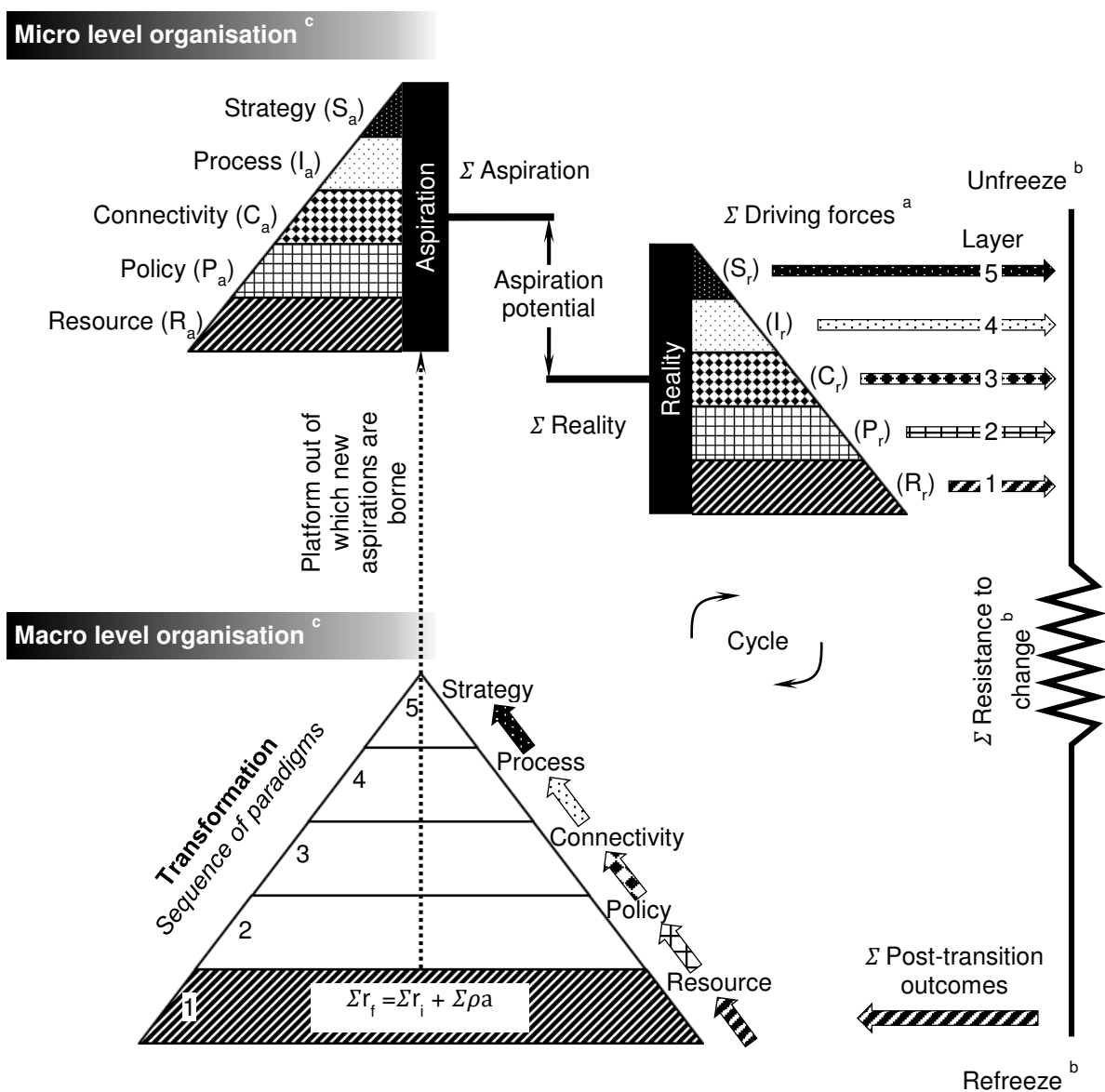
Figure 2.40: Theory of teleworking: maturity model

#### 2.1.3.2.1 Manifest definitions: maturity model of teleworking

As discussed earlier socio-factors are manifest definitions of teleworking. The maturity model of teleworking (shown in figure 2.41 on page 88) in contrast fills a gap in the modelling of teleworking namely that, as much as factors of teleworking can be identified and measured (directly or indirectly) this alone does not provide sufficient information for decision-making with regards to implementation of teleworking. The maturity model provides a context for factors identified for teleworking in terms of development and so, relevant stakeholders can assess the success of teleworking initiatives not only on the face value of factor measurements but in terms of how those measurements fit into the larger development picture. In other words the maturity model adds further comprehension to measurements of teleworking. For example, workers may perceive technology as a hindrance to



meeting work objectives yet an underlying problem may not be a resource issue rather the issue may be related to issues outside of their control such as policy or agreements concerned with the ownership of technology; a model that provides a comprehension to stakeholders with linkages of technology (resource layer of maturity) to agreements (policy layer of technology) may improve this situation of technological hindrance and raise awareness to technical support teams in addition to revisions to contractual work agreements. In other words, without a maturity model, the organisation may overlook linkages of perceptions to the development and maturity of teleworking and so, long term plans with regards to teleworking may be absent of comprehensive information. The maturity model is an overarching context to all factors (as identified preceding this section and in later sections below); a context to factors manifest as per the definitions of teleworking.



Source: adapted from <sup>a</sup>Lewin (1951a); <sup>b</sup>Lewin (1951b); <sup>c</sup>Maslow (1943); and Paulk et al., (1993)

Figure 2.41: Maturity model of teleworking (Haq et al., 2012a and 2012b)

Explanations of the maturity model of teleworking as depicted in figure 2.41 on page 88 builds on the published work of Haq et al. (2012a and 2012b) and follows in the sections below.

#### 2.1.3.2.2 Development and evaluation of the maturity model

The layered teleworking maturity model is shown in figure 2.41 on page 88. There are five layers and the first three of the layers are mapped across to the research study and are thus the foci of the research study. Exclusion of the latter two layers namely, *process* and *strategy* is a feasible proposition as the two theoretically only exist following an establishment of the first three layers. Hence, there isn't an inconsistency that would be apparent from say, studying the latter two layers alone. Here the research study would be limited in terms of model recommendations if the organisation does not have information regarding the first three layers. In other words, if an organisation is relatively weak in terms of the first three layers yet cannot confirm this weakness, actions would be limited to two layers that are in fact underpinned by three further layers. Thus, improvements in the first three layers may in turn result in improvements in the latter two layers. The ordering of layers therefore has an importance and exclusion of layers should ideally start with the upper most layer working downwards.

As the project sought insight into teleworking and its implementation a fitting model would be one that is consistent to organisational change process particularly as stated in the introduction that teleworking has not grown to the extent that one may expect. A layered model of organisational change would be a good inclusion to an investigation of teleworking development that is, expectations of adoption rates of homeworking can be explained by context: although there are resources available to operate at a distance from the employer organisation there exists policy issues which in turn create a level of resistance to those adoption rates. For example homeworking is not a requirement upon organisations for employees as a method of working; and this has taken a change in terms of encouragement (requests for flexible working) only recently in terms of law (Gov.UK, 2014). Again, the policy here does not ensure flexible working will happen and thus, policy as a layer of organisational development provides ample context to explain the aforementioned slow growth. Organisations may thus, remain fixed within traditions of working and the impetus for change does not materialise; and this process of change is relevant to maturity model yet not inclusive to the Maslow (1943) model. Hence, this void as per the Maslow (1943) model (in the context of organisation's) brings the maturity model on to another distinct part of the model that was incorporated: the Lewin's (1951a and 1951b) change model.

Lewin's (1951a and 1951b) models of organisational change is an alternative organisational change model (not a part of Maslow's, 1943, adapted theory). However, Lewin's (1951a and 1951b) model is aggregated into the Maslow (1943) model as explained further below (similar to the principle theme with regards to the earlier socio-modelling of aggregation): the model covers a cycle of change from unfreeze to change to refreeze. Recent government encouragement for teleworking practices as

mentioned helps to unfreeze an organisation into adoption of new working practices. Maslow's (1943) model in its original form is motivation theory; focused on a layered approach to explaining the individual. The model has been adapted and interpreted to organisation level and so, an insight can be gained into development of an organisation in a simplified way; an organisation can be explained by a five layered approach to development and which in turn provides context to teleworking maturity. The layered interpretation of individual to organisation is as follows:

**1) the physiological layer is interpreted as resource**

In other words, the most basic of needs to exist and live can be interpreted as resources that are needed as a pre-cursor for that organisation to exist for example, human resource (workers), buildings and equipment.

**2) the safety layer is interpreted as policy**

In other words, safety is founded in terms of rules that must exist for resources to operate and work. For example, technology is a resource that must have constraints such as security and login passwords before that resource is used.

**3) the belongingness layer is interpreted as connectivity**

In other words, belongingness is founded in terms of connectivity; technology used in line with security allows a network to exist whereby each and every individual worker follows the same protocol as the other. Thus employees without a security may not access the organisational network and thus connectivity is maintained between workers belonging to that organisation. This connectivity creates a sense of team, loyalty and commitment to the organisation.

**4) the self-esteem layer is interpreted as process**

This layer is not readily interpretable at the organisational level in the same way as the above three layers. However the capability maturity model (Paulk et al., 1993) is adopted here to interpret this layer and process was identified (further explanation follows later in this chapter).

**5) the self-actualisation layer is interpreted as strategy**

This layer is not readily interpretable too at the organisational level in the same way as the former three layers. The capability maturity model (Paulk et al., 1993) is adopted here to interpret this layer and strategy was identified (further explanation follows later in this chapter).

Maslow's (1943) model is adapted as stated above and aggregated with Lewin (1951a and 1951b) model of change whereby needs are sought to be satisfied (in turn creating aspirations for an organisation), this begins an unfreeze state to an organisation for example, an investment in resources may be sought in terms of recruitment of new employees or training and development of

current staff. Additionally software investment such as collaborative technologies may be sought. When needs are met the organisation refreezes and moves on to the next phase of policy whereby rules and procedures are followed to utilise the investment most effectively. For example, those trained in collaborative technologies have access to those technologies and security as per the technologies is set up. The aggregated model is as shown in figure 2.41 on page 88. Furthermore, Maslow's (1943) model is consistent with a further research as called upon by Bailey and Kurland (2002, p.383) (and as stated in the introduction) whereby motivations of workers for teleworking and theory building has is not to an adequate level of research.

In terms of simplification, layers of organisational development are identifiable (adapted from Maslow, 1943; and Paulk et al., 1993) and the process required to move through the layers is also identified (Lewin, 1951a and 1951b). The maturity model presents a simplified, holistic context of organisational development. The maturity model is a culmination of the three aforementioned models; models which exist as alternatives today, yet for this research project aggregated into a single theory to satisfy the aspects of development that should be part of maturity theory, as discussed above.

The sections below discuss the details of the aggregated model and introduce a new concept to the model, the micro and macro levels. Although the models (Maslow, 1943; Lewin, 1951a and 1951b) in original form date to over 60 years in age, the above and below sections update the models to level of interpretation to an organisation and thus applicability too in today's research; there is a context to the research study that can be understood (as shown in this project - empirical testing with CFA in Chapter 6 and utility explained in Chapter 7).

#### 2.1.3.2.3 Narrative of the maturity model

The maturity model, as shown in figure 2.41 on page 88, is a means to assess the maturity (Paulk et al., 1993) of telework for each unit of an organisation such as a department or company. Whilst teleworking is not a new concept or reality (World at Work, 2009. *Cited In:* Sener and Bhat, 2009, p.1) over many years it has not delivered widely in terms of modernisation of the workplace (Lupton and Haynes, 2000, p.324; Pérez et al., 2005, p.96; Pyöriä, 2011, p.386). Exponential growth of technology in terms of adoption rates and advancement has contributed to and cemented the lower level layer of the macro level transformation process today. The infrastructure layer has materialised to the extent that it would now present a firm foundation for teleworking to exist in terms of sustainability and longevity. As the size of each macro level layer in figure 2.41 on page 88 correlates to time, subsequent layers would be formed in decreasing time scales. To avoid being left behind, the focus for teleworking now switches to resource, policy and connectivity capabilities within the organisation to adopt and implement teleworking sooner rather than later, in order to sustain services and continue operations. Early positioning may also be a potential source for competitive advantage.

Each macro layer is a paradigm of operation within the organisation, such that micro level operations occur within the parameters of that macro layer, through work from all sections and department groups contributing to the resource infrastructure of the organisation. This accumulation of resources would need to reach an optimal point as per an experience curve (Hofstrand, 2013) before the subsequent layer enters a phase of development successfully; not easily achievable (see Ashford, 2009). The subsequent phase is characterised with a paradigm shift as operations which contribute to the organisation move it to a different macro protocol; utilising a language and output context consistent with policy and governance.

Organisation development is characterised by two patterns of change: (a) intangible resources emerge and improve at an increasing rate, whilst (b) each output in terms of tangible, physical resources add less, or decrease in margin. To put this into a value context: successful macro layer 2 organisations would be typically those that not only measure their enterprise in terms of physical assets and resources that is, price of resource infrastructure, but also in terms of policy and governance value for example through areas such as intellectual property, copyright and branding. As the organisation enters a subsequent paradigm of networking and connectivity the preceding macro layers are optimised through an understanding of the way that connectivity, or for example teams, operate. Transition may entail intellectual property and rights of layer 2 to accommodate and sustain macro layer 3. The capability (Paulk et al., 1993) of an organisation to achieve macro layer 3 status is dependent on the extent to which micro level operations are sustained. Bonds in terms of work relationships and networking structures positively accommodate greater networks of operation that is, cross-team working or communities rather than the relatively isolated, units of teams which are characteristic of the success at paradigm or macro layers 1 and 2.

#### 2.1.3.2.4 The micro and macro levels

The five layers as depicted in figure 2.41 on page 88 are divided into two levels: micro and macro and an organisation or unit of any kind can be viewed in terms of those two levels. The success of an organisation is measured in terms of the capability (Paulk et al., 1993) for all macro layers to materialise and importantly mature to their potential. The micro level layers operate concurrently (figure 2.41 on page 88; and figure 2.42 on page 93) and the macro level layers operate sequentially (figure 2.41 on page 88) with the micro level adding to and accumulating within the first layer of the macro model, namely resource. As the resource macro layer matures, operations of the micro level shift in paradigm or theme to the policy macro layer. A complementary diagram is shown in figure 2.42 on page 93. Macro development is theoretically bound by sequence: a macro layer cannot commence in terms of development until the preceding layer is established. Macro-development or transition to each macro layer would be as per restraining forces or a resistance factor (Lupton and Haynes, 2000, p.325). These types of forces may be minimal, or significantly inhibit development and manifest themselves in terms of resistance to change. Each of the layers is discussed further below.

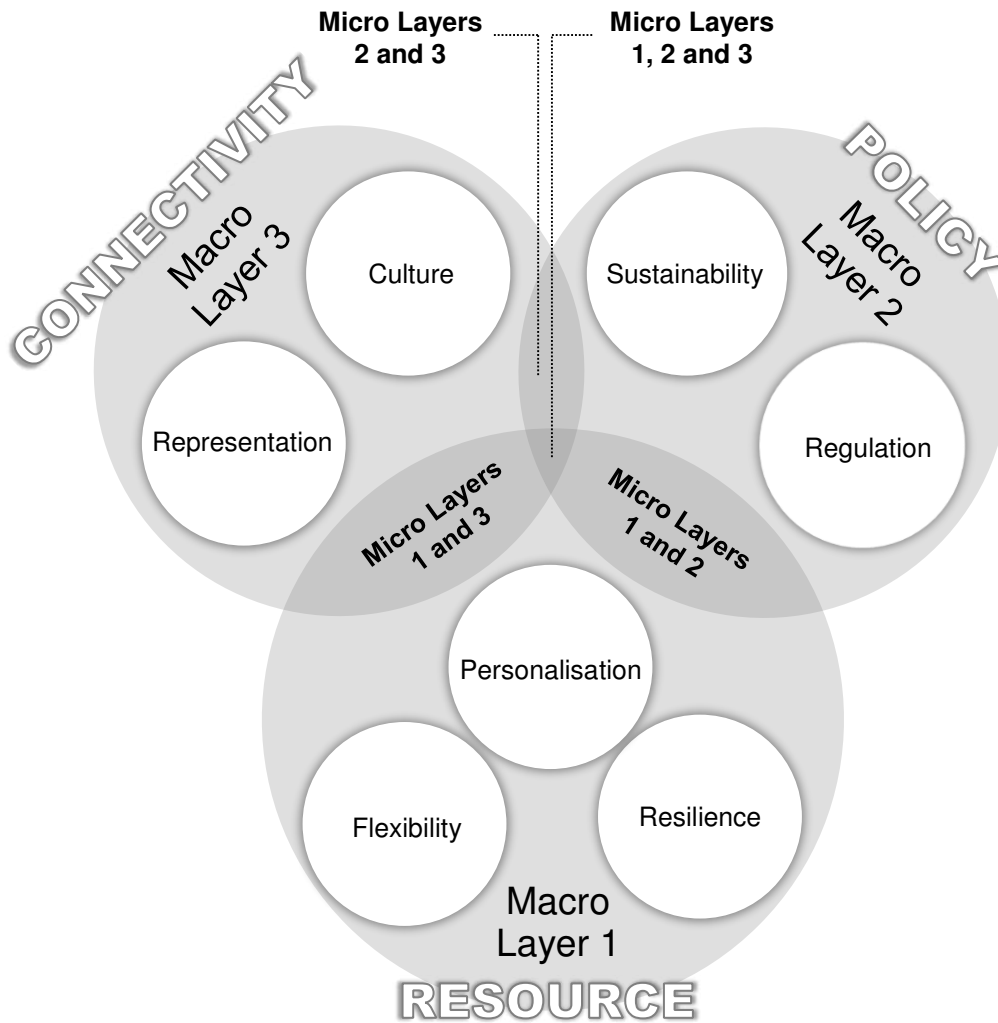


Figure 2.42: Themes of telework

#### 2.1.3.2.5 Resource (layer 1)

Teleworking has experienced growth within the European Union (Hardill and Green, 2003, p.217. *Cited In:* Hislop and Axtell, 2007, p.36), and USA and Canada (WorldatWork, 2008. *Cited In:* SonicWall, 2008, p.1). Growth is also described (statistically) for the USA, from 2005 to 2009 as per Lister and Harnish (2011, p.4) and for the UK, from 2005 to 2010 (CBI, 2010, p.23). Conversely, however, it is also noted that the rates of growth number less than one may expect (Lupton and Haynes, 2000, p.324; Pérez et al., 2005, p.96; Pyöriä, 2011, p.386). Hence, since the term was first coined and given the level of advancement with regards to technology over the last few decades such as a web-based resource infrastructure, there is an inference and understanding that teleworking practices contain therein limitations to growth. Transition to teleworking the world over may not be immediately evident or visible in such a macro-form due in large part perhaps to a naturally emerging syndrome of 'boiling the frog' (Lewin, 1951b) and this lack of visibility may affect conclusions to the extent that rates of adoption are misinterpreted as below-par.

Nonetheless there is an understanding that with any type of change, there may also be restraining forces that decelerate rates of growth. Firstly, technology may be culturally perceived to be a threat to the existing, workers that is, technology may replace the work force (for example see Sale, 1996 with regards to Luddites). Secondly, there may be an inconsistency between technology and the usability of that technology. Technology may fall behind in terms of usability to the human, 'soft' demands and needs. Inconsistencies between technology and people, would also be restraining forces for telework suitability within an organisation. Training may be required to improve adoption rates of telework. Also, in terms of foundation and infrastructure: a disproportionate overhead of training with the technology in question may indicate a failure in terms of technological development rather than human skills. When infrastructure has formed near to an optimal point or at full potential, policy type initiatives and implementation can occur across the organisation.

At the resource level (layer 1) - each form of teleworking practice will be defined by a set of socio-factors namely: a) resilience (continuity level of work), b) personalisation (for example, time management) and c) flexibility (employability potential).

#### 2.1.3.2.6 Policy (layer 2)

Policy is an intermediary layer and function to upper and lower layers (figure 2.41 on page 88). Firstly, policies protect the established infrastructure that is, rules, procedures, copyright and intellectual property for example as part of a framework supporting resources within the organisation. Secondly, there would be support and accommodation to networks and a sense of belonging (Maslow, 1943). A weak existence in terms of policy (see Broek and Keating, 2011) would thus hinder or restrain the prosperity and longevity of the organisation in terms of its communities. Policy, contracts, rules and procedures (borne out of micro-level concurrent operations) are in a state of maturity when there is little variation (Paulk et al., 1993) in terms of development i.e. policy is established and standardised, and protocols are sustained.

At the policy level (layer 2) - each form of teleworking practice will be defined by a set of socio-factors namely: a) regulation (over the regularity to which workers telework) and b) sustainability (for example, the extent to which teleworking policy alleviates and reduces commuting-related stress and the negative impact on the environment from pollution, congestion and road maintenance for example).

#### 2.1.3.2.7 Connectivity (layer 3)

Successful development of macro level layers 1 and 2 has a collective outcome as a platform for communities of teleworking practice; a set of shared values are characteristic of this layer. With regard to telework: the extent to which Web 2.0 technologies are a feature of community practices is

largely dependent on 1) the underlying resource infrastructure and 2) an alignment of policies, contracts and agreements.

Within the bounds of this operational paradigm at layer 3, the company is valued significantly in terms of intangible assets. Communication is characteristic of this layer and language protocols (digital or otherwise) would be utilised to a relatively higher level i.e. to an extent not feasible or seen in supporting macro-layers 1 and 2. In the pre-digital era communities were based significantly on physical, face-to-face networks with relatively time-consuming protocols. By comparison teleworking creates a relational network where there are a significantly higher number of connections between staff, employees and customers that can be utilised to a higher degree compared to before. For many companies, successful development of resource infrastructure and policy has become an enabler of customer service: for example O2 recently piloted a telework day (O2, 2012) in preparation for the 2012 Olympics.

At the connectivity level (layer 3) – each form of teleworking will be defined by a set of socio-factors namely: a) representativeness (the extent to which workers have autonomy, commitment and loyalty for example) and b) culture (the extent to which workers are part of a team, have work-life balance, managerial support and trust).

#### 2.1.3.2.8 Process (layer 4)

Layer 4 is an overarching paradigm that describes process improvement: the kind of operations that take precedent post-development of layers 1, 2 and 3. There is change to the preceding layer, connectivity: workers contribute creatively in terms of change requests and new idea development and a consistency over time would see the organisation enter a new paradigm that is, process improvements for the organisation and in turn, significantly increase the intangible value of the company; a feat not achievable within the supporting layers 1, 2 and 3.

An organisation at layer 4 is distinguishable from others in the sector or industry. The size of the macro layer relative to others theoretically mirrors top tier organisations within an industry that is mature (Paulk et al., 1993) at a higher layer and they number relatively few in the industry to which they belong. As teleworking practices mature an organisation may mature to a creative capacity (layer 4) and with this its capabilities improve significantly.

#### 2.1.3.2.9 Strategy (layer 5)

Success at layer 4 sets forth a viable top-end layer of strategy improvement. Top level management capabilities are theoretically borne out of success at layer 4. Perspectives in this sense are consistent with the level of vision of the organisation in terms of strategy and direction and subsequently, a coherent voice or clear mission statement materialises. Additionally, new resources may be attracted



to organisations at this level of maturity (influx of human resources and technological investment for example); improving the driving strength of the company and thus aspirations potentially increase. Resources are strategically aligned and optimised to improve integrity of operations at each supporting layer. Theoretically, characteristics of layer 5 are *optimisation, coherency, long-term planning, future direction* and *control mechanisms*. An organisation at layer 5 has effectively, reached a maturity (Paulk et al., 1993) peak and secures sustainability and longevity relative to others in the industry or market. There is a high level of predictability and minimal variability (Paulk et al., 1993) in terms of patterns across layers. In summary:

- 1) layer 1 resources are marked by optimal staff turnover rates for example,
- 2) layer 2 by standardised policies and protocols,
- 3) layer 3 by strengthened teams-working for example and networking capabilities,
- 4) layer 4 by process improvements consistent over the long term (reliability) and
- 5) layer 5 by clear, defined direction for growth; that disseminates down through the layers effectively.

#### 2.1.3.2.10 Resistance to change

There can be a number of restraining forces (Lupton and Haynes, 2000, p.325) that decelerate rates of growth. An example in terms of policy layer is as follows: at a macro level, organisations may seek a level of policy agreements in terms of employment contracts to establish telework as an official working practice. Policy (for example see Gruber, 2010) would form a protection mechanism through the function of the policy layer in connection to the lower layer of telework resources, which are promoted and connectivity therefore accommodates telework. It follows therefore, that inadequate or outdated policies negatively impacts on the growth of teleworking; growth may decelerate as per limitations in policy. Policy is a tool required for teleworking sustainability.

#### 2.1.3.2.11 Conclusion [Teleworking maturity model]

The first three layers of the teleworking maturity model namely, resource, policy and connectivity were consistent with the three broad socio-categories described earlier. Thus, the three layers of the maturity model were applicable to this research study and hence utilised. The maturity model provides a context and meaning to the research study in terms of teleworking maturity and development.

Teleworking is a socio-technical working practice and the socio aspect (in addition to linkages to maturity) have been discussed above. The research now turns to the technical aspect, as follows in the section below.

### 2.1.3.3 Technical factors of teleworking

As stated in Chapter 1, technical factors of teleworking in terms of analyses were out of scope in this research study. The technical factors were however identified as part of the research study in teleworking (as discussed below) and data collected is available for future work and analyses. **In addition, there were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1 and so, the technical questions of the survey were utilised to identify and exclude data inconsistencies from the sample.**

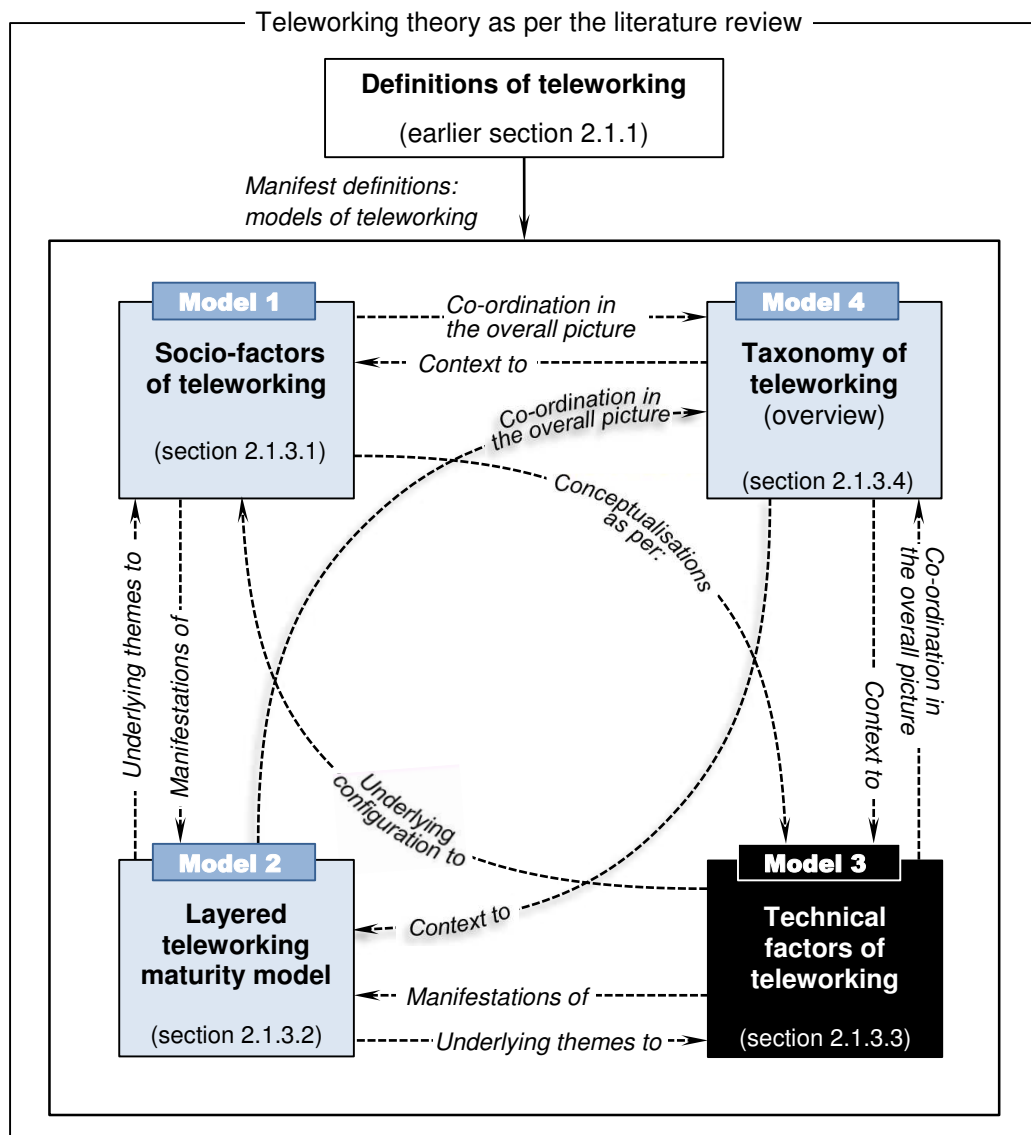


Figure 2.43: Theory of teleworking: technical factors of teleworking

#### 2.1.3.3.1 Introduction: manifest definitions and the technical model of teleworking

Meanings of technology as per The Open University (2005, pp.21-25) is drawn upon to identify and flesh out the technical factors of teleworking in relation to earlier definitions discussion as per section 2.1.1: production technology (The Open University, 2005, table 1, p.24) has a direct alignment to the technical model of teleworking. For example the nature of teleworking discussion in terms of gateways and distance (section 2.1.1.1) manifests as two technical dimensions identifiably, *gateways* and *spatial locality*. Furthermore, the flexibility discussion with regards to figure 2.8 on page 35 and figure 2.10 on page 38, manifestly links in to further examples of technical factors for example, *ICT usage* (how often and to what extent that benefit can be exploited by workers by usage of technology). A second example is the dimension, *content* of work that is, simply choosing electronic work over physical and out of which flexibility arises in working practices. Additionally, dimension *content* is further complemented by definitions associated to product technology (section 2.1.1.2): the discussion regarding conceptualisation namely that they emerge from usage and utilisation of technology over time is manifestly a parameter of *content*: the extent to which workers use technology over physical working teleworking (over time). Thus technical model of teleworking is manifestly linked to definitions of teleworking.

#### 2.1.3.3.2 Identification of technical factors of teleworking

There is a number of technical factors of teleworking that are manifestly identifiable. These factors were identifiable in terms of three distinct types: *dimensions*, *attributes* and *organisational roles*. *Dimensions* are identified in the sections below; and by drilling down further with regards to each of these dimensions, *attributes* were also identifiable. Additionally, organisational roles were identifiable as an integral part of the technical factorisation of teleworking. After explanations regarding each of the three (*dimensions*, *attributes* and *organisational roles*), figure 2.44 on page 112 shows the three in terms of modelling of the definitions of teleworking; in addition, linkages to socio-factors and the maturity model are shown too. A survey was conducted with questions pertaining to technical factors (dimensions, attributes and organisational roles) as shown in Appendix F (section two), however data collected will thus, be utilised in future work.

Technical factors **in terms of analyses** were out of scope for this research study, in other words:

- 1) the technical questions (as per section 2.1.3.3) was developed at a later stage of the research study, that is, after the pilot study.**
- 2) the onus of the research study over the first two years of study leaned significantly to socio-factors of teleworking. In other words, the technical questions were inclusive to theory for a comprehensive explanation and definition with regards to teleworking.**

- 3) Furthermore, the magnitude of the technical factors of teleworking (this section, 2.1.3.3) in terms of data analysis rendered technical factors future work and thus, out of scope for this research study. For completion of the research study the technical factors were discussed, identified and documented (following sections below).

In addition, there were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1 and so, the technical questions of the survey were utilised to identify and exclude data inconsistencies from the sample.

#### 2.1.3.3.3 Technical factorisation

Technical factors (*dimensions, attributes and organisational roles*) were identifiable and derived as per the following two criteria:

- 1) There are a number of meanings of technology (The Open University, 2005, pp.21-25). These are as follows: ‘application technology, product technology and production technology [each in terms of] artefact, knowledge [and] mode of enquiry and action’ (The Open University, 2005, table 1, p.24). The meanings can be utilised to identify technical factors of teleworking. Hence, each of the technical factors were identified and explained based on meanings consistent with technology.
- 2) Each of the factors must be consistent to meanings of teleworking (in addition to technology as stated above) that is, factors must have a focus to the research study of teleworking in terms of information and communications technology (ICT); as opposed to the wider definition of technology which does **not** exclude mechanical technology such as engines and cars for example. In other words, technical factors must have a consistency to socio-factors of teleworking (as discussed in earlier section 2.1.3.1); rather than implications on the mechanics of engines and cars for example.
- 3) Technical factors may be identifiable based on their capacity to differentiate working practices or identify types of teleworking practices (and to a finer granularity than informal conceptualisations as per earlier section 2.1.1.2). For example *content* was identified as a technical dimension with the attributes *electronic content* and *physical content* that can be utilised to differentiate data in terms of teleworkers and non-teleworkers respectively. In other words, types of teleworking practices may be identifiable and thus contribute to the teleworking field. The capacity to identify and differentiate between teleworking practices was a criterion for factor identification.

There is additional future work and potential utility following the identification of types of teleworking: to address its complexity by mapping types of teleworking practices to types of jobs (profiling of characteristics and configuration; Hill and Menda, 1998, figure 5, p.58) and furthermore, determine

and decipher optimal levels of working per job type or job role (potential future work as per a positivist viewpoint - Saunders et al., 2012, figure 4.1, p.128).

The identification of technical factors in terms of *dimensions* and *attributes* follows in the sections below. Identification of job roles follows after *dimensions* and *attributes*. A complete diagram of the dimensions, attributes and organisational roles is as shown in figure 2.44 on page 112. Although technical factors are out of scope for this research study, a survey was conducted with questions pertaining to technical factors (*dimensions*, *attributes* and *organisational roles*) and this survey is shown in Appendix F (section two of the survey). Data collected will be analysed in future work.

#### 2.1.3.3.4 Dimensions and attributes

##### 2.1.3.3.4.1 Content [Dimension 1 of 11; with attributes: *electronic* and *physical*]

A key difference between pre- and post-digital era is content of work. As per the earlier abstraction definition of teleworking (section 2.1.1.3), content is defined in terms of electronic processing (Pérez et al., 2005, figure 1, p.98) or products such as word documents, spreadsheets, emails, blogs, instant messages, forum posts, Voice over Internet Protocol (VoIP) and video conferencing. This type of content creates resilience for an organisation where work may have continuity in for example adverse weather conditions (Daniels et al., 2001, table I, p.1152; and figure 2.16 on page 61) which may otherwise cause disruptions to commuting and productivity.

Additionally, type of content would differentiate employees that do teleworking from those that do physical working (non-teleworking); and serve as a demographic-type utility in research studies by sifting and sorting teleworking data from non-teleworking data and thus potentially allowing for comparative studies between the two groups of workers.

In technical summary, dimension *content* is an aggregation of attributes *electronic* and *physical*; and attributes *electronic* and *physical* are a simplification of dimension *content*.

To conclude, resilience can be achieved via electronic content (or teleworking) and content can be utilised as a tool to divide data into two groups, namely teleworkers and non-teleworkers. Hence, ***content*** was identified as a technical dimension of teleworking **with two attributes - *electronic* and *physical***.

##### 2.1.3.3.4.2 Orientation [Dimension 2 of 11; with attributes: *task* and *time*]

Work is affected by and dependent on parameters such as *task* and *time* (Tietze and Musson, 2003, pp.439-441; and Hislop, and Axtell, 2009, table 1, p.64) and these parameters in isolation may differentiate working practices with task-driven working practices potentially differing from time-driven working practices:

- 1) *Task-driven* work is done independent of time constraints and thus, primarily relates to completing the task at hand. The question asked here would be ‘what can be done?’ as opposed to ‘what can be done within a time-frame?’ A task-oriented company may achieve an experience curve (Hofstrand, 2013), and thus greater quality and expertise in the tasks, as opposed to an organisation whose work is primarily orientated to time. Research suggests that teleworking may be adopted in an environment of task pressures (Daniels et al., 2001, figure 1, p.1160). Teleworking may improve the capacity of working via a reduction in distractions and interruptions (for example, see Manning, 1985. *Cited In:* Bailey and Kurland, 2002, p.393; and Daniels et al., 2001, table I, p.1152; and figure 2.20 on page 66) and so tasks may be completed to a higher depth and/or standard. However over-working is also more commonly reported (Musson and Tietze, 2004, p.256).
  
- 2) *Time-driven* work is done under time constraints. The question asked here would be ‘what can be done and when?’. The element of time may add pressures and thus create stress (for example, as per Tietze et al., 2002, p.395; and figure 2.20 on page 66). A time-oriented approach may be more diverse in terms of the work yet at the expense of the expertise (experience curve; Hofstrand, 2013), or standards that can be comparably achieved may be lower than with the above stated task-oriented approach. Research suggests that in terms of overall impact of teleworking (inclusive of employees that do not telework) time management may be negatively affected (Bailey and Kurland, 2002, p.393; and figure 2.20 on page 66).

In technical summary, dimension *orientation* is an interpretive aggregation of attributes *task* and *time*; and alternatively attributes *task* and *time* are a simplification of dimension *orientation*.

To conclude, dimension *orientation* can differentiate teleworkers from non-teleworkers in terms of experience curve (Hofstrand, 2013), expertise, standards, quality and diversity. ***Orientation*** was identified as a technical dimension of teleworking **with two attributes namely, *task* and *time***.

#### 2.1.3.3.4.3 Hardware location [Dimension 3 of 11; with attributes: *dependent* and *independent*]

Hardware (Zuurmond, 2005, p.136) is identified as a factor with regards to teleworking or ICT working. The location of technology (Hislop and Axtell, 2007, figure 1, p.43) in terms of hardware can be a determinant of the type of teleworking that is practised and there were two types of location with regards to hardware (adapted from Allsopp, 2010) identifiable namely: *dependent* and *independent*.

- 1) Technology in terms of hardware that is stationary (fixed) over long periods of time in terms of location is regarded as *location-dependent* hardware. In other words, the location-dependent hardware technology is effectively interface point(s) where workers commute to and from for continuity of work. *Location-dependent* hardware such as desktop computers owned by teleworkers can positively affect the degree of flexibility that may exist for these workers (as per

Alexander et al., 2010, p.520; and figure 2.24 on page 69). Understandably, this type of working practice consistently over the long-term may impact on the lives of employees to such an extent that they may regard themselves as part of a group or type of working practice which is significantly different to workers with *location-independent* hardware (explained further below).

- 2) Technology in terms of hardware that is portable is regarded as *location-independent*. Examples include smartphones, laptops and tablet PCs. Thus, workers have flexibility in addition to *location-dependent* hardware (discussed above) in terms of the location from which he/she can work from.

Flexibility as per the above can increase the pool of candidates (as per Harpaz, 2002, p.74; and figure 2.24 on page 69) that are available to an organisation such that employees can work at a distance and so an employer may offer jobs (recruitment potential as per Di Martino and Wirth, 1990. *Cited In:* Teo and Lim, 1998, p.258; and figure 2.24 on page 69) feasibly to candidates residing at relatively large distances from the employer site. This potential may also reduce relocation costs (Lupton and Haynes, 2000. *Cited In:* Kowalski and Swanson, 2005, p.238; and figure 2.24 on page 69).

In technical summary, dimension *hardware location* is an aggregation of attributes *dependent* and *independent*; and attributes *dependent* and *independent* are a simplification of dimension *hardware location*.

To conclude, dimension *hardware location* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers. **Hardware location** was identified as a technical dimension of teleworking **with two attributes namely, dependent and independent.**

#### 2.1.3.3.4.4 Software deployment [Dimension 4 of 11; with attributes: *server* and *stand-alone*]

Software (Zuurmond, 2005, p.136) is identified as a factor with regards to teleworking or ICT working. Software technology (in addition to hardware as discussed above) can be determinant of the type of teleworking that is practiced and there were two types of software technology identifiable namely: *server* and *stand-alone* (Zuurmond, 2005, p.136).

- 1) *Server* software (or *network* as per Zuurmond, 2005, p.136) technology enables a worker to access available software at a distance such that software is available and ready to use on a remote server and that software is nearly always owned by the employer organisation. In other words, the software is not installed on the local computer. Examples include Web Outlook, Google Docs and MS Word via Citrix. Software that runs from a USB drive for example may also be included in this definition that is, the software is accessible from a central location comparable to servers, yet the USB drive is portable too unlike servers. Nonetheless, software as described above can be accessed, utilised or available at any computer independent of the location of the

computer (such as desktop or tablet PC). Hence, server software provides flexibility additional and complementary to hardware location (discussed above).

- 2) *Stand-alone software* is software that is installed on the local computer (independent of a remote server). Locally installed software is perhaps the most common type of software deployment today, and the software is often owned by the employee. In contrast to server software, stand-alone software access is limited to the computers that have the software installed (that is, the software cannot be accessed at any computer) and thus, employees have a limited flexibility.

Software deployment, like hardware technology discussed earlier, improves flexibility: employees may use sever and stand-alone software to different degrees consistently over time and so these variations and complexities in configurations of hardware and software between employees may be indicative of different types of teleworkers (this is an area of potential future work). The flexibility has been reported positively, in terms of an increase in entrepreneurial activity (Daniels et al., 2001, table I, p.1152; and figure 2.24 on page 69), however in terms of the infrastructure of hardware and software, costs may be higher for an organisation in terms of selection and training (Wilson and Greenhill, 2004, p.211; and figure 2.24 on page 69) and investment (Lupton and Haynes, 2000, p.325 and figure 2.24 on page 69).

In technical summary, the dimension *software deployment* is an aggregation of attributes *server* and *stand-alone*; or alternatively attributes *server* and *stand-alone* are a simplification of dimension *software deployment*.

To conclude, dimension *software deployment* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers. **Software deployment** was identified as a technical dimension of teleworking **with two attributes namely, server and stand-alone.**

#### 2.1.3.3.4.5 ICT usage [Dimension 5 of 11; with attributes: *regularly* and *irregularly*]

Hardware and software is discussed in earlier sections yet the time element was not included in this discussion. Workers may invest different amounts of time with technology over the course of their employment (Tremblay, 2002. *Cited In:* Greenhill and Wilson, 2006, p.381; Sener and Bhat, 2009, pp.4-6; and Alexander et al., 2010, table 1, p.510) and so these variations in terms of time between employees may be indicative of different utilisations of technology and in turn, potentially different types of teleworkers over time may be identifiable. Hence, there were two types of ICT usage identifiable (in terms of a simplification) namely: *regularly* and *irregularly*.

The agreements or contracts governing the use of the technology in terms of time can have positive impacts such as a decrease in marginalisation of groups of employees such as older workers (Allenby et al., 2005, pp.1035-1036; and figure 2.27 on page 72) or negative impacts such as security concerns (Henderson, 1995. *Cited In:* Kowalski and Swanson, 2005, p.238; and figure 2.27 on page



72), and space sharing privacy (Zalesny and Farace, 1987. *Cited In:* Teo and Lim, 1998, p.258; and figure 2.27 on page 72).

In technical summary, dimension *ICT usage* is an aggregation of attributes *regularly* and *irregularly*; and alternatively, attributes *regularly* and *irregularly* are a simplification of dimension *ICT usage*.

To conclude, dimension *ICT usage* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers and so, ***ICT usage*** was identified as a technical dimension of teleworking **with two attributes namely, *regularly* and *irregularly*.**

#### 2.1.3.3.4.6 Spatial locality [Dimension 6 of 11; with attributes: *off-site* and *on-site*]

Hardware and software is discussed in earlier sections yet the location of the employee (described here as *spatial locality*) was not inclusive to that discussion. Hence, there were two types of location identifiable namely: *off-site* and *on-site* and there may be varying locations per employee and overall, variations between employees may be indicative of different types of teleworkers.

- 1) *Off-site* (Daniels et al., 2001. *Cited In:* Hislop and Axtell, 2007, p.39) refers to employees who are able to work at a distance from the employer's site. Examples include the worker's home, internet cafés, on a train, or at client organisations. The positive impacts of off-site working particularly in terms of the working from home are apparent in terms of reductions in commuting time and expense (Kurland and Bailyn, 1999. *Cited In:* Tietze et al., 2002, p.386; and figure 2.30 on page 75) and reductions in pollution (Clean Air Council, 2003. *Cited In:* Kowalski and Swanson, 2005, p.238; and figure 2.30 on page 75).
- 2) *On-site* refers to employees who work at the employer's site. Examples include the main office buildings or call centres owned by the organisation. The attribute can be utilised as a mechanism for dividing data into two groups, off-site workers and on-site workers for comparative study.

In technical summary, dimension *spatial locality* is an aggregation of attributes *off-site* and *on-site*; and alternatively attributes *off-site* and *on-site* are a simplification of dimension *spatial locality*.

To conclude, dimension *spatial locality* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers and so ***spatial locality*** was identified as a technical dimension of teleworking **with two attributes namely, *off-site* and *on-site*.**

#### 2.1.3.3.4.7 Gateways [Dimension 7 of 11; with attributes: *too few* and *too many*]

Gateways have been discussed earlier in section 2.1.1.1.2, and identified as a technical parameter of teleworking. The term *gateways* as per this research study is synonymous with the term *portal*; in other words an interface between the worker and the destination, for example access to a local PC,

may require entering a log on username and password or to access to a remote server (such as a Virtual Private Network (VPN)) which may require a unique security password.

Gateways are interpretable as a production technology (The Open University, 2005, pp.21-25); as a platform that is often needed before the actual product such as word processing software can be used. For example word processing may require the worker to log on to a local PC before word processing software can be opened. Video conferencing however may be inclusive of an additional gateway for example logging on to Skype. The extent to which gateways are a repetitive task (to a level of resistance) or conversely automated via software technology (in other words, seamless to the worker) may impact on the extent to which teleworking is utilised as a working practice over physical working (non-teleworking).

Furthermore, gateways are comparable to gateways in the physical world. Commuting for example may require a high number of gateways such as access to transport, roads infrastructure (route choice in day-to-day journeys as per traffic congestion for example), and access to site buildings before work responsibilities commence. A high number of gateways (or too many) with regards to commuting may induce stress and so remote-working excludes commuting and traffic congestion may be reduced (Sener and Bhat, 2009, p.1; and figure 2.30 on page 75) and therefore stress levels may also be reduced (Harpaz, 2002, p.76; and figure 2.30 on page 75).

In technical summary, dimension *gateways* is an aggregation of attributes *too few* and *too many*; and alternatively attributes *too few* and *too many* are a simplification of dimension *gateways*.

To conclude, dimension *gateways* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers (in terms of utilisation levels of teleworking) and so, ***gateways*** was identified as a technical dimension of teleworking **with two attributes namely, *too few* and *too many*.**

#### 2.1.3.3.4.8 Contextual constraints [Dimension 8 of 11; with attributes: *high* and *low*]

The environment (or different work spaces) can impact on the level of teleworking that can be done (Sherry and Salvador, 2002. *Cited In*: Hislop and Axtell, 2007, p.44). In other words, there may be *contextual constraints* (Axtell et al., 2008, p.906). For example, working at a public place such as on a train may hinder security of the information you would like to communicate to employees whilst off-site. Thus, there can be constraints to varying degrees, high as in this example or, conversely low for example, on-site where building design is consistent with knowledge creation (Watad and Paterson, 2010; and figure 2.33 on page 78). In this latter example job responsibilities such as designated rooms and offices, in addition to established frameworks of policies and procedures for on-site working may improve the teleworking context. Over time, for each context in which work can be done,

constraints may impact on the type of teleworking that is practised. Hence contextual constraints are identified as a technical dimension of teleworking with attributes *high* and *low*.

Constraints as described above may be a hindrance on autonomy and control; certainly, Jenkins (2004. *Cited In*: Greenhill and Wilson, 2006, p.385; and figure 2.33 on page 78) report that the impacts of teleworking on autonomy do vary or as per the example above, external factors to the job can affect the degree to which autonomy and control can be exercised. In contrast, low constraints in terms of technology that is, ICT enabling workers to connect with each other at any time (as per root definition in earlier section 2.1.1.1; Harpaz, 2002, p.74; Tietze and Musson, 2005, p.1337. *Cited In*: Hislop and Axtell, 2007, p.39) may have a negative impact in terms of over-availability (Harpaz, 2002, p.77; and figure 2.33 on page 78) as reported.

In technical summary, dimension *contextual constraints* is an aggregation of attributes *high* and *low*; and alternatively, attributes *high* and *low* are a simplification of dimension *contextual constraints*.

To conclude, dimension *contextual constraints* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers (in terms of utilisation levels of teleworking) and so, ***contextual constraints*** was identified as a technical dimension of teleworking **with two attributes namely, *high* and *low***.

#### 2.1.3.3.4.9 Response (or responsiveness) [Dimension 9 of 11; with attributes: *prompt* and *untimely*]

Participants via teleworking can communicate at any time (Harpaz, 2002, p.74; Tietze and Musson, 2005, p.1337. *Cited In*: Hislop and Axtell, 2007, p.39) and as per earlier section 2.1.1.1 (root definition) and section 2.1.1.3 (abstraction definition), *response or responsiveness* (a measure of the participants' time to reply) was an identifiable technical factor of teleworking.

Varying levels of responsiveness over time may indirectly and hypothetically reflect participation levels in terms of commitment. Teleworking is reported to have a positive impact on commitment to the job by employees (Teo and Lim, 1998, p.255; and figure 2.33 on page 78). In contrast, there are varying reports with regards to commitment to the organisation whilst teleworking which have been found to be both 1) a negative or drawback of teleworking (Harpaz, 2002, p.76; and figure 2.33 on page 78) and 2) a positive or benefit of teleworking (Igbaria and Guimaraes, 1999. *Cited In*: Kowalski and Swanson, 2005, p.238; and figure 2.33 on page 78).

In technical summary, dimension *response (or responsiveness)* is an aggregation of attributes *prompt* and *untimely*; and alternatively attributes *prompt* and *untimely* are a simplification of dimension *response (or responsiveness)*.

To conclude, dimension *response (or responsiveness)* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers (in terms of utilisation levels of teleworking) and so *response (or responsiveness)* was identified as a technical dimension of teleworking **with two attributes namely, *prompt and untimely***.

#### 2.1.3.3.4.10 Activity [Dimension 10 of 11; with attributes: *asynchronous* and *synchronous*]

The dimension *activity* is part-description of earlier (above) attributes, *prompt* and *untimely* of dimension *response (or responsiveness)*. However, the responsiveness may be determined to an extent by the technology that is utilised. As per the meaning of technology (The Open University, 2005, pp.21-25) dimension *activity* can be differentiated from dimension *response (or responsiveness)* in terms of the availability and utilisation of *asynchronous* or *synchronous* product technologies (Johansen, 1988. *Cited In*: Griffiths, 1999, second and third table; and Pérez et al., 2005, p.97):

- 1) Asynchronous is both a) discontinuous and b) indirect line of communication between participants. Each and every communication between participant(s) contains an acknowledgement of response delay (subtle yet informal) for example, emailing and blogging. Asynchronous communication is defined out of a response delay (c.f. a *synchronous* response delay below) as follows:
  - a) an offline element or discontinuity that is, where each and every communication by the sender is firstly stored at a point (namely, a server) between participants before receipt by the destination participant; and
  - b) a participants' time to respond. To simplify, participants communicate within different temporal boundaries or in other words at different times for example email and voicemail. The response delay on average over asynchronous-type communications is significantly higher than synchronous-type communications.
- 2) Synchronous is both a) continuous and b) direct line of communication between participants. Each and every communication between participant(s) occurs in real-time or in other words, within the same temporal boundaries for example instant messaging, video conferencing or using a telephone. Synchronous communication is defined out of response delay (c.f. *asynchronous* response delay, above) as follows:
  - a) Dependent on speed of communication between participants. Hence, significantly low bandwidth speeds such as dial up internet services incur significant transmission delays compared with broadband; and (over page)

- b) a participants' time to respond. A storage point (namely, a server) between participants is not a requirement for this type of communication and so, the response delay on average is significantly lower than asynchronous-type communications.

Activities (as explained above) may differ for different types of workers that is, the asynchronous and synchronous communication may vary per employee and this may be underpinned by work hours and the types of software that enable asynchronous or synchronous communication.

Teleworking may be more synonymous with asynchronous communication; that is synchronous communication requires that participants be available at the same time. However this availability may not be feasible. For example, countries where time zones can be significantly different in terms of night and day can mean that synchronous technology is rendered redundant for cross-country communication.

Nonetheless, and with a consistency over time, it follows therefore, that patterns of communications or levels of asynchronous to synchronous communications may emerge per job type or work hours (in terms of a positivist viewpoint - Saunders et al., 2012, figure 4.1, p.128). The patterns may not be easily identifiable in the short term. Thus, dimension *activity* as described above is a valid and technical factor of working practices. Furthermore, *activity* may also differ between types of working practices and for example, a negative impact is reported between co-workers (Golden, 2007. *Cited In*: Tietze et al., 2009, p.592; and figure 2.36 on page 81) that is, between those off-site and on-site workers.

In technical summary, dimension *activity* is an aggregation of attributes *asynchronous* and *synchronous*; and alternatively, attributes *asynchronous* and *synchronous* are a simplification of dimension *activity*.

To conclude, dimension *activity* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers (in terms of utilisation levels of teleworking) and so, **activity** was identified as a technical dimension of teleworking **with two attributes namely, asynchronous and synchronous**.

#### 2.1.3.3.4.11 Networking capacity [Dimension 11 of 11; with attributes: *online* and *offline*]

Firstly, two attributes of technology were identifiable namely: *online* and *offline* and secondly, these attributes were aggregated to identify meaning namely to the dimension *networking capacity*. '[Meanings of technology may be] different ... to different people' (The Open University, 2005, p.25), and so, an explanation for each attribute is given below, followed further below with applications in terms of socio-factor examples:

- 1) *Offline capacity* is work that is done without an internet connection or that work is not dependent on an internet connection for example, word processing on the local PC. However offline working also means that information communications technology is not used altogether. In other words, offline working can mean non-teleworkers or physical working such as hand-written letters, and physical meetings. This ambiguity is resolved as per an additional dimension stated earlier, namely: ICT usage.

Thus workers that state that they do not use ICT at all, are also by definition working offline, in other words they are physical workers. Likewise, workers that state that they work offline and use ICT regularly are teleworkers of a type. Hence, attribute *offline* of dimension *networking capacity* in conjunction with attribute *regularly* of earlier dimension *ICT usage* defines working practice comprehensively compared to say a single dimension *networking capacity* which alone is not clear in terms of the differentiation between teleworkers and physical workers. The latter also puts forward the proposition (and a theme of this thesis) for modelling a comprehension of the definition of teleworking that is to say that the more dimensions that are identifiable, the greater the level of clarification and simplification and in turn alleviation of ambiguity within the definition.

- 2) *Online capacity* is work that is dependent on a connection to the internet. For example an employee may work with applications available in the cloud such as Google Docs or via Citrix and this work would require an online connection consistently over the duration of that work. Other online dependent work includes emailing and social networking.

Notably, the attributes *online* and *offline* of dimension *networking capacity* have a consistency to earlier stated attributes *server* and *stand-alone* of dimension *software deployment*, respectively. As per The Open University (2005, p.22), 'one person's component (or tool) is another person's product and yet another person's application' and so, subtle differences (a finer granularity) were identifiable between the dimension *networking capacity* and dimension *software deployment* as follows: the former has a focus with regards to connectivity between workers and the latter a focus to resource infrastructure; in other words, networking capacity is dependent on levels of software deployment. Therefore, networking capacity as a dimension of teleworking in terms of the above is a comprehension-serving addition to technical factors of teleworking.

Connectivity as mentioned above can be illustrated in terms of socio-factors as follows: networking capacity as described may affect the degree of worker inclusion (Morganson et al., 2010, p.584) for example, isolation is reported in the teleworking literature (Watah and Paterson, 2010; and figure 2.36 on page 81) and the level of managerial support may be questionable regarding online working (Harpaz, 2002, p.77; and figure 2.36 on page 81). However, online working for example, *groupware* may improve team-working (Pérez et al., 2005, p.98; and figure 2.36 on page 81).

In technical summary, dimension *networking capacity* is an aggregation of attributes *online* and *offline*; and alternatively, attributes *online* and *offline* are a simplification of dimension *networking capacity*.

To conclude, dimension *networking capacity* has significant linkages to socio-factors of teleworking and potential linkages to types of teleworkers (in terms of connectivity) and so, ***networking capacity*** was identified as a technical dimension of teleworking **with two attributes namely, *online* and *offline***.

#### 2.1.3.3.4.12 Summary of dimensions and attributes

Table 2.18 below was translated into a set of 11 survey questions pertaining to each dimension (namely, section two of the survey, as shown in Appendix F); the attributes as listed in table 2.18 below were answer options for each question to survey participants. **Furthermore, and notably, a third and fourth option was added to each question namely:**

- 1) ***A mixture*** (that is, a combination of the two attributes for each dimension) and
- 2) ***Not applicable*** (that is, the dimension was not applicable to the employee).

The dimensions and attributes in terms of the survey (and in addition to aforementioned Appendix F) are shown collectively in figure 2.44 on page 112.

#	Dimension	Attribute
1)	Content	Electronic
		Physical
2)	Orientation	Task
		Time
3)	Hardware location	Dependent
		Independent
4)	Software deployment	Server
		Stand-alone
5)	ICT usage	Regularly
		Irregularly
6)	Spatial locality	On-site
		Off-site
7)	Gateways	Too few
		Too many
8)	Contextual constraints	High
		Low
9)	Response (or responsiveness)	Prompt
		Untimely
10)	Activity	Asynchronous
		Synchronous
11)	Networking capacity	Online
		Offline

Table 2.18: Technical factors of teleworking in terms of dimensions and attributes

#### 2.1.3.3.5 Organisational roles

Furthermore, three organisational roles in terms of existing literature regarding business, work and employees, were identified as applicable to types of teleworking practices. The three organisational roles identified were, **intra**, **inter** and **extra-organisational**.

In contrast, employees may be grouped into types of teleworking practice as per their job responsibilities. However, there is a large number of job responsibilities that exist and so, mapping of technical factors per job type may not be feasible and so, the complexity has been simplified to three distinct groupings of job roles as follows:

- 1) **Intra-organisational role** (Anderson et al., 2001, p.364; Zuurmond, 2005, p.133; Deverell and Burnett, 2012; and Fleischmann et al., 2013, p.143)

In other words, communications between employees belonging to the **same organisation**, that is, working internally (within) the organisational structure.

- 2) **Inter-organisational role** (Anderson et al., 2001, p.364; Zuurmond, 2005, p.133; and Fleischmann et al., 2013, p.143)

In other words, communications between employees belonging to **different organisations**, that is, employees working in a representative capacity of their organisation to employees of other organisations. For example, council employees speaking with business clients (and vice versa).

- 3) **Extra-organisational role** (Zuurmond, 2005, p.133; and Deverell and Burnett, 2012)

In other words, communications between employees of an organisation and persons not belonging to an organisation, that is, employees working in a representative capacity of their organisation to people (and vice versa). For example employees of a council speaking with members of the general public (and vice versa).

Each of the three job roles with regards to dimensions and attributes is as shown in figure 2.44 on page 112. The three roles were included in the technical questions of the survey as shown in Appendix F.



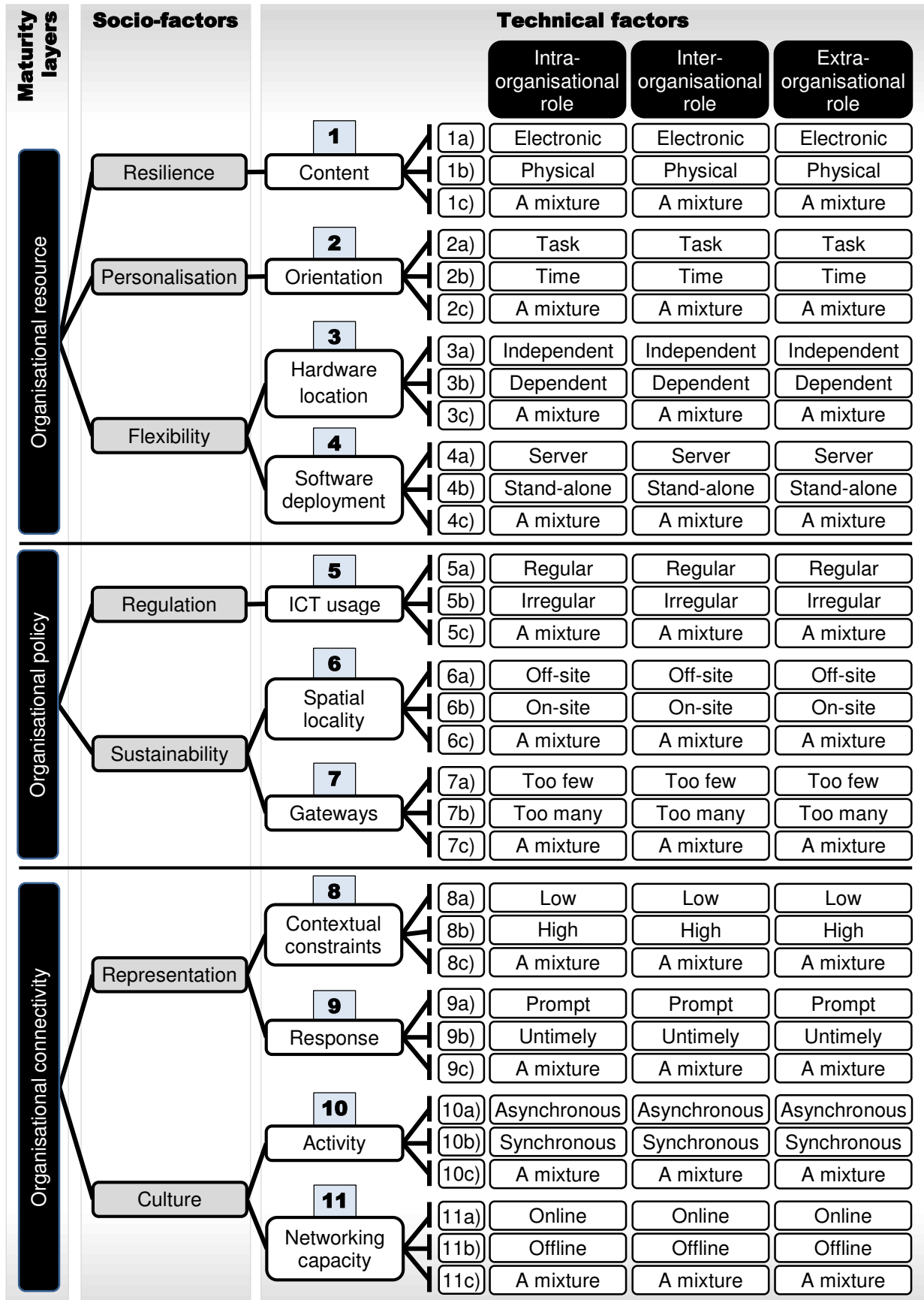


Figure 2.44: Modelling the comprehensive definition of telework in terms of technical factors; and mapping to maturity layers and socio-factors

#### 2.1.3.3.6 Conclusions [Technical factors of teleworking]

Teleworking is currently ambiguously defined and so technical factors (*dimensions, attributes and organisational roles*) were identified to simplify and clarify the definitions of teleworking. The following three criteria were utilised as a method of identification of technical factors:

- 1) Meanings of technology (The Open University, 2005, pp.21-25) in terms of: 'application technology, product technology and production technology [each in terms of] artefact, knowledge [and] mode of enquiry and action' (The Open University, 2005, table 1, p.24).
- 2) Consistency to meanings of teleworking (in addition to technology as stated above).
- 3) The capacity of the technical factor to potentially differentiate working practices. For example content was identified as a technical dimension with attributes electronic content and physical content; and the two attributes can be utilised to differentiate data in terms of teleworkers and non-teleworkers respectively.

There were 11 dimensions identifiable with two attributes for each dimension. The dimensions are stated in bold and attributes in parenthesis as follows: **content** (*electronic and physical*), **orientation** (*task and time*), **hardware location** (*dependent and independent*), **software deployment** (*server and stand-alone*), **ICT usage** (*regularly and irregularly*), **spatial locality** (*on-site and off-site*), **gateways** (*too few and too many*), **contextual constraints** (*high and low*), **response or responsiveness** (*prompt and untimely*), **activity** (*asynchronous and synchronous*), and **networking capacity** (*online and offline*). Furthermore, three organisational roles in terms of existing literature regarding business, work and employees, were identified as applicable to types of teleworking practices. The three organisational roles identified were **intra**, **inter** and **extra-organisational**. A complete diagram of the aforementioned dimensions, attributes and organisational roles is shown in figure 2.44 on page 112.

A survey was conducted with questions pertaining to technical factors (dimensions, attributes and organisational roles) as shown in Appendix F (section two). Data collected will be analysed in future work. Technical factors in terms of analysis were out of scope for this research study, in other words:

- 1) **the technical questions (as per section 2.1.3.3) was developed at a later stage of the research study, that is, after the pilot study.**
- 2) **the onus of the research study over the first two years of study leaned significantly to socio-factors of teleworking. In other words, the technical questions were inclusive to theory for a comprehensive explanation and definition with regards to teleworking.**
- 3) **Furthermore, the magnitude of the technical factors of teleworking (section 2.1.3.3) in terms of data analysis rendered technical factors future work and thus, out of scope for**

**this research study. For completion of the research study the technical factors were discussed, identified and documented.**

**In addition, there were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1 and so, the technical questions of the survey were utilised to identify and exclude data inconsistencies from the sample.**

In terms of future work data may be utilised to identify types of teleworking practice (or indications of). Potential utility following the identification of types of teleworking is to address complexity by mapping types of teleworking practices to types of jobs or job roles (profiling of teleworking practices; Hill and Menda, 1998, figure 5, p.58) in terms of a positivist viewpoint (Saunders et al., 2012, figure 4.1, p.128). However, the above may foreseeably require additional surveys and/or complementary research methods such as interviews.

The three modelling sections above namely 2.1.3.1, 2.1.3.2 and 2.1.3.3 were brought together in terms of taxonomy of teleworking (following section).

### 2.1.3.4 Taxonomy of teleworking

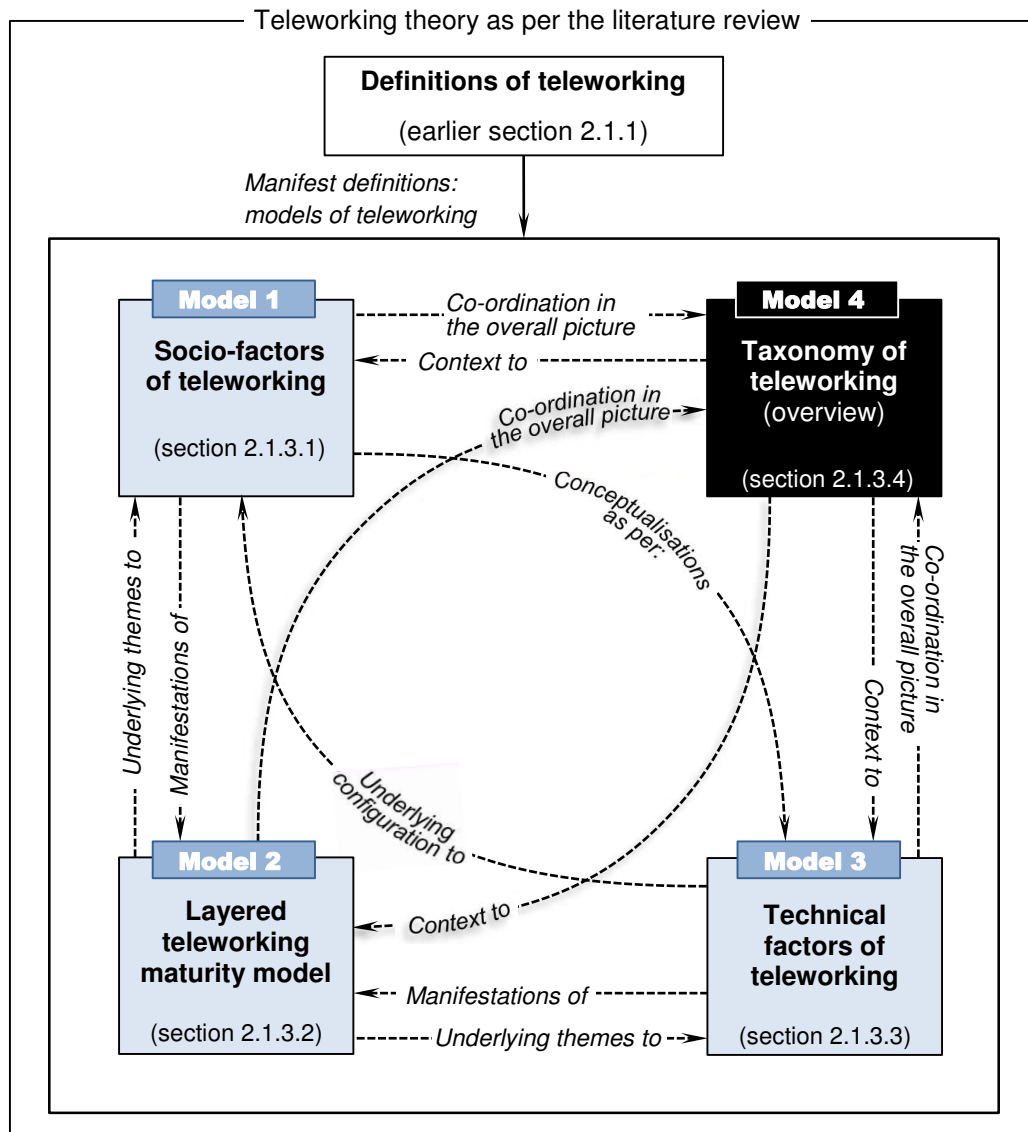
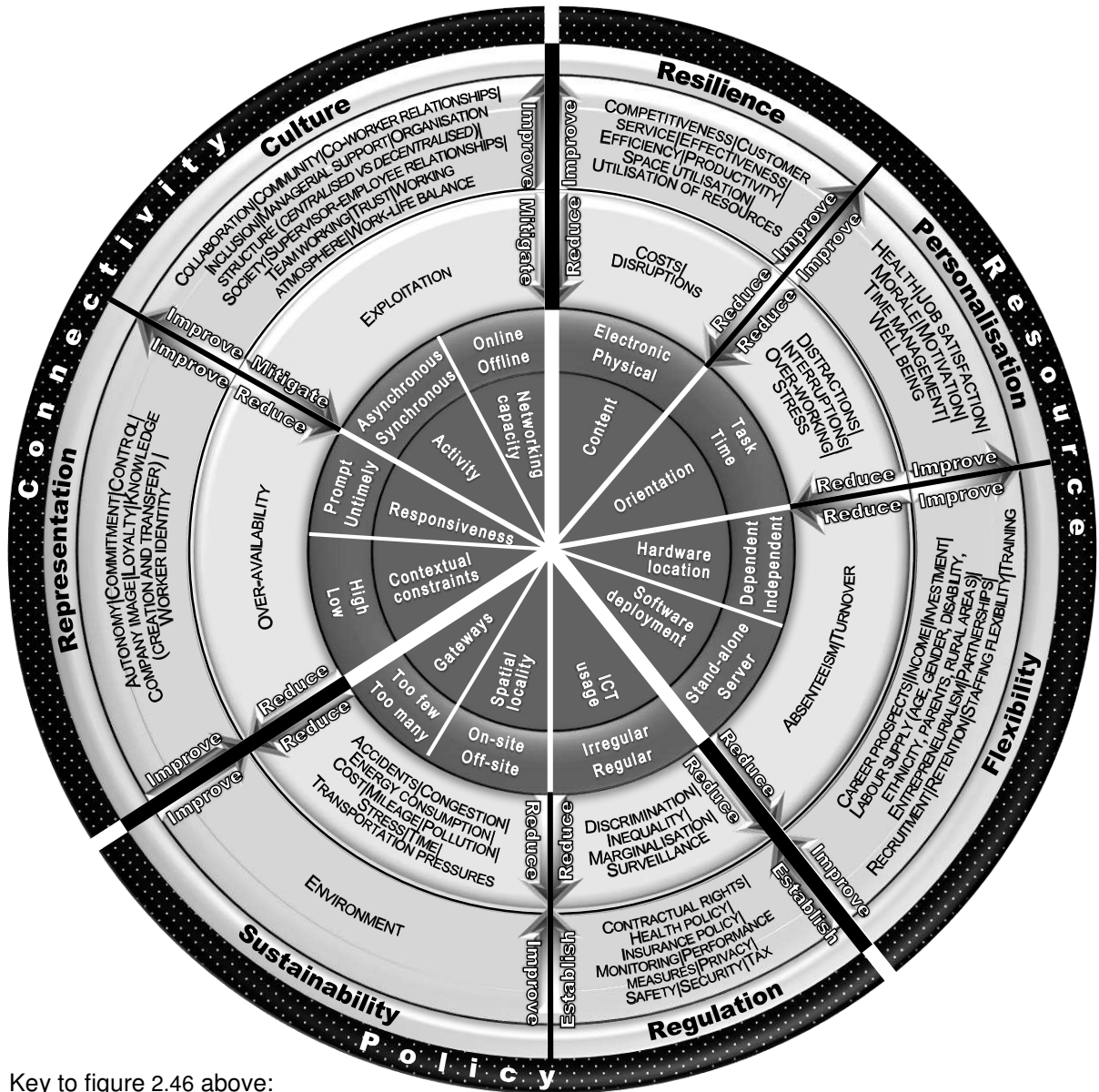


Figure 2.45: Theory of teleworking: taxonomy of teleworking

Thus far, factors pertaining to socio and technical aspects of teleworking have been identified. In addition and following the modelling of the socio-factors, the maturity model was identified as a key linkage to the broad socio-categories of resourcing, governance, and networking and so, the maturity model was utilised in place of the broad categories. In summary the three models thus far are:

- 1) Socio-factors of teleworking (section 2.1.3.1)
- 2) Layered maturity model (section 2.1.3.2)
- 3) Technical factors of teleworking (section 2.1.3.3)

The three models above were brought together as a metamodel via an iterative process as illustrated in terms of linkages (arrows) as per figure 2.45 above. The metamodel namely, the taxonomy of teleworking is as shown in figure 2.46 on page 116. An explanation follows after the diagram.



Key to figure 2.46 above:

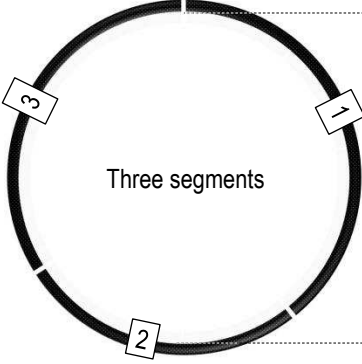
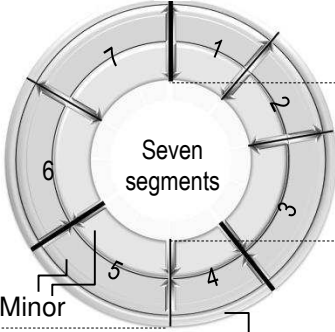
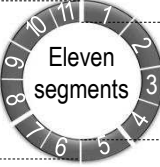

Layers of teleworking maturity	Socio-factors of teleworking	Technical factors of teleworking	
 <p>Three segments</p>	 <p>Seven segments</p> <p>Minor</p> <p>Major</p>	<p>Dimensions</p>  <p>Eleven segments</p>	<p>Attributes</p>  <p>Eleven segments</p>
<p>Source: section 2.1.3.2</p>	<p>Source: section 2.1.3.1</p>	<p>Source: section 2.1.3.3</p>	

Figure 2.46: A taxonomy of telework (alignment of maturity and socio-technical segments)

#### 2.1.3.4.1 Manifest definitions: taxonomy of teleworking

As stated earlier, each of the three aforementioned models in terms of factors was brought together to form the taxonomy of teleworking. The taxonomical model evolved after many parameters, manifest definitions (or factors) of socio, maturity and technical models of teleworking were identifiable. The socio-model was further simplified: socio-factors were grouped into major themes for example, *environment* and *pollution* were factors associated with major socio-factor *sustainability*. An overarching model namely the maturity model provided the co-ordination capacity to arrange and sort socio and technical factors. In other words, the three layers of the maturity model presented themes over which socio-factors and technical factors could be aligned (in other words, a shared, thematic consistency was identified). Precise co-ordination was achievable by concurrently reviewing major socio-factors such as *sustainability* with the layers of maturity and technical dimensions too. For example, the socio-factor *environment* (the positive impact on the environment from teleworking) was regarded as a policy (and governmental) issue in terms of cutting back on carbon emissions and pollution. Technical factors that impact on pollution in terms of the physical work forgone by using ICT were dimensions, *gateways* (resistance to physical working such as commuting to work as discussed in the root definitions of teleworking) and *spatial locality* (offsite versus on-site working impacts on environment). Development of the taxonomy was thus, an iterative process, sorting factors until a consistent theme was identifiable across all factors (or segments as shown in figure 2.46). Although there can be links between factors (alternatively, measures) of different segments, the taxonomy as presented is put forward as a primary alignment between factors and firm proposition for a taxonomy of teleworking. Furthermore, this taxonomy is not previously put forward in all existing teleworking literature; certainly not to the extent as shown in figure 2.46.

#### 2.1.3.4.2 An evaluation of the taxonomy

Regarding taxonomy of teleworking, Garrett and Danziger (2007, p.29) state:

'Ideally, there should be a conceptually guided and empirically validated set of categories that are mutually exclusive—key elements of a strong taxonomy. This ideal has not yet been achieved .... dimensions are carefully defined, [yet] they are not integrated into a single, coherent taxonomy.' (Garrett and Danziger, 2007, p.29).

A fourth model (figure 2.46 on page 116) has therefore been developed which is a taxonomy of teleworking and which has consistency to the above statement in terms of conceptual guidance and builds on the process of identification of factors of teleworking followed by the conceptual identification of minor and major socio-factors (as per existing literature), co-ordinated further with the three conceptual layers of the maturity model. In addition, as technical factors were conceptualised in terms of dimension and attributes these can also be seen as consistent with the existing literature. Moving to the second point of the above statement, empirical validation, in terms of a positivist viewpoint (Saunders et al., 2012, figure 4.1, p.128) a number of models were developed out of the socio-factors, or socio-taxonomy, and these were tested with confirmatory factor analysis (Chapter 6).

The technical factors in terms of analysis were (as mentioned earlier) out of scope of this research study and thus empirical validation of these would be future work.

The taxonomy model as shown in figure 2.46 on page 116 also builds on the work of Haq (2012a and 2012b) that is, a metamodel consisting of the socio and technical factors in addition to layers of the maturity model in what is a taxonomy of teleworking. The taxonomy of this research essentially brings together the three models already outlined into a single unified-type diagram:

- 1) as illustrated via the key of figure 2.46 on page 116; and importantly,
- 2) consistent with the review of literature stated in each model section earlier.

In other words, the taxonomy of teleworking maps back to each of the model sections of this chapter. There is utility with regards to the taxonomy of teleworking in terms of a coherent and co-ordinated structure. The taxonomy can be utilised at the very least in terms of language and awareness of potential benefits and driving forces of teleworking in addition to potential drawbacks and restraining forces of teleworking. In addition, identification of factors of teleworking is alternatively, an identification of potential measures of teleworking for future work in this field; and consistency across researchers with regards to measures of teleworking as per the taxonomy only serves to accomplish an aim of standardisation of the taxonomy of teleworking.

#### 2.1.3.4.3 Conclusions [Taxonomy of teleworking]

To conclude, the taxonomy of teleworking as shown in figure 2.46 on page 116 is an amalgamation of the following: socio and technical factors of teleworking in addition to the layers of the maturity model. Furthermore, the taxonomy as shown in figure 2.46 on page 116, coherently encapsulates this section namely modelling the definitions of teleworking, and has a consistency to the viewpoint of Garrett and Danziger (2007, p.29) in terms of a taxonomy that is conceptually guided. In addition, there is utility in terms of awareness of factors and therein potential measures of teleworking. There may also be future work in terms of standardisation of the taxonomy of teleworking.

## 2.2 Conclusions [Teleworking theory]

The definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus. It is important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. Teleworking was defined in terms of:

- 1) ***root definition,***
- 2) ***conceptual definition and***
- 3) ***abstraction.***

As per the above, teleworking was defined in terms of comprehension and modelling of the definitions can be standardised and thus the ambiguity over the definition can be alleviated.

There were four models of the above definitions of teleworking namely:

- 1) **Socio-factors of teleworking**
- 2) **Maturity model of teleworking**
- 3) **Technical factors of teleworking**
- 4) **Taxonomy of teleworking**

Firstly, in terms of the socio-factor model: there were a number of socio-factors identified as per existing literature with regards to teleworking. The factors were grouped in terms of minor and major socio-factors. Subsequently, major socio-factors were identifiably grouped in terms of three broad categories of *resourcing*, *governance* and *networking*. Following, this categorisation, the three broad categories were identifiably linked to three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity*.

Secondly, in terms of the teleworking maturity model: the first three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity* were consistent with the three broad socio-categories. The three layers of the maturity model were therefore applicable to this research study and hence utilised. The maturity model provides a context and meaning to the research study in terms of teleworking maturity and development. As mentioned earlier teleworking is a socio-technical working practice and the socio-aspect (in addition to linkages to maturity) were studied. The research then turned to the technical aspect.

Thirdly, in terms of the technical model: teleworking is currently ambiguously defined and so technical factors (*dimensions*, *attributes* and *organisational roles*) were identified to simplify and clarify the definitions of teleworking. In terms of theory, there were 11 dimensions identifiable with two attributes for each dimension. The dimensions are stated in bold and attributes in parenthesis as follows: **content** (*electronic* and *physical*), **orientation** (*task* and *time*), **hardware location** (*dependent* and *independent*), **software deployment** (*server* and *stand-alone*), **ICT usage** (*regularly* and *irregularly*), **spatial locality** (*on-site* and *off-site*), **gateways** (*too few* and *too many*), **contextual constraints** (*high* and *low*), **response or responsiveness** (*prompt* and *untimely*), **activity** (*asynchronous* and *synchronous*), and **networking capacity** (*online* and *offline*). Furthermore, three organisational roles in terms of existing literature regarding business, work and employees, were identified as applicable to types of teleworking practices. The three organisational roles identified were, **intra**, **inter** and **extra-organisational**.

A survey was conducted with questions pertaining to technical factors (dimensions, attributes and organisational roles) as shown in Appendix F (section two). Data collected may be analysed in future work. Analysis of technical factors was out of scope for this research study, that is: (over page)



- 1) **the technical questions (as per section 2.1.3.3) was developed at a later stage of the research study, that is, after the pilot study.**
- 2) **the onus of the research study over the first two years of study leaned significantly to socio-factors of teleworking. In other words, the technical questions were inclusive to theory for a comprehensive explanation and definition with regards to teleworking.**
- 3) **Furthermore, the magnitude of the technical factors of teleworking (section 2.1.3.3) in terms of data analysis rendered technical factors future work and thus, out of scope for this research study. For completion of the research study the technical factors were discussed, identified and documented.**

**Although, the technical aspect of teleworking is out of scope for this research study in terms of analysis, there were a number of response inconsistencies apparent to the technical questions of the survey – details as per later section 4.3.1 and so, the technical questions of the survey were utilised to identify and exclude data inconsistencies from the sample.** In terms of future work data may be utilised to identify types of teleworking practice (or indications of). Potential utility following the identification of types of teleworking is to address complexity by mapping the types of teleworking practices to types of jobs or job roles (profiling of teleworking practices; Hill and Menda, 1998, figure 5, p.58) in terms of a positivist viewpoint (Saunders et al., 2012, figure 4.1, p.128).

Fourthly, in terms of the taxonomical model: the above three models were brought together in terms of taxonomy of teleworking. The taxonomy of teleworking as shown in figure 2.46 on page 116 is an amalgamation of the socio and technical factors of teleworking in addition to the layers of the maturity model. Furthermore, the taxonomy coherently encapsulates this section by modelling the definitions of teleworking.

The above concludes Chapter 2: teleworking theory. In Chapter 3, a number of measures pertaining to socio-factors were identified, and research methods namely, an initial questionnaire design and Q-sort study were utilised to distil and reduce the number of measures further to a feasible quantity for the later survey to participants. Chapter 3 thus discusses the process followed as per identification and distillation of socio-measures of teleworking in terms of research methods.

In Chapter 4 data collected in terms of descriptive statistics are presented and sample size discussed as per exclusions. In Chapter 5 the approach taken for confirmatory factor analysis (CFA) is discussed before the results of the CFA are documented in Chapter 6. In Chapter 6 models were created with socio-measures for each layer of the maturity model namely, *resource*, *policy* and *connectivity*. Data as per the survey for each of these models were analysed in terms of confirmatory factor analysis. Chapter 7 concludes the findings as per the theory (Chapter 2) and CFA (Chapter 6).

## Chapter 3: Research methods

There are three research methods in this study: 1) an initial questionnaire design, 2) Q-sort study and 3) web-based survey. There is a process regarding the research methods as illustrated and outlined in figure 3.1 below. The process is detailed in the sections after the diagram.

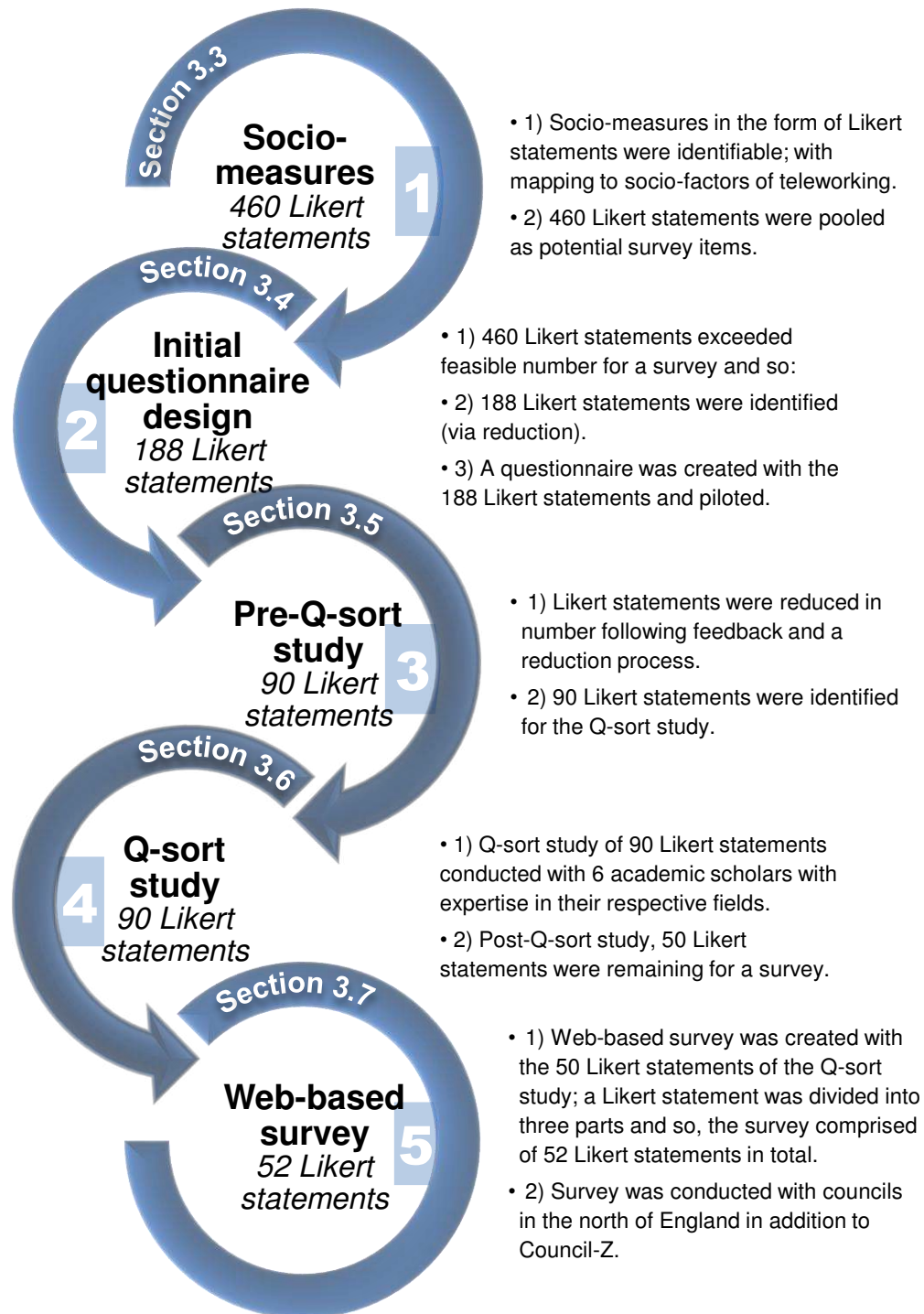


Figure 3.1: Research methods and process of a reduction in number of Likert statements

### 3.1 Introduction to chapter

As per research with regards to peer-reviewed journal papers, 460 Likert statements were identified as potential measurements (socio-measures) of teleworking for the survey. Identification of Likert statements for the survey followed three criteria namely that the Likert statements must be: consistent with the subject of teleworking, tried and tested in previous studies and linkable to socio-factors of teleworking. 188 Likert statements were identified for the initial questionnaire design. The reduction from 460 to 188 was based on a number of criteria that is, 1) a manageable number of Likert statements was sought for the initial questionnaire design (as per time constraints of employees that would be taking part), 2) a diversity of socio-factors was desirable, Likert statements were to be identified as per the socio-factors of teleworking, wording of Likert statements was to be clear and understood, and duplicates were to be excluded. The initial questionnaire design was put to participants of a council as explained below.

Councils were chosen as the study initially commenced with a council in the north of England; a council that would like to know more about teleworking practices in their workplace particularly as there were cutbacks imminent in the public sector and so flexible working practises were sought as a potential means of dealing with cutbacks whilst maintaining standards of front line services. However, due to these cutbacks in the public sector (significantly with regards to the councils over the time duration of this study) there was difficulty obtaining a participation in the survey to the level required (over 200 as per the later confirmatory factor analysis). Furthermore, due to the now, delicate nature of the study participants may be concerned over the impact of the study on their jobs (*see also Appendix G*), and so the utility of the study is written later in this thesis as per a cautionary approach. Thus, 80 councils in the north of England (human resources department) were contacted (via non-probability sampling) by telephone and email to obtain a sufficient sample size. However, due to the aforementioned cutbacks, a fraction of this number participated. A management report was produced for participant councils (Haq, 2013b and Haq, 2014a) which raises awareness of teleworking practices yet not going so far as to support those cutbacks rather, to inform concerning ways in which services may still be operational to a standard following those cutbacks.

The initial questionnaire design was conducted with three participants of Council-Z (anonymised). Following feedback from the initial questionnaire design, and as per discretion, 90 Likert statements were brought forward to the Q-sort study: the reduction from 188 to 90 was based on the following criteria. Firstly, duplicates were excluded. Secondly, Likert statements as per perception duplication (across employees) was excluded. Thirdly, relatively isolated Likert statements were excluded (that is, where only one or two Likert statements were representative of a factor or in other words, where there was lack of supporting academic studies). Fourthly and finally, Likert statements with ambiguous interpretation (and therefore, measurement ambiguity) were excluded.

The 90 Likert statements were at this stage formally unlinked to the maturity model layers and so, a Q-sort study was conducted to sort Likert statements to one of three maturity layers namely, *resource*, *policy* or *connectivity*. In addition, the Likert statements were sorted in terms of importance within each layer that is, the order by which Likert statements could be put to participants in the survey. This is to ensure that the survey prioritised Likert statements pertinent to teleworking and participants' time. In other words, employees may have a limited amount of time to participate in the survey and so, the survey questions were ordered such that the more pertinent questions regarding teleworking were answered and thus create an improved value and contribution for later analyses. However, to state here: there was no missing data with regards to the survey and thus all questions were answered; the ordering of Likert statements in terms of importance as mentioned above became a redundant procedure.

Following the Q-sort study there was a consensus regarding 50 Likert statements. The 50 Likert statements were used in the final survey instrument (web-based survey). One of the 50 Likert statements (identified later below) was divided into three parts and so, the web-based survey had 52 Likert statements in total.

A few councils were contacted initially with regards to the 52 Likert statement web-based survey. However as stated earlier, participation was difficult to receive for the survey and so, a larger number of councils in the north of England (section 4.2 on page 143) were contacted and the survey conducted with a proportion of these councils (as per approval). However, aggregate participation was significantly below the 200 sample size requirement for a confirmatory factor analysis and so, the data was utilised in terms of a pilot study. Following the pilot study, a council agreed to participate with a potential participation above the aforementioned requirement of 200, namely, Council-Z (section 4.3 on page 143). Participation above 200 was in fact received. Each of the two surveys was subject to terms and conditions, anonymity, and computer security agreements.

### **3.2 Research methodology explanation**

The research methodology was positivist (Saunders et al., 2012, figure 4.1, p.128), and aimed to create an empirical measurement instrument that was consistent to (and guided by) teleworking theory and thus allow organisations in terms of positivism to measure teleworking within their workplace and subsequently assess feasibility of teleworking. The research therefore concentrates on the empirical measurement aspects of teleworking that is the extent to which a viable and feasible empirical measurement of teleworking can be created. As stated earlier, teleworking can be categorised in terms of two aspects:

- 1) Socio-factors (earlier section 2.1.3.1; and Haq, 2012a, and 2012b) and**
- 2) Technical-factors (earlier section 2.1.3.3).**

The research focuses on the development of measurement models of teleworking pertaining to socio-factors with the technical aspect out of scope for this research and to be considered in future work. The socio-factors are grouped:

- 1) **in terms of the maturity model (see section 2.1.3.2) to three conceptual layers namely, resource, policy and connectivity.**
- 2) **within each conceptual layer that is, as per existing theory (details in later section 5.1.3.2) and new theory (details in later section 5.1.3.3).**

Three test models were created out of the socio-factors:

- 1) **a model of socio-factors for resource,**
- 2) **a model of socio-factors for policy, and**
- 3) **a model of socio-factors for connectivity.**

The measurement instrument: the three models stated above consisted of Likert statements with 7-point scales, which are more reliable than anchors that number less such as 3-point scales for example (Irwing, 1996, p.5).

The first phase of the research analysis involved the Likert statements consistent with the socio-factors for each layer as documented in Haq (2012a, and 2012b). The socio-factors in terms of models were then tested with confirmatory factor analysis for viability and feasibility of measurement for teleworking.

### **3.3 Socio-measures**

Likert statements or more specifically, Likert scales for each Likert statement allow for a measurement of worker perceptions and thus are indicative of teleworking socio-factors. To create a measurement instrument of teleworking, a number of Likert statements were found as per existing literature; each a consistency with the socio or perceptual aspects as described earlier.

**Four hundred and sixty (460) Likert statements in addition to 17 questions regarding demographics were identified as shown by Haq (2012c). The 460 Likert statements were found using search terms in Summon (2014) such as *teleworking* and *questionnaire* with criteria *Journals* to filter results. Additionally, search terms related to impacts of teleworking as identified in Chapter 2 were used such as *environment*. The quality of the studies was also reviewed to improve confidence in the subsequent analysis as summarised in table 3.1 on page 125.**

Research

Ranking of Journal paper	Number of Likert statements for each opposite ranking	Total number of Likert statements	Number of Journal papers regarding all Likert statements opposite
4*	99	460	40
3*	90		
2*	159		
1*	103		
Not listed	9		

Table 3.1: Journal rankings (CORE, 2010) - Likert statements of relevance to teleworking

Identification of Likert statements followed the below criteria; Likert statements must be:

- 1) **consistent with the subject of teleworking** and may not necessarily need to include the word *teleworking* to measure teleworking. For example, take the following Likert statement: 'I do not feel isolated in the department.' (adapted from Şeker, 2011, p.258): the Likert statement is consistent with socio-factor, workplace inclusion. Workplace inclusion is a factor of teleworking as per literature review in terms of worker isolation via using technology or working remotely (see for example, Bussing, 1998. *Cited In*: Harpaz, 2002, p.77; and Hislop and Axtell, 2011, p.54).
- 2) **tried and tested** that is measures existing as per peer-reviewed literature; hence, contain a degree of reliability (albeit not in absolute terms) above measures created for the first time.
- 3) **linkable to a socio-factor** that is, each measure should map to an identifiable group (later referred to as a latent factor); this condition adds a clarification and context to the Likert statements and helps understanding, interpretation and logical grouping of observed variables (see later section 5.1.3.3.1 on page 164).

### 3.3.1 Conclusions

To conclude, 460 Likert statements were identified as potential measurements (socio-measures) of teleworking for the survey. To identify Likert statements for the survey, three criteria were followed namely that the Likert statements must be: consistent with the subject of teleworking, tried and tested in previous studies and linkable to socio-factors of teleworking. Of the 460 Likert statements (Haq, 2012c), 188 Likert statements were brought forward for the initial questionnaire design.

### 3.4 Initial questionnaire design

Initial questionnaire design (Appendix B)

Ranking of Journal paper	Number of Likert statements for each opposite ranking	Total number of Likert statements	Number of Journal papers regarding all Likert statements opposite
4*	30	188	19
3*	16		
2*	75		
1*	62		
Not listed	0		

Table 3.2: Journal rankings (CORE, 2010) - Likert statements of the initial questionnaire design

Out of the 460 Likert statements (Haq, 2012c) as per the above, 188 Likert statements were identified for the initial questionnaire design. The 188 Likert statements were identified as per discretion and in terms of the following criteria:

- 1) **To reduce the current number (460) to a manageable capacity for the later survey, (as per time constraints of employees that would be taking part)**
- 2) **A diversity of socio-factors was desirable that is, for consistency to a theme of the study namely, comprehension,**
- 3) **Likert statements to be identified must link (be in line) with the socio-factors as identified per the theory chapter,**
- 4) **Wording of Likert statements should be clear and understood, and**
- 5) **Duplication to be excluded.**

The 188 Likert statements were put to participants as described in the section below.

#### 3.4.1 Method of the initial questionnaire design

**A copy of the initial questionnaire design with the 188 Likert statements is as shown in Appendix B.** The initial questionnaire design was conducted by pencil and paper with three employees of Council-Z; each of the three questionnaires consisted of the same questions yet ordered differently to minimise shared perceptions (perception duplication). This issue may manifest out of discussion by participants pertaining to question wording or interpretation difficulties (University of Strathclyde, 2014) which they were allowed to do over the course of completing the questionnaire.

The instrument was completed by each participant individually and within the same time frame, and as opposed to a collective or group discussion (apart from questions related to Likert statement wording and interpretation for example and which were raised mid-way through). The questionnaire was also conducted in a space environment at Council-Z isolated from the day-to-day operations and

so, there was no interruption or distraction to survey completion. The questionnaire contained open-ended questions so that feedback as per the viewpoint of each employee could be received and which may help to create an improved finalised survey.

### **3.4.2 Conclusions**

One hundred and eighty-eight (188) Likert statements were identified from the pool of 460 Likert statements. The reduction was based on a number of criteria. To summarise, a manageable number of Likert statements was sought for the initial questionnaire design (as per time constraints of employees that would be taking part), and a diversity of socio-factors was desirable that is, for consistency to a theme of the study namely, comprehension. Likert statements identified were to be consistent to the socio-factors of teleworking, wording of Likert statements was to be clear and understood, and duplication excluded. The initial questionnaire design was conducted with three participants of Council-Z and feedback helped with the next step of the research that is, to identify a (reasonable) number of Likert statements that could be brought forward to academic scholars for Q-sorting.

### **3.5 Pre-Q-sort study**

Prior to the Q-sort study, a further number of Likert statements were excluded based on the following summary:

**Firstly, the Likert statements were grouped in terms of the theory of socio-factors and so responses could be compared and identified in terms of similarities and differences more easily and so decisions for exclusion could be clarified.**

**Secondly, a minimum number of socio-factors were sought for each of the three aforementioned layers: 10 for resource, 10 for policy and 10 for connectivity of the maturity model pre-Q-sort study. The most relevant Likert statements that met this criterion were chosen (Haq, 2012d).**

That is, the study sought to empirically model each of the three aforementioned layers of the maturity model. To do this, the study required a sufficient number of Likert statements per layer. The allocation of Likert statements to layers was done at this stage as per Haq (2012d) and initial questionnaire design feedback. In terms of an aggregate summary of Haq (2012d):

- 1) Duplicates were excluded** that is, Likert statements that were close in terms of wording (and thus, measurement too) were excluded.
- 2) Where perceptions were consistently the same for more than one Likert statement of a socio-factor grouping that is, there is no measureable difference identifiable in perception, then perception duplication was removed.**



Differences in perceptions was sought in the research, perceptions that were the same were thus excluded. The exclusion above was not applied if the Likert statements in question were the only representation of the socio-factor group in question that is, where perception duplication would result in an exclusion of the socio-factor group too, this was avoided where feasible as a comprehensive-type representation of socio-factors was sought.

**3) Where only a single Likert statement was representative of a socio-factor then that Likert statement and socio-factor too was excluded. In other words, isolated Likert statements which are not grouped to represent a socio-factor were excluded.**

**4) Likert statements with ambiguous interpretation (and thus measurement ambiguity) were excluded.**

As per the above, out of the 188 Likert statements, 90 were remaining for the later Q-sort study (Haq, 2012d) as shown in Appendix C.

### 3.5.1 Conclusions

Following feedback from the initial questionnaire design, a further number of Likert statements were excluded. The reduction from 188 to 90 was based on the following criteria: 1) duplicates were excluded, 2) Likert statements as per perception duplication was excluded, 3) isolated Likert statements were excluded and 4) Likert statements with ambiguous measurement were excluded.

Following the exclusions, 90 Likert statements were remaining for the Q-sort study as shown in Appendix C. A Q-sort study was conducted to sort Likert statements to one of three maturity layers namely, *resource*, *policy* or *connectivity* and the Likert statements were sorted in terms of importance within each layer that is, the order by which Likert statements could be put to participants in the survey. Details regarding the Q-sort study follow in the section below.

### 3.6 Q-sort study

Q-sort study (Haq, 2012d)

Ranking of Journal paper	Number of Likert statements for each opposite ranking	Total number of Likert statements	Number of Journal papers regarding all Likert statements opposite
4*	18	90	17
3*	5		
2*	31		
1*	36		
Not listed	0		

Table 3.3: Journal rankings (CORE, 2010) - Likert statements of the Q-sort study

As stated in the preceding section, 90 Likert statements (Appendix C) were remaining after exclusions for Q-sorting. The Q-sort study was undertaken in terms of two tasks numbered further below. In terms of participants, the first task (allocation) was conducted with six academic scholars with expertise in their respective fields in addition to Haq (2012g) and so, seven participants in total. Haq (2012g) was inclusive to the first part of the Q-sort study as this task was completed following the requirement of Likert statements to be even across the three layers (as stated earlier in section 3.5); in other words, Haq (2012g) had sorted and allocated Likert statements into three layers prior to the Q-sort study. The second task (ranking) Q-sort was conducted with the six academic scholars only.

The two tasks of the Q-sort (as stated above) are as follows:

- 1) **Allocation of each Likert statement to one of three maturity model layers namely: resource, policy or connectivity. Thus, a model can be created for each layer.**

Conducted with six academic scholars with expertise in their respective fields in addition to Haq (2012g) and so, seven participants in total.

- 2) **Ranking Likert statements in terms of importance. Thus, only the most important Likert statements would be included in each model.**

Conducted as part of the sorting process with each of the six academic scholars.

### 3.6.1 Logical options

Three logical paths were identifiable for the Q-sort regarding the two aforementioned tasks (allocation and ranking) before the survey was created. Of the three logical paths (or options), **Logical option 1 was chosen and is summarised in figure 3.2 below.** Logical options 2 and 3 are documented in Appendix D. **Detailed steps regarding logical option 1 is as shown in figure 3.3 on page 130 and figure 3.4 on page 131.**

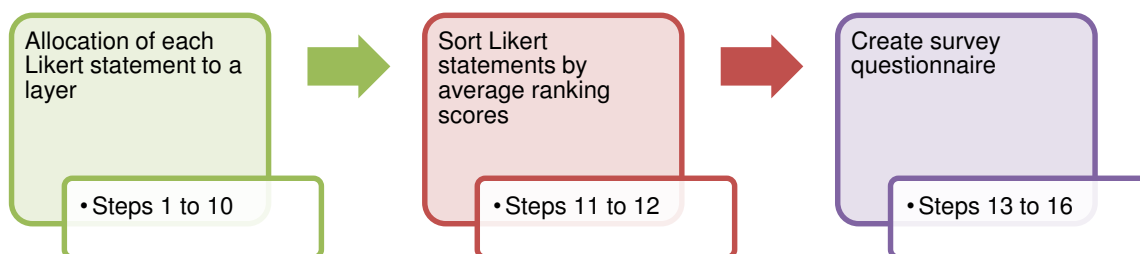
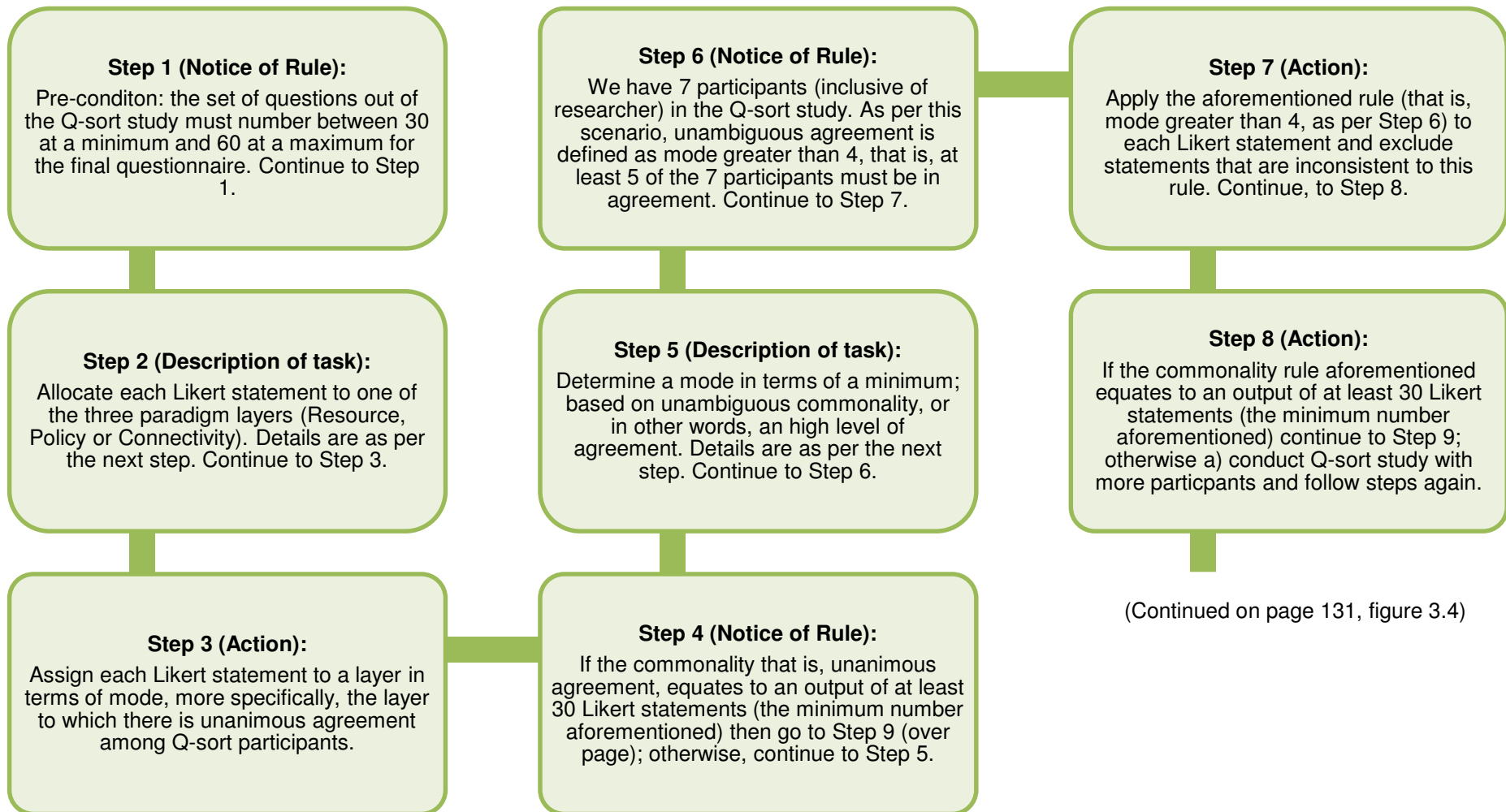


Figure 3.2: Summary of logical option 1



(Continued on page 131, figure 3.4)

Figure 3.3: Logical option 1 [Steps 1 to 8 of 16]

(Continued from page 130,  
figure 3.3)

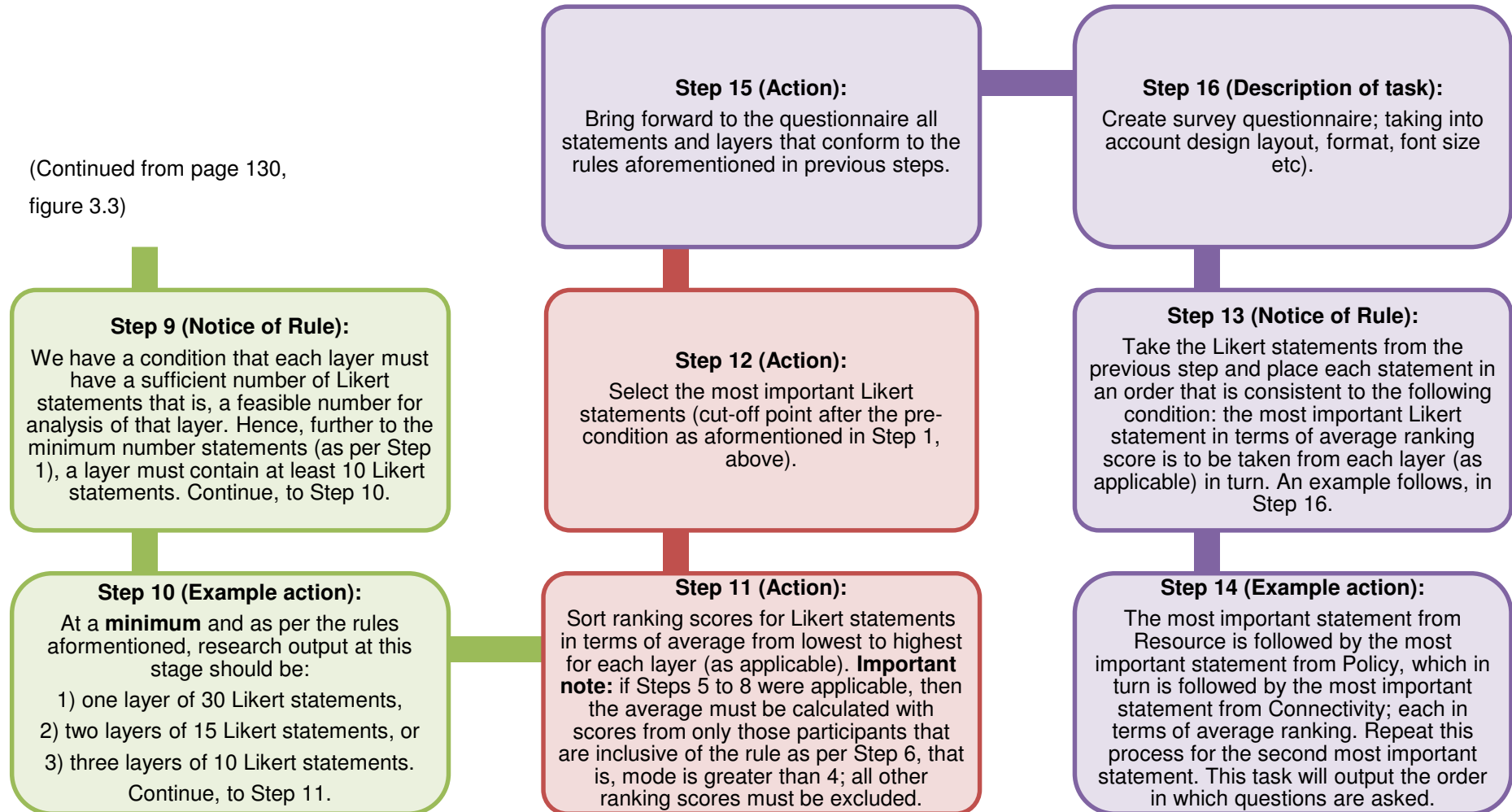


Figure 3.4: Logical option 1 [Steps 9 to 16 of 16]

### **3.6.2 Method of Q-sort**

Academic scholars of the University of Huddersfield with expertise in their respective fields were contacted by email, with six academic scholars agreeing to participate individually (each participant Q-sorted on either a different day or time) in the Q-sort study.

The Q-sort study was conducted with the 90 Likert statements provided on strips of paper (Haq, 2012e). Three headings were also printed off namely, *resource*, *policy* and *connectivity*. The Q-sort followed a consistent procedure for each of the six academic scholars namely:

- 1) the ordering of the Likert statements was the same (a pile of 90 strips with the same order) for each participant,**
- 2) desk space was utilised to allocate paper strips of Likert statements to each of the three headings (*resource*, *policy* and *connectivity*),**
- 3) participants were then asked to order the Likert statements in terms of importance: most important socio-measure to least important socio-measure (in terms of meanings as per their experience and expertise), and**
- 4) a snapshot (digital photograph) was taken of the allocation and ordering of the paper strips for each participant; in other words, of the desk space. The snapshots are as shown in Haq, (2012f).**

In addition and earlier to the Q-sort study, Haq (2012g) also allocated each Likert statement to a layer - a task completed as per earlier section 2.1.3.1 (heading 'Socio-factors of teleworking') and section 3.5 above. In other words, to make sense of the existing literature, Likert statements were categorised as per the three layers of the maturity model and so, this work was used as a double check once the results of the Q-sort were summarised. In terms of the 50 unambiguous Likert statements (details follow in the next section), Haq's (2012g) allocation differed on 9 of the 50 Likert statements namely those as shown in table 3.4 on page 133. Hence, the Q-sort study sorted Likert statements to layers other than that allocated per Haq (2012g) and thus the research method was a valuable exercise to sort Likert statements more precisely (and with a comprehension, in other words the inclusion of 6 academic scholars).

#	Unambiguous Likert statements with differences to Haq (2012g)	Layer to which there was consensus	Level of consensus	Layer as per Haq (2012g)
1)	'I do not have to get management's approval before I handle problems.' (Adapted from Babakus et al., 2003, p.283)	Policy	6 academic scholars	Resource
2)	'I am able to say what I mean regardless of the situation I'm in.' (Kuvaas, 2007, Table AI, p.397)	Connectivity	5 academic scholars	Resource
3)	'I have confidence that I can complete my work because I can access information needed to perform my job.' (Adapted from Wang, 2011, p.330)	Resource	5 academic scholars	Policy
4)	'Problems relating to technology are quickly identified.' (Adapted from Bateman et al., 2002, p.225)	Resource	5 academic scholars	Connectivity
5)	'We ensure that we make the maximum practical use of our buildings and equipment.' (Bateman et al., 2002, p.225)	Resource	6 academic scholars	Connectivity
6)	'Please indicate how well you think the Council has achieved the objective: funds available to the Council.' (Adapted from Ellis and Shockley-Zalabak, 2001, p.390); adapted further in the web-based survey to 'How well do you think the Council has achieved its performance objectives?' (Adapted from Ellis and Shockley-Zalabak, 2001, p.390)	Resource	5 academic scholars	Connectivity
7)	'I am more independent than most people.' (Kuvaas, 2007, Table AI, p.397)	Connectivity	5 academic scholars	Resource
8)	'Once technological problem(s) are identified the team is quick to address the problem(s).' (Adapted from Bateman et al., 2002, p.225)	Resource	5 academic scholars	Connectivity
9)	'My job doesn't affect whether I enjoy my free time outside of work.' (Zhao and Rashid, 2010, p.39)	Connectivity	5 academic scholars	Resource

Table 3.4: Unambiguous Likert statements of Q-sort study with differences to Haq (2012g)

The details regarding consensus or agreement are as provided in the following section. In summary, as there were several viewpoints per Likert statement (7 participants), and to ascertain an overall agreement per Likert statement steps as per logical option 1 as stated earlier, were applied (see Haq, 2012g). The findings are detailed in the following section.

### 3.6.3 Findings as per the Q-sort study

The results in terms of graphical output is as shown in figure 3.5 on page 136; and explained with table 3.6 on page 135. The results of the Q-sort study show that there were 50 Likert statements identified as per an agreement consensus among the 6 academic scholars in addition to Haq (2012g). In other words, 50 Likert statements could be brought forward to the web-based survey. Complementary to the graph, the results break down per layer and type of agreement is as shown summarised in table 3.5 below too.

Layer of maturity	Number of Likert statements by:			Aggregate number of Likert statements per maturity layer
	Unanimous agreement (7 participants)	Very strong agreement (6 participants)	Strong agreement (5 participants)	
Resource	2	3	11	16
Policy	7	4	7	18
Connectivity	4	6	6	16
<b>Aggregate number of Likert statements per type of agreement</b>	13	13	24	<b>50</b>

Table 3.5: Likert statements per layer and type of agreement following the Q-sort study

Terms as per the graph in figure 3.5, p.136:	Key for terms (opposite):
{ <i>x, y, z</i> }	<p>{<i>x, y, z</i>} as per the horizontal axis of the graph, refers to a set of three layers, where each layer, <i>x, y</i> or <i>z</i>, is given in terms of number of participants. For example, {5, 1, 1} translates to 5 participants for layer <i>x</i>, 1 participant for layer <i>y</i> and 1 participant for layer <i>z</i>.</p>
	<p>The value of <i>x</i> in each set as shown on the horizontal axis of the graph:</p> <ol style="list-style-type: none"> <li>1) is equal to a minimum number of participant(s) for that set.</li> <li>2) decreases in number that is, 7 to 0, from left to right.</li> </ol>
	<p>We have 7 participants in the Q-sort study and so:</p> <ol style="list-style-type: none"> <li>1) the <i>x</i> value of the first set (from left to right) is equal to 7.</li> <li>2) each set as shown on the graph contains all the different numbers of participants for each layer that would be possible for an allocation of a Likert statement.</li> <li>3) the sum of <i>x, y</i> and <i>z</i>, in each set is less than or equal to 7.</li> </ol>
<p>Exclusions (cut-off point in terms of unambiguous and ambiguous Likert statements)</p>	<p><u>Problem statement</u>: Likert statements can be allocated to one of three layers, <i>x, y</i> or <i>z</i> and the layer to which each Likert statement shall belong yet needs to be determined.</p> <p><u>Resolution to problem statement</u>: There were 7 participants in the Q-sort study. Participants arranged and sorted Likert statements, individually. Following the Q-sort task, the following rule was adopted as a resolve to the problem statement: if 5 or more participants allocate a Likert statement to the same layer, then designate that Likert statement to that layer.</p> <p>The rule as described would filter out Likert statements where the collective opinion is divided (ambiguous) that is, 4 or less participants are in agreement regarding the layer to which the Likert statement should be assigned and thus, excluded from the final survey. A cut-off point is as shown on the graph depicting the division between agreements of 5 participants or more and 4 participants or less.</p> <p>As per the text as shown within columns of the graph:</p> <ul style="list-style-type: none"> <li>➤ <b>7 participants = Unanimous</b></li> <li>➤ <b>6 participants = Very strong agreement</b></li> <li>➤ <b>5 participants = Strong agreement</b></li> </ul>

Table 3.6: Key to figure 3.5 on page 136



### A graph to show number of Likert statements per set of layers

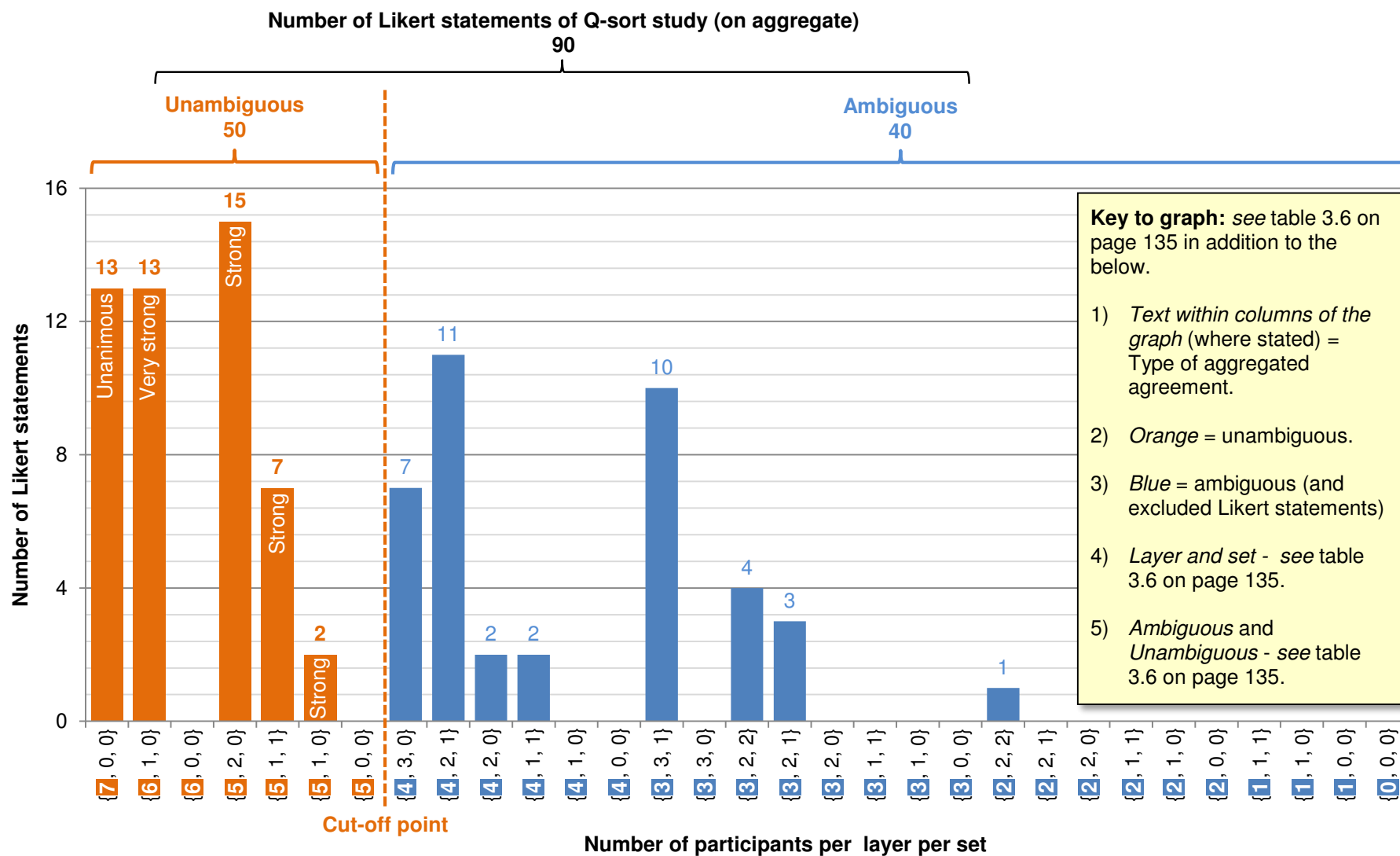


Figure 3.5: Reduction of questions as per Q-sort study Logical option 3

### **3.6.4 Conclusions of Q-sort study**

To conclude, a Q-sort study was conducted with 90 Likert statements following earlier reduction as per the initial questionnaire design. The Q-sort study served two important functions as follows. Firstly, the allocation of each of the 90 Likert statements to one of three maturity model layers namely: *resource*, *policy* or *connectivity* and so, a model can be created for each layer. Secondly, the Likert statements were ranked in terms of importance. Thus, only the most important Likert statements would be inclusive to each model aforementioned above.

Following the Q-sort study there was a consensus regarding fifty (50) Likert statements in terms of the aforementioned allocation. The 50 Likert statements were brought forward to the final survey instrument (web-based survey). In fact, a Likert statement (namely, ID25 as shown documented as per Haq, 2012g) was divided into three parts and so, the web-based survey comprised of 52 Likert statements in total. Henceforth, the research study refers to 52 Likert statements hereon in to avoid confusion.

## **3.7 Web-based survey**

### **3.7.1 Introduction**

As stated earlier, Likert statements comprise of what is, empirical measures of socio-factors of teleworking (earlier theory section 2.1.3.1). In addition, there were technical factors of teleworking (earlier theory section 2.1.3.3). As stated earlier, participation was received in the web-based survey from 1) employees of councils in the north of England and 2) employees of Council-Z. Participation was received via non-probability convenience sampling (factor invariance was not used as the population was stratified) – further details in Chapter 4, (section 4.1). In terms of questions asked in the survey:

- 1) The former namely, the survey with councils in the north of England was conducted with demographic questions and Likert statements or rather, socio-factors of teleworking only. In contrast:**
  
- 2) The latter, namely Council-Z survey was conducted with demographic questions, Likert statements (socio-factors of teleworking) and in addition, questions regarding the technical factors of teleworking.**

The reason for the difference between the two surveys (with additional technical questions for Council-Z) was that:

- 1) the technical questions (as per the earlier theory section 2.1.3.3) were developed at a later stage of the research study, that is, after the pilot study.**

2) the onus of the research study over the first two years of study leaned significantly to socio-factors of teleworking. In other words, the technical questions were inclusive to theory at this stage, over and above empirical testing and serving as a comprehension to definitions of teleworking theory.

**The technical factors of teleworking (section 2.1.3.3) are not analysed as they are out of scope for this research study.**

The following section follows on from the Q-sort study namely that 52 Likert statements were brought forward to the web-based survey (councils in the north of England and Council-Z) in terms of socio-factor of teleworking.

### 3.7.2 Socio-measures of teleworking

Post-Q-sort study, in other words: web-based survey

Ranking of Journal paper	Number of Likert statements for each opposite ranking	Total number of Likert statements	Number of Journal papers regarding all Likert statements opposite
4*	8	52 <sup>a</sup>	15
3*	5		
2*	17 <sup>a</sup>		
1*	22		
Not listed	0		

<sup>a</sup>Likert statement (namely, ID25 as per the Q-sort study and as shown documented as per Haq, 2012g): was divided into three parts and so, the web-based survey comprised of 52 Likert statements in total.

Table 3.7: Journal rankings (CORE, 2010) - Likert statements of the web-based survey

The 52 Likert statement web-based survey was conducted firstly in terms of a pilot study with councils in the north of England (section 4.2 on page 143) and then, at Council-Z (section 4.3 on page 143).

### 3.7.3 Method of web-based survey

The surveys were conducted with web-based software *Bristol Surveys* as per their license with the University of Huddersfield. The survey had a web link which was distributed (via email) to participant councils for their distribution to employees (via for example electronic bulletin boards, or email) that may be potential participants in the survey. In advance of the survey, the potential drawbacks of this approach included the following: firstly, the web link may be distributed to persons outside of council capacity and secondly, participants can theoretically complete the survey more than once. Thus, a

data protection notice in addition to a welcome page was written to advise regarding the latter (namely for participants to attempt the survey once only) and so avoid duplication of response. With regards to the former, staff members were contacted via human resources and so, the web link to the survey was distributed internally by staff of the council who were aware of the survey and the research and hence limited the extent to which the web link may be accessed outside of the council.

**The data protection notice was supplied with the web-based survey on a separate web page and so, each potential participant could read the terms and conditions, and further details regarding the research, anonymity and computer security, before participation.**

#### **3.7.4 Data protection**

**Each of the two surveys was subject to a number of agreements through terms and conditions, ethical considerations and research anonymity; as documented in full in Appendix E and Appendix F and briefly summarised below.**

The two surveys were conducted using a web link to the survey provided to participant councils as the method by which employees could access and take part in the survey. The terms and conditions were provided as a separate web page (on the University of Huddersfield server) in addition to the survey so that each potential participant could read through the document before taking part. The terms and conditions clarified the method of survey distribution, the terms used in the content of the survey, together with information regarding the research analysis and ethical conduct in terms of computer security. Examples are as given in table 3.8 on page 140.

#### **3.7.5 Conclusions**

The 52 Likert statement web-based survey was conducted firstly in terms of a pilot study with councils in the north of England and secondly, at Council-Z. Questions regarding the technical factors of teleworking were added to the survey at Council-Z. Although data was collected regarding the technical section of the survey at Council-Z, these questions were out of scope in this research study and not analysed at this time. Each of the two surveys was subject to terms and conditions, anonymity, and computer security agreements.

<b>Examples as per Appendix E and Appendix F:</b>	
<b>TERMS AND CONDITIONS</b>	The terms "we", "our" and "us" refer to the research team of Computing and Engineering at the University of Huddersfield.
<b>RESEARCH AND ANONYMITY</b>	As per academic protocol, no personal data is asked for or retained, that is, the research student has agreed not to identify any individuals when reporting their results and so, the survey is anonymous.
	Results are dependent on response rates and so, we may: a) aggregate results for each participating Council or, b) aggregate results for all Councils together. All results (as aforementioned above) will be anonymous.
	The results of our research, aggregated and anonymous as aforementioned above: a) will be part of the research student's doctoral thesis and b) may be published in our Journal paper(s). Regarding the latter: in addition to the research team, our Journal paper(s) may include other staff member(s) or person(s) with a contribution to the field of teleworking.
	... the name of each participating Council will be anonymised that is, a) we will refer to each participating Council in terms of a letter for example, Council A, B, C or, Organisation A, B, C, otherwise, b) we aggregate results for all Councils together (as aforementioned in 2.5 above) and we will refer to this aggregate as one anonymous organisation such as, Organisation Z.
<b>COMPUTER SECURITY</b>	The research student's survey account is accessible by him via a) his log-in username and password only and b) secure web protocol only that is, https. The password aforementioned is with the research student only.

Table 3.8: Examples of data protection and ethical considerations of the web-based survey

### 3.8 Conclusion [Research methods]

To reiterate and conclude, 460 Likert statements were identified as potential measurements (socio-measures) of teleworking for the survey. To identify Likert statements for the survey, three criteria were followed namely that the Likert statements must be: consistent with the subject of teleworking, tried and tested in previous studies and linkable to socio-factors of teleworking. Of the 460 Likert statements (Haq, 2012c), 188 Likert statements were brought forward to the initial questionnaire design.

The reduction from 460 to 188 was based on a number of criteria. To summarise, a manageable number of Likert statements was sought for the initial questionnaire design (as per time constraints of employees that would be taking part), and a diversity of socio-factors was desirable that is, for consistency to a theme of the study namely, comprehension. Likert statements identified were to be consistent to the socio-factors of teleworking, wording of Likert statements was to be clear and understood, and duplication excluded.

The initial questionnaire design was conducted with three participants of Council-Z and feedback helped with the next step of the research that is, to identify a (reasonable) number of Likert statements that could be brought forward to academic scholars for Q-sorting. The number of Likert statements were reduced further, from 188 to 90, based on the following criteria: 1) duplicates were excluded, 2) Likert statements as per perception duplication (across employees) was excluded, 3) relatively isolated Likert statements (less than two Likert statements per socio-factor) were excluded and 4) Likert statements with ambiguous measurement were excluded.

The 90 Likert statements were brought forward to a Q-sort study: Likert statements were sorted to one of three maturity layers namely, *resource*, *policy* or *connectivity* and sorted in terms of importance within each layer that is, the order by which Likert statements could be put to participants in the survey. Following the Q-sort study there was agreement consensus for 52 Likert statements and these were brought forward to the final survey instrument (web-based survey).

The 52 Likert statement web-based survey was conducted firstly in terms of a pilot study with councils in the north of England and secondly, at Council-Z (anonymised). Questions regarding the technical factors of teleworking were added to the latter survey (at Council-Z). Although data was collected regarding the technical section of the survey at Council-Z, these questions in terms of analyses were out of scope in this research study. Each of the two surveys was subject to terms and conditions, anonymity, and computer security agreements.

The above concludes Chapter 3. Data collection of the survey in terms of participation with regards to councils in the north of England in addition to Council-Z is as detailed in following Chapter 4. Council-Z was the primary organisation of the research study and so, there is an extensive description of statistics pertaining to Council-Z alone; a summary is also given for the pilot study with councils in the north of England.

## Chapter 4: Data collection

### 4.1 Introduction

There were two surveys of the research study (described below) in terms of non-probability convenience sampling (factor invariance was not used as the population was stratified); due to the cutbacks in the public sector (significantly with regards to the councils over the time duration of this study) there was difficulty obtaining a participation in the survey to the level required (over 200 as per the later confirmatory factor analysis). After two years (since the start of the study) via convenience sampling firstly, participation was received (in terms of an aggregate) by a number of councils in the north of England. Secondly, participation was received by employees of Council-Z. Participation as per the two surveys is described in the sections below.

With regards to the former, (councils in the north of England): 80 councils were contacted initially via non-probability convenience sampling (by email and telephone) and the survey was carried out at 14 councils (anonymised) in the north of England. Data was collected from 66 participants. The sample size was relatively small for the pilot study and statistical analyses was only undertaken in terms of Mann-Whitney U and Kruskal-Wallis tests (Haq, 2014a).

With regards to the latter (Council-Z): 478 employees participated in each of the three sections of Council-Z survey. There were a number of data inconsistencies identifiable as per section two of the survey: each of the technical questions was interdependent that is, an answer in one question would limit response options in another question. However, due to the complexity of the technical section, the survey design could not facilitate this cross-question interdependency with the available software. Thus the survey was dependent on participants' selecting responses that were consistent across technical questions. For example if a participant responded that they use software yet also responded that they do not use hardware, then the two responses are inconsistent (as software must run on hardware). To obtain a consistent sample from the data, inconsistencies such as that described were excluded. Following this action, of the 478 survey participants of Council-Z, 264 were consistent in their response and were thus brought forward to analysis (Chapter 6). The exclusion of 214 participants is clarified in later section 4.3.1 (heading 'Exclusion of participants'). In future and potential replication of the survey, the technical section may need to be facilitated with software that can meet the requirements and complexity of the interdependencies between questions (in other words, the onus of consistency can be passed on to software as opposed to survey participants).

In terms of the characteristics of the remaining sample, there were 173 female to 91 male. Apart from the (16-25) and (66 and over) age groups, females were higher in number compared to males across all other age groups namely, the 26-35, 36-45, 46-55 and 56-65 age groups. Thus, in the sample studied teleworkers were mostly female. The sample consists of 78 per cent full-time workers and 20 per cent part-time with a disproportionate number of females to males regarding the latter (of the 53

part-time workers, 48 were female). In addition, of the 67 employees that work less than 36 hours per week (hpw), 58 were female. Hence, flexible work arrangements as a characteristic of part-time working (or less than 36 hpw), was exercised predominantly by female workers as per the remaining sample. Furthermore, there was an identifiable difference in patterns in terms of the ratio of full-time to part-time workers across age groups. To state the difference in patterns hypothetically and in terms of aggregation: age group 46-65 have a greater propensity to work full-time compared to the 16-45 age group.

The above is a summary of Chapter 4. As aforementioned, there were two surveys of the research study: firstly, participation was received in terms of an aggregate by a number of councils in the north of England. Secondly, participation was received by employees of Council-Z. Information regarding the two follows.

## **4.2 Councils in north of England [Pilot study; 66 participants]**

The survey instrument as put to participants of the pilot study is as shown in Appendix E (revised questionnaire). The statistically significant results (Haq, 2014a) identify key differences between groups of participants for each of three categories: 1) gender, 2) age and 3) work location. The latter, work location was divided into two valid locations that is, only two of the six locations (details given later in the document as per Haq, 2014a) met the requirements for statistical testing and analysis namely: 1) main council buildings and 2) home. The findings and conclusions are summarised as per Haq (2014a, pp.2-4).

## **4.3 Council-Z survey**

To summarise in terms of the content of Council-Z survey instrument (Appendix F):

- 1) Section One consisted of demographic questions,**
- 2) Section Two consisted of technical questions (consistent with the theory of technical factors of teleworking; section 2.1.3.3); and**
- 3) Section Three consisted of Likert statements (consistent with the theory of socio-factors of teleworking; section 2.1.3.1).**

Participation to the each of the above three sections of Council-Z survey was received by 478 employees. As aforementioned, there were a number of data inconsistencies regarding the technical section of the survey. The details follow in the section below.

### **4.3.1 Exclusion of participants**

There was a sample of 478 participants to Council-Z survey (Appendix F). The research study sought data as per the technical factors of teleworking and so; a linkage between the socio and technical



aspects of teleworking may be feasible. To do this, a number of inconsistencies (invalid responses) regarding the technical section of the survey had to be excluded; in other words, a consistent sample was required across all sections of the survey.

Thus, full details of the exclusions regarding the technical factors are stated as per Haq (2013a) and summarised below in terms of two examples. As the reduction of the sample from 478 to 264 pertains solely to the technical section of the survey, familiarity (or recap) with regards to the technical factors of teleworking (section 2.1.3.3) namely, *dimensions* and *attributes* (section 2.1.3.3.4) and *organisational roles* (section 2.1.3.3.5) would be advised to the reader. The process of exclusions followed a cross-dimension evaluation of responses, three times that is, cross-dimension evaluation for each organisational role, *intra*, *inter* and *extra*. Two examples of the exclusion process are as follows:

**1) Example 1: dimension *content* and dimension *orientation* - there were six (6) identifiable inconsistencies (Haq, 2013a) that is, as per the following:**

To state that there is no content of any kind, physical or electronic (that is participants responded *not applicable* to dimension content) is an equivalence of not working; and so there cannot be an orientation to work or vice versa. In other words, if you have an orientation to work, you must (at some point and realistically) produce content of some kind (such as physical, verbal and/or electronic). Six participants were excluded as per inconsistency between responses of dimensions *content* and *dimension*, namely that they answered *not applicable* to *content* yet answered with applicability to dimension *orientation*; three were excluded in terms of inter-organisational role and three were excluded in terms of extra-organisational role.

**2) Example 2: dimension *hardware* and dimension *software* - there were nineteen (19) identifiable inconsistencies (Haq, 2013a) that is, as per the following:**

To state that hardware is not applicable is to state that software too is not applicable. Hence, participants that answered *not applicable* to hardware yet *applicable* to software were excluded. Of the nineteen excluded as per the above:

- a) two had inconsistent responses over each of the three organisational roles
- b) two had inconsistent responses over inter and extra-organisational roles,
- c) eight had inconsistent responses in terms of inter-organisational role, and
- d) seven had inconsistent responses in terms of extra-organisational role.

Hence, exclusions as per the above was a mechanism for identifying teleworkers from the initial sample of 478 participants. In other words, about half or 264 of the 478 were confirmed as teleworkers. Analyses specific to the technical factors was out of scope, owing largely to the magnitude of the analysis that would be required in line with the analysis of socio-measures as

documented in this thesis already. In other words, the two analyses, socio and technical amount to two projects in their own right. Nonetheless, the process of exclusions as per the technical section of the survey was as aforementioned, able to identify teleworkers from the sample and so, the socio-factors were analysed for workers who practice teleworking at the very least some of time; with none of the sample 264 consisting of those that do not telework at all.

### 4.3.2 Remaining sample [264 participants]

Post-exclusions the remaining valid sample consisted of data from 264 participants. A report was produced for Council-Z regarding the data (Haq, 2013b) and the findings were categorised into four sections namely: gender, age, type of employment and work hours. The statistically significant results were reported in the document (Haq, 2013b), that is, the key differences between groups of participants for each of the sections aforementioned. There was a small but measureable difference in perceptions between groups and the findings and conclusions were summarised as per Haq (2013b, pp.2-3).

Descriptive statistics that is, characteristics of the remaining sample, are discussed in the following section.

### 4.3.3 Descriptive statistics of remaining sample

In total there were 264 participants of the online survey. Characteristics of the sample are shown in each of the following sections.

#### 4.3.3.1 Gender

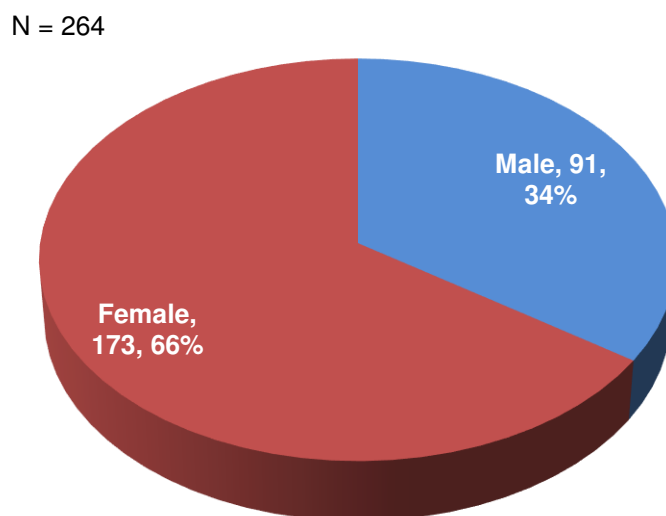


Figure 4.1: A pie chart to show proportion of males to females of the sample

### 4.3.3.2 Gender by age group

**Gender \* Age group: Cross tabulation**

		Age group						Total	
		16-25	26-35	36-45	46-55	56-65	66 and over		
Gender	Male	Count	6	9	25	33	17	1	91
		% within Gender	6.6%	9.9%	27.5%	36.3%	18.7%	1.1%	100.0%
	Female	Count	3	33	44	64	29	0	173
		% within Gender	1.7%	19.1%	25.4%	37.0%	16.8%	0.0%	100.0%
Total		Count	9	42	69	97	46	1	264
		% within Gender	3.4%	15.9%	26.1%	36.7%	17.4%	0.4%	100.0%

Table 4.1: Frequency table for gender by age group

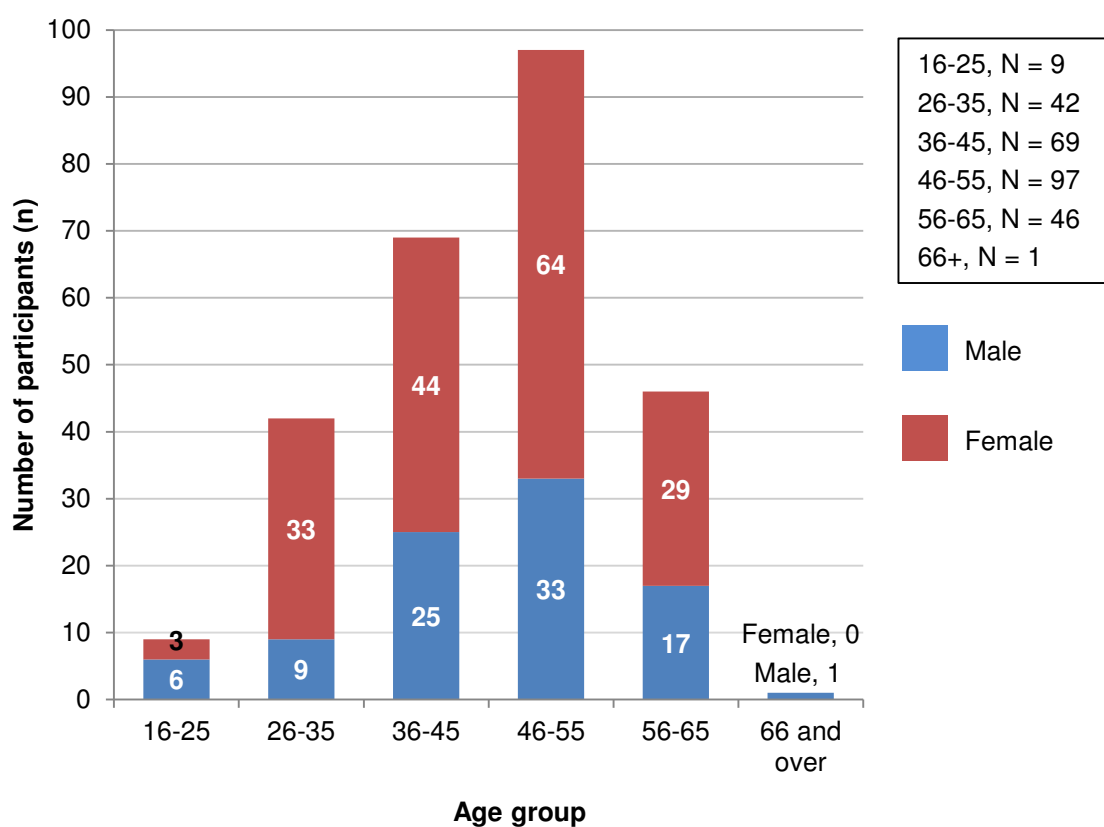
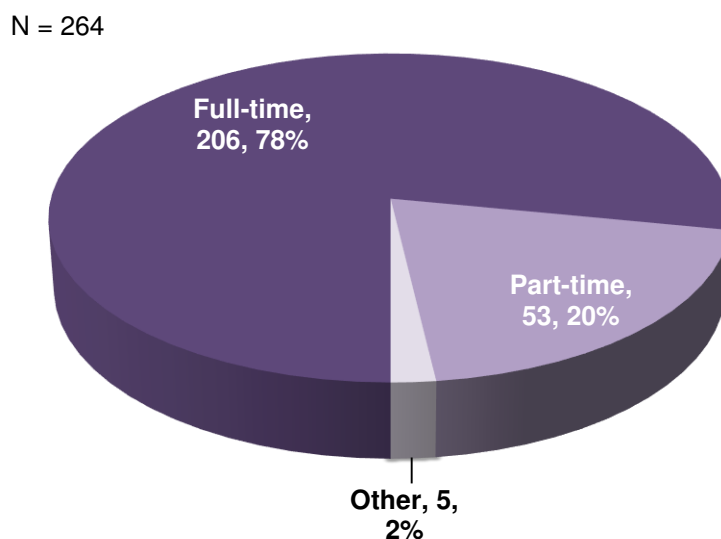


Figure 4.2: A graph to show numbers of males and females per age group

### 4.3.3.3 Type of employment



*Note.* *Other* refers to descriptions of employment where full-time or part-time were not satisfactory. Examples include: 1) *contract* work which may vary between full-time and part-time, 2) working less than full-time hours yet significantly higher than part-time hours such as 30 hours per week. 3) In addition *other* may refer to less than 16 hours per week time and be referred to as *casual* work as opposed to part-time.

Figure 4.3: A pie-chart to show proportion of participants per type of employment

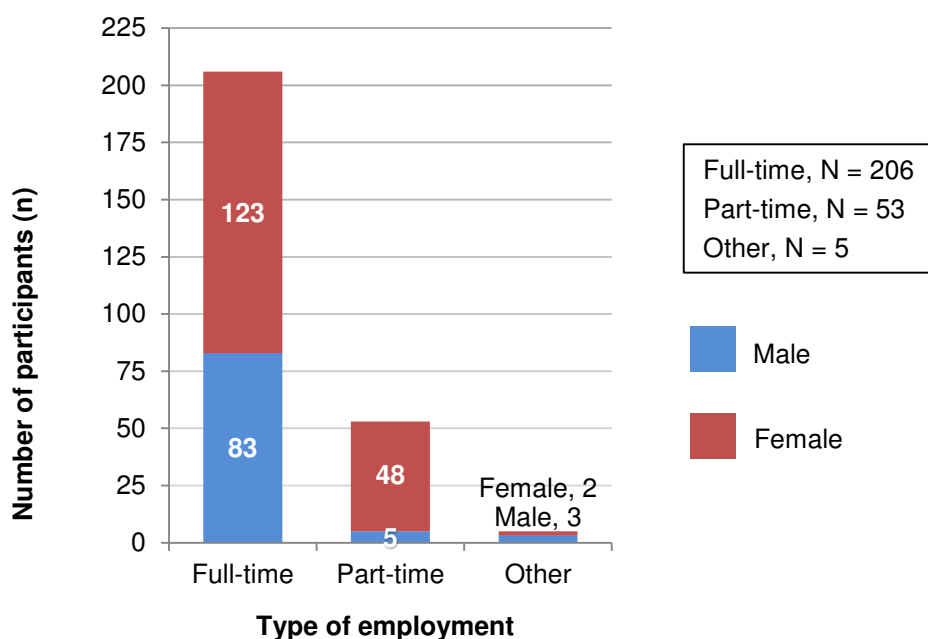
#### 4.3.3.3.1 Gender by type of employment

##### Gender \* Type of employment Cross tabulation

		Type of employment			Total	
		Full-time	Part-time	Other		
Gender	Male	Count	83	5	3	91
		% within Gender	91.2%	5.5%	3.3%	100.0%
Gender	Female	Count	123	48	2	173
		% within Gender	71.1%	27.7%	1.2%	100.0%
Total		Count	206	53	5	264
		% within Gender	78.0%	20.1%	1.9%	100.0%

*Note.* *Other* refers to descriptions of employment where full-time or part-time were not satisfactory. Examples include: 1) *contract* work which may vary between full-time and part-time, 2) working less than full-time hours yet significantly higher than part-time hours such as 30 hours per week. 3) In addition *other* may refer to less than 16 hours per week time and be referred to as *casual* work as opposed to part-time.

Table 4.2: Frequency table for gender by type of employment



*Note.* *Other* refers to descriptions of employment where full-time or part-time were not satisfactory. Examples include: 1) *contract* work which may vary between full-time and part-time, 2) working less than full-time hours yet significantly higher than part-time hours such as 30 hours per week. 3) In addition *other* may refer to less than 16 hours per week time and be referred to as *casual* work as opposed to part-time.

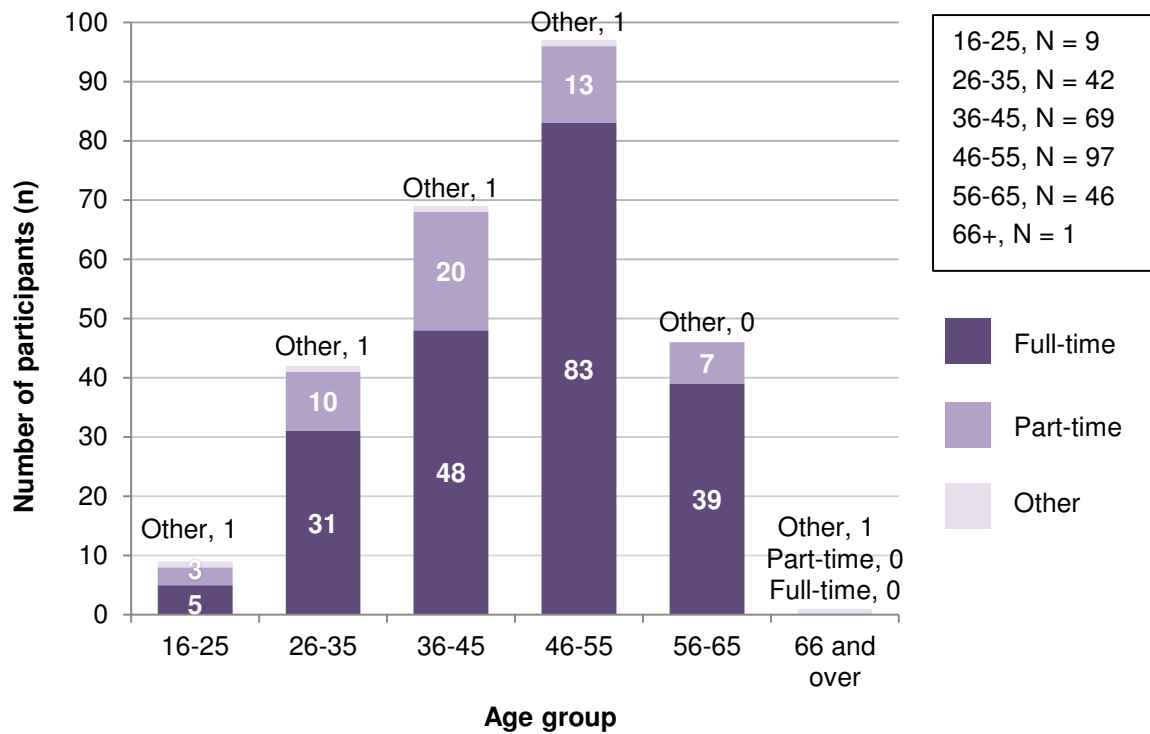
Figure 4.4: A graph to show numbers of participants by gender per type of employment

#### 4.3.3.3.2 Age by type of employment

		Type of employment			Total	
		Full-time	Part-time	Other		
Age	16-25	Count	5	3	1	9
		% within Age	55.6%	33.3%	11.1%	100.0%
	26-35	Count	31	10	1	42
		% within Age	73.8%	23.8%	2.4%	100.0%
	36-45	Count	48	20	1	69
		% within Age	69.6%	29.0%	1.4%	100.0%
	46-55	Count	83	13	1	97
		% within Age	85.6%	13.4%	1.0%	100.0%
	56-65	Count	39	7	0	46
		% within Age	84.8%	15.2%	0.0%	100.0%
	66 and over	Count	0	0	1	1
		% within Age	0.0%	0.0%	100.0%	100.0%
	Total	Count	206	53	5	264
		% within Age	78.0%	20.1%	1.9%	100.0%

*Note.* *Other* refers to descriptions of employment where full-time or part-time were not satisfactory. Examples include: 1) *contract* work which may vary between full-time and part-time, 2) working less than full-time hours yet significantly higher than part-time hours such as 30 hours per week. 3) In addition *other* may refer to less than 16 hours per week time and be referred to as *casual* work as opposed to part-time.

Table 4.3: Frequency table for age by type of employment



*Note.* *Other* refers to descriptions of employment where full-time or part-time were not satisfactory. Examples include: 1) *contract* work which may vary between full-time and part-time, 2) working less than full-time hours yet significantly higher than part-time hours such as 30 hours per week. 3) In addition *other* may refer to less than 16 hours per week time and be referred to as *casual* work as opposed to part-time.

Figure 4.5: A graph to show numbers of participants by age per type of employment

#### 4.3.3.4 Work hours

Participants were divided into the two groups according to their hours per week (hpw): 1) 1 to 35 hpw and 2) 36 or more hpw. Statistics are as shown in figure 4.6 below:

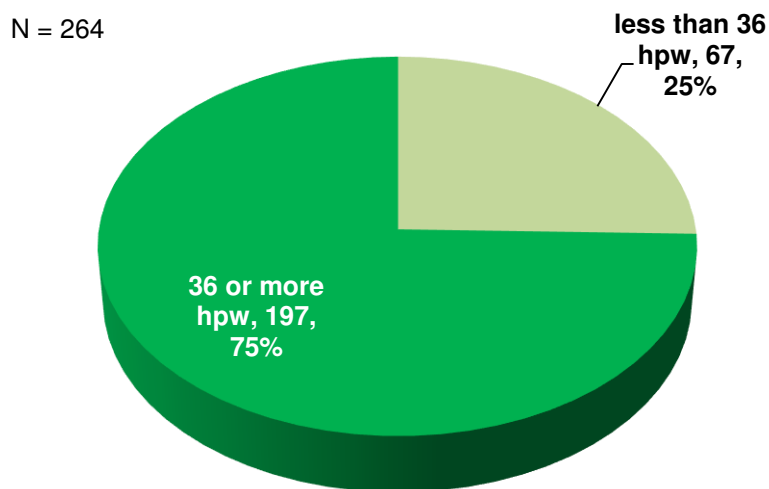


Figure 4.6: A pie-chart to show proportion of participants by work hours

4.3.3.4.1 Gender by work hours

**Gender \* Work hours Cross tabulation**

			Work hours per week		Total
			Less than 36	36 or more	
Gender	Male	Count	9	82	91
		% within Gender	9.9%	90.1%	100.0%
	Female	Count	58	115	173
		% within Gender	33.5%	66.5%	100.0%
Total	Count	67	197	264	
	% within Gender	25.4%	74.6%	100.0%	

Table 4.4: Frequency table for gender by work hours

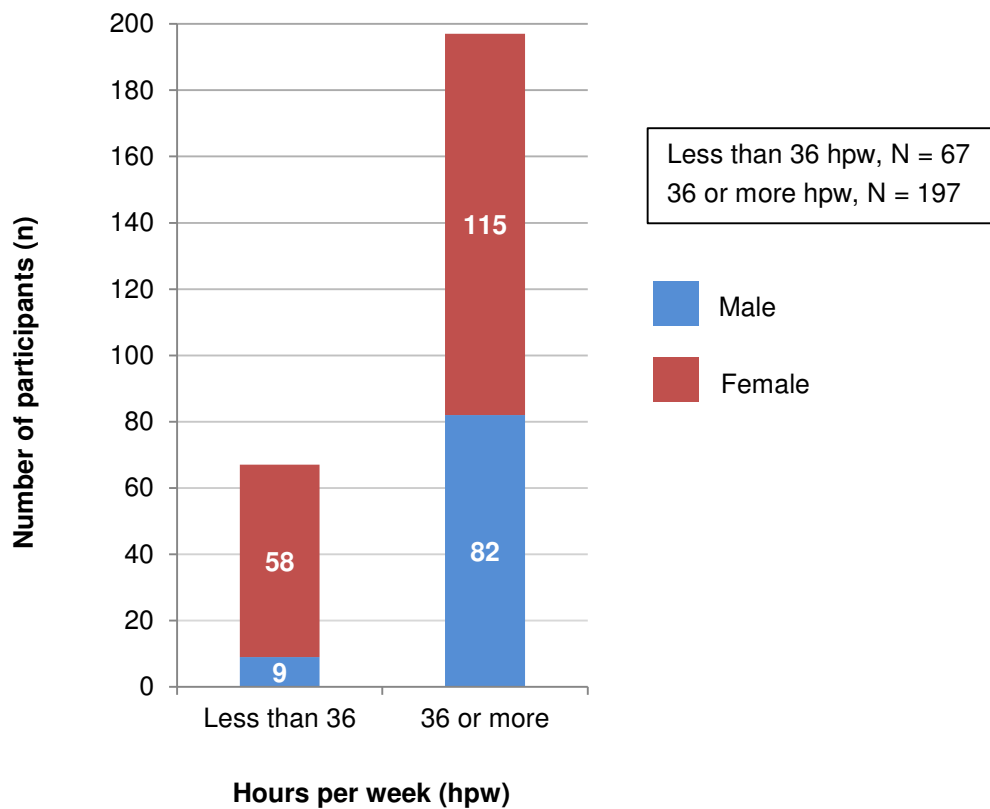


Figure 4.7: A graph to show numbers of participants by gender per work hours

4.3.3.4.2 Age by work hours

**Age \* Work hours Cross tabulation**

		Work hours per week		Total	
		Less than 36	36 or more		
Age	16-25	Count	5	4	9
		% within Age	55.6%	44.4%	100.0%
	26-35	Count	11	31	42
		% within Age	26.2%	73.8%	100.0%
	36-45	Count	23	46	69
		% within Age	33.3%	66.7%	100.0%
	46-55	Count	19	78	97
		% within Age	19.6%	80.4%	100.0%
	56-65	Count	8	38	46
		% within Age	17.4%	82.6%	100.0%
	66 and over	Count	1	0	1
		% within Age	100.0%	0.0%	100.0%
Total	Count	67	197	264	
	% within Age	25.4%	74.6%	100.0%	

Table 4.5: Frequency table for age by work hours

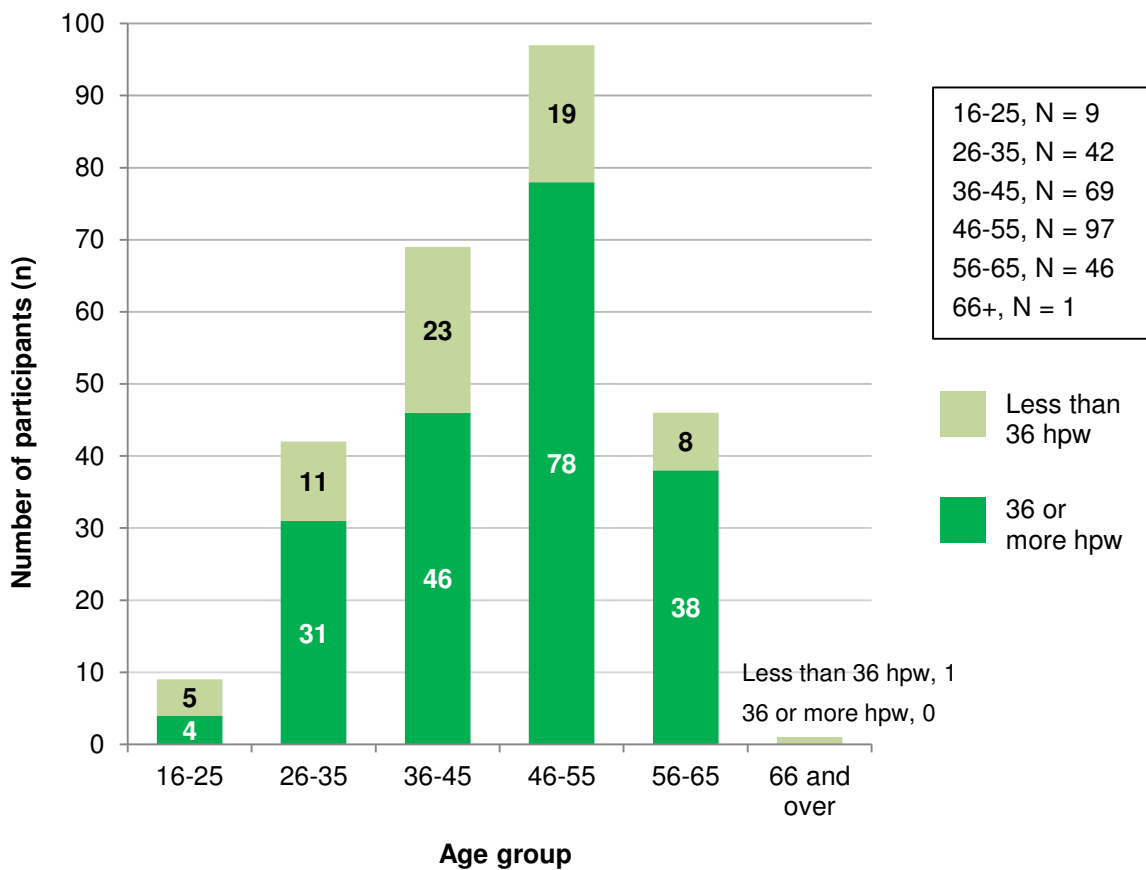


Figure 4.8: A graph to show numbers of participants by age per work hours



#### 4.4 Conclusions [Results]

To conclude, there were two surveys of the research study: firstly, participation was received (in terms of an aggregate) by a number of councils in the north of England. Secondly, participation was received by employees of Council-Z (anonymised). Participation as per the two surveys is described in the sections below.

With regards to the former, (councils in the north of England): the survey was carried out at 14 councils (anonymised) in the north of England. The survey instrument as put to participants of the pilot study is as shown in Appendix E (revised questionnaire). Data was collected from 66 participants. The sample size was relatively small for the pilot study and statistical analyses was only undertaken in terms of independent *t*-tests and analysis of variance (Haq, 2014a).

With regards to the latter (Council-Z) and in contrast to the pilot survey: technical questions were added to the Council-Z survey as shown in section two of Appendix F. Participation to the each of the above three sections of Council-Z survey was received by 478 employees. There were data inconsistencies which were used to exclude invalid answers and so, out of the 478 sample participation received to the Council-Z survey, 264 valid responses were brought forward to analysis (Chapter 6).

In terms of the characteristics of the sample 264 participants, there were 173 female to 91 male. Apart from the 16-25 and 66 and over age groups, females were higher in number compared to males across all other age groups namely the 26-35, 36-45, 46-55 and 56-65 age groups. The sample consisted of 78 per cent full-time workers and 20 per cent part-time with a disproportionate number of females to males amongst part-time workers (of the 53 part-time workers, 48 were female). In addition, of the 67 employees that work less than 36 hours per week (hpw), 58 were female. Hence, flexible work arrangements, as a characteristic of part-time working (or less than 36 hpw), was exercised predominantly by female workers. Furthermore, there was an identifiable difference in patterns in terms of the ratio of full-time to part-time workers across age groups. To state the difference in terms of aggregation: age group 46-65 have a greater propensity to work full-time compared to the 16-45 age group.

This concludes Chapter 4. Chapter 5 discusses the approach taken regarding the analysis of data of the sample 264 participants from Council-Z. In Chapter 6 confirmatory factor analyses were undertaken with the data; in other words, and as stated earlier, empirical models were built for each theoretical layer of maturity namely, *resource*, *policy* and *connectivity*.

## Chapter 5: Data analysis approach

### 5.1 Introduction

This chapter discusses the approach taken regarding the confirmatory factor analyses of data pertaining to the sample 264 survey participants of Council-Z (as described in terms of descriptive statistics earlier). In other words, the following sections are pre-requisites to the understanding of the confirmatory factor analyses:

- 1) **Software,**
- 2) **Terminology,**
- 3) **Model formation, refinement and optimisation,**
- 4) **Model evaluation criteria, and**
- 5) **Contribution.**

In each of the above, the knowledge in terms of language used in this chapter (by which the confirmatory factor analyses were conducted and interpreted) is put forward to the reader. The five above named sections follow below.

#### 5.1.1 Software

Confirmatory factor analyses were conducted using IBM AMOS 20.0.0 (Build 817) and IBM SPSS Statistics 20.0.0.

#### 5.1.2 Terminology

**For the purpose of this thesis** a number of terms were used and defined to add clarification and communicate the analyses more effectively. The terms that were used in this research regarding confirmatory factor analysis are defined in this section. Usage of the terms as defined is consistent throughout the thesis.

##### 5.1.2.1 Latent factor, latent construct and latent variable

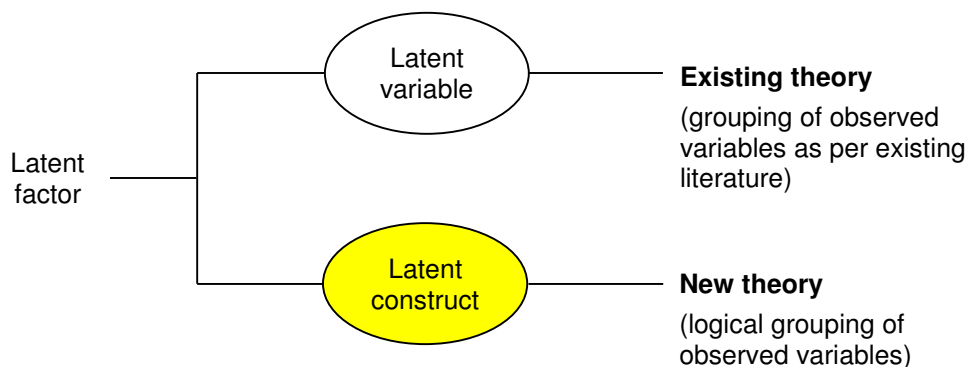


Figure 5.1: Latent factor defined in terms of two types for the purpose of this thesis

Although the terms, *latent factor*, *latent variable* and *latent construct* are used interchangeably in existing literature, **for the purpose of this thesis** a distinct clarification is made regarding these terms as illustrated in figure 5.1 on page 153. The clarification described below improves communication of the confirmatory factor analyses that were conducted. To elaborate on figure 5.1 on page 153:

- 1) ***Latent factor* is defined as a variable that cannot be directly observed and is measured indirectly by observed variables.**
- 2) ***Latent variable* is defined as a variable that cannot be directly observed (as per latent factor above) and has already been measured indirectly by observed variables as per existing literature. In other words, *latent variable* is defined by and what is termed (for the purpose of this thesis) as a direct grouping of observed variables (direct to mean: directly from existing literature without change to established theory).**
- 3) ***Latent construct* is defined as a variable that cannot be directly observed (as per latent factor above) and is measured indirectly by observed variables for the first time as new theory in this thesis. In other words, *latent construct* is defined by and what is termed (for the purpose of this thesis) as a logical grouping of observed variables (logical to mean: observed variables are grouped in terms of new theory and not primarily based on existing literature or established theory).**

Latent constructs are new theory (not in existing literature) and are highlighted consistently in yellow on the diagrams of this chapter.

In summary, *latent variables* refer to existing theory, *latent constructs* to new theory and *latent factor* an aggregated-type definition to describe both the former two. For example, to refer to a model that is inclusive of latent variables in addition to latent constructs, the term *latent factors* may be used.

#### 5.1.2.2 *Likert statements, observed variables and indicators*

The terms *Likert statements*, *observed variables* and *indicators* are used interchangeably in this thesis. Likert statements were used to measure each latent factor on a 7-point scale and are thus, observed variables. Likert statements were grouped in terms of existing theory (latent variables) or new theory (latent constructs); they are in turn, indicators of the latent variable or latent construct to which they belong that is, they explain variance of an underlying latent factor.

#### 5.1.2.3 *Theoretical build*

*Theoretical build* is a generalised term that is interchangeable with the following description: formation, refinement and optimisation of models and factor structures – see section following.

### 5.1.3 Theoretical build of models and factor structures

Formation, refinement and optimisation or in other words, the theoretical build of models and factor structures, falls into three categories:

- 1) Likert statements in terms of re-wording, labels and reverse coding,
- 2) Existing theory; and
- 3) New theory.

Each of the above in terms of the theoretical build of models and factor structures for resource, policy and connectivity, follow in the sections below.

#### 5.1.3.1 Likert statements

##### 5.1.3.1.1 Re-wording

Sentence adaptation is actioned with regards to Likert statements as applicable that is, the re-wording or revision of Likert statements to accomplish the following:

- 1) **to improve communication, or**
- 2) **translate the measure into a teleworking-related context.**

An example for (1) and (2) above is provided in the below section, to show re-wording as minor change that is, no significant departure from or impact on, theory (existing or new).

##### 5.1.3.1.1.1 Improve communication

Take for example the following Likert statement where, the word *organisation* has been substituted for the word *council* to improve communication to participants of the survey; each participant belongs to that known type of organisation:

'The Council's key policies, processes and procedures for information systems are clearly documented.' (Adapted from Curry and Moore, 2003, p.107).

The linkage of latent variable *information systems* (Curry and Moore, 2003, p.107) to the above adapted Likert statement is not a misalignment following the aforementioned word change above. The above is self-explanatory; clearly the adaptation in the observed variable (Likert statement):

- 1) **does not signify measurement of a different latent variable,**
- 2) **is consistent to the measurement of information systems (as per existing theory).**

#### 5.1.3.1.1.2 Translation of Likert statement into a teleworking-related context

Take for example the following Likert statement where, the word *SNS* (social networking service) as per existing theory is substituted for the word *teleworking* as per consistency to this research study:

'Teleworking can (or could) help me stay connected with colleagues.' (Adapted from Shu and Chuang, 2011, p.32).

SNS and teleworking are both consistent with the inference of the Likert statement where a tool is utilised for staying connected with colleagues. Hence, the linkage of latent variable *maintaining relationships* (Shu and Chuang, 2011, p.32) to the above adapted Likert statement is not a misalignment following the aforementioned word change above. In other words, and again, clearly the adaptation in the observed variable (Likert statement):

- 1) does not signify measurement of a different latent variable,**
- 2) is consistent to the measurement of *maintaining relationships* (as per existing theory).**

In the following section there is a distinct clarification between a) the re-wording of Likert statements and b) alignment of Likert statements to latent factors that is, the two in this research study are distinctly different; the former does not impact on the latter in this research study and vice versa. Furthermore, the latter, (b), is based out of theory alone not word changes:

#### 5.1.3.1.1.3 Difference between re-wording Likert statement and its alignment to a latent factor

Latent factors are created out of existing theory or logic (new theory): observed variables are grouped together out of theory; they are not grouped together based on word changes to Likert statements. In other words, the alignment of an observed measure to latent factor does not change or is not impacted, by the re-wording of the observed measure in question. As discussed above, word changes in this research study are minor details not significant changes: the changes do not warrant a rethink over the kind of latent factor that is explained by the re-worded observed measure.

#### 5.1.3.1.1.4 Conclusion

To conclude, word changes in observed variables of this research study do not constitute significant departure from theory. Observed variables map back to theory:

- 1) directly (no wording changes), or
- 2) in terms of minor word changes (adapted Likert statements) as stated in above examples.

Furthermore, observed variables can be re-grouped or assigned to a different latent factor, however this action is completed out of theory alone not, in terms of word changes or re-wording of Likert statements which as discussed above are simply, minor details.

#### 5.1.3.1.2 Likert scale

First and foremost the confirmatory factor analyses were conducted with a consistency namely that all observed variables were:

- 1) **Likert statements;**
- 2) **on a 7-point scale (*also known as 7 scale anchors*) and**
- 3) **direction of the scale was consistent namely that anchor point 1 translated as a negative perception and anchor point 7, a positive perception.**

The above meets a consistency for the later confirmatory factor analyses that were conducted:

- 1) **A 7-point scale arguably, creates a capacity whereby data can be assumed to be normality distributed; a requirement for confirmatory factor analysis (see Kline, 2011, p.79). Furthermore and in addition to sample size (later section 5.1.4.1 on page 168) and normality (later section 5.1.4.2 on page 168) requirements, Harrington (2009, p.45) states that: ‘it may be possible to treat the variables as continuous when there are at least five response categories’.**
- 2) **A 7-point scale is ‘favourable in terms of people’s ability to reasonably discriminate between scale values (anchors)’ (Kline, 2011, p.179). Additionally, anchors that are less in number such as 3-point scales may affect reliability (Irwing, 1996, p.5) and so, there is a consistency to reliability.**
- 3) **There wasn’t a mixture of 5-point and 7-point Likert scales (as per initial survey design decisions) and so, there wasn’t an ambiguity regarding interpretation of correlations in this regard.**
- 4) **The fact that the direction of the scale was consistent for all observed variables meant that the capacity for interpretation of latent factor to factor correlations and factor loadings was largely improved.**

##### 5.1.3.1.2.1 Labels (categories of Likert anchors)

Each of the 52 Likert statements of the survey was measured on a 7-point scale and the first and last points were labelled to survey participants. Forty-eight (48) of the 52 Likert statements were coded as: 1 = strongly disagree and 7 = strongly agree. Coded points 2 to 6 are interpretable as 2 = Disagree, 3 = Disagree slightly, 4 = Neutral, Not sure or Undecided, 5 = Agree slightly and 6 = Agree.

Thus, high numbers are indicative of positive perceptions and low numbers indicative of negative perceptions. As applicable, coding points 1 and 7 (inclusive of an interpretation of coding points 2 to 6) are as shown in the tables below and the following chapter.

Seven (7) of the 53 Likert statements were reverse coded to reflect the consistency as stated above namely, that points 5, 6 and 7 were to translate as a positive perception and points 1, 2 and 3 as a negative perception. Reverse coding is detailed in the next section below.

#### 5.1.3.1.2.2 Reverse coding

Seven (7) Likert statements (as shown listed in table 5.1 below) were reverse coded for consistency in terms of direction across all observed variables namely that:

- 1) **point 1 translated as a negative perception; and**
- 2) **point 7 translated as a positive perception.**

ID	Likert statement	Description of measurement
19c	'The Council supports you through its health policies. Teleworking can (or could) hinder the fulfilment of the Council's health policies.' (Adapted from Illegems et al., 2001, table 3, p.288).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
19i	'I have to do things that should be done differently.' (Zhao and Rashid, 2010, p.40).	(The above are reversed as per a reverse coding that was applied to the opposite observed variables for consistency in direction across all Likert statements of the survey.)
19o	'Teleworking hinders (or could hinder) the security of internal data.' (Adapted from Illegems et al., 2001, table 3, p.288).	
20i	'Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.' (Adapted from Teo et al. (1999, table 1, p.41).	
25a	'The Council should only allow employees to telework if they provide their own computers.' (Adapted from Guthrie, 1997, Exhibit 1).	1 = Always acceptable 2 = Often acceptable 3 = Usually acceptable 4 = Unsure, Undecided, Neutral or Indifferent 5 = Occasionally acceptable 6 = Rarely acceptable 7 = Never acceptable
25b	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1).	(The above are reversed as per a reverse coding that was applied to the opposite observed variables for consistency in direction across all Likert statements of the survey.)
25c	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1).	

Table 5.1: Reverse coded observed variables

Likert statement, 19c is taken from list as shown in table 5.1 on page 158: firstly, the wording of the Likert statement means that the scale is reversed from the initial assignment of disagree to agree that is, agreement to the Likert statement would conversely translate as negative perception with regards to the impact on health policies. Hence, negative perceptions would be denoted by points 5 , 6 and 7 as opposed to the required 1, 2 and 3. Therefore, a correction to the direction was sought, in other words, this item was reverse coded for a consistency across all survey Likert statements.

In addition, there would be improvement to interpretive capacity of confirmatory factor analyses for example, 19c may less easily be grouped with other Likert statements that conversely have Likert scales with a direction opposite to 19c. Thus interpretation of the Likert statements as a collective set or as latent factors can create ambiguity. Reverse coding resolves the inconsistency and ambiguity. Hence, points 1, 2 and 3 always translated as a negative perception and 5, 6 and 7 always a positive perception (for each and every Likert statement). Likert statement 19c (in addition to six other Likert statements as identified in earlier table 5.1 on page 158) were reverse coded.

#### 5.1.3.1.2.3 Different labels

Seven (7) of the 53 Likert statements had different labels for anchor points 1 and 7 (that is, not *strongly disagree* to *strongly agree* respectively as per the majority of Likert statements) as shown in table 5.2 on page 160 inclusive of an interpretation of coded points 2 to 6.

As per the preceding section, point 1 translated as a negative perception and point 7, a positive perception. Likert statements 25a, 25b and 25c were reverse coded as stated in the preceding section for consistency to the aforementioned positive and negative ends of the scale and as stated earlier, survey data with regards to participants' perceptions was unchanged before and after the reverse coding procedure.



ID	Likert statement	Description (and interpretation) of measurement
21a	'I know where to access policies, processes and procedures for information systems.' (Adapted from Curry and Moore, 2003, p.107).	1 = Never true 2 = Rarely true 3 = Occasionally true 4 = True about half the time 5 = Usually true 6 = Often true 7 = Always true
22a	'I feel I am in the loop with what's going on within my department.' (Adapted from Morganson et al., 2010, p.584).	1 = Very little 2 = Little 3 = Marginally (negative) 4 = Unsure, Undecided, Neutral or Impartial 5 = Marginally (positive) 6 = Much 7 = Very much
23a	'I trust top management.' (Ellis and Shockley-Zalabak, 2001, table 2, p.389).	1 = Very little 2 = Little 3 = Marginally (negative) 4 = Unsure, Undecided, Neutral or Impartial 5 = Marginally (positive) 6 = Greatly 7 = Very greatly
24a	'How well do you think the Council has achieved its performance objectives?' (Adapted from Ellis and Shockley-Zalabak, 2001, p.390).	1 = Completely unachieved 2 = Mostly unachieved 3 = Somewhat unachieved 4 = Unsure, Undecided, Neutral or Indifferent 5 = Somewhat achieved 6 = Mostly achieved 7 = Almost completely achieved
25a	'The Council should only allow employees to telework if they provide their own computers.' (Adapted from Guthrie, 1997, Exhibit 1).	1 = Always acceptable 2 = Often acceptable 3 = Usually acceptable 4 = Unsure, Undecided, Neutral or Indifferent 5 = Occasionally acceptable 6 = Rarely acceptable 7 = Never acceptable
25b	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1).	(As stated earlier, the above are reversed as per a reverse coding that was applied to the opposite observed variables for consistency in direction across all Likert statements of the survey.)
25c	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1).	

Table 5.2: Likert statements with anchor labels other than *strongly disagree to strongly agree*

### 5.1.3.2 Existing theory

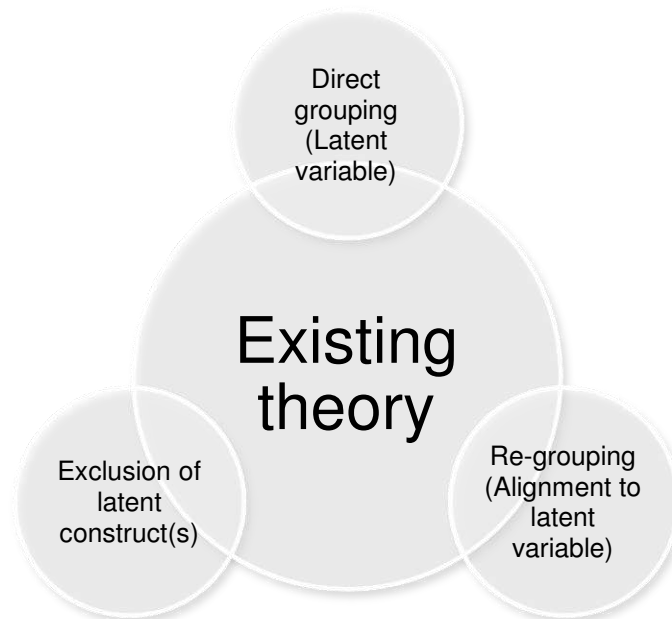


Figure 5.2: Three aspects inclusive to model development in terms of existing theory

A reminder to the reader that the terminology used in the following sections (and throughout the thesis) such as *direct grouping*, *latent variable* and *latent factor* are explained in earlier section 5.1.2; and as aforementioned, the explanations are for the purpose of this thesis.

#### 5.1.3.2.1 Direct grouping (Latent variable)

The theoretical models contain latent factors where applicable, built consistent to published findings. In other words, theory follows an alignment where observed variables are grouped directly from existing literature; variance in each latent variable as per published literature is explained by observed variables. Where published findings do not directly guide the research in terms of how observed variables should be grouped together in terms of latent factors, logical development (as per understanding and bibliography of existing literature) is utilised to group observed variables and as explained in later section 5.1.3.3 (heading 'New theory (logical model development)').

#### 5.1.3.2.2 Re-grouping (Alignment to latent variable)

There is an example in the CFA models where observed variables were re-aligned to form a group to follow existing theory: take the example of the resource model (figure 6.5 on page 184) which contains three observed variables explained in terms of job satisfaction in existing literature. However, the three observed variables are defined as a measure of job satisfaction by different authors. In other words, all three measures are not defined as job satisfaction by a single author. Hence, the observed variables were re-grouped together in terms of existing theory. **For the purpose of this thesis the term *re-grouped* refers to the above explanation.**

#### 5.1.3.2.3 Exclusion of latent construct(s)

A rule of thumb is applied namely that **at least one of the CFA factor structures** in each of the three models resource, policy and connectivity are **created out of existing theory alone**. Hence, logically created constructs are excluded from the model for at least one of the factor structures. Hence, an evaluation can be made of models of existing theory alone in comparison to models of a mixture (existing and new theory), thus further contribute to research in the teleworking field.

#### 5.1.3.3 New theory (logical model development)

The theory of the research is encapsulated within figure 2.46 on page 116 in terms of a taxonomy. This study as stated in the theory chapter takes a positivist approach (Saunders et al., 2012, figure 4.1, p.128) to study the socio-factors of figure 2.46 and more specifically, factors pertaining to each of the following three maturity layers (see section named, *teleworking maturity model* on page 87):

- 1) **Resource**
- 2) **Policy**
- 3) **Connectivity**

To develop the survey, existing literature was researched in terms of questions that could be identifiably consistent with each of the three named layers above. Socio-measures were found as per existing literature (peer-reviewed journals) to an array of socio-factors as discussed in Chapter 2 teleworking theory.

The CFA models were developed in accordance with the theory that is, socio-measures or in other words, observed variables (as per the terminology of this chapter and chapter 6) were grouped as per existing literature (and consistent with socio-factors of theory). Observed variables that did not pertain to a group as per existing literature (that is, some of the observed variables after the Q-sort study stood alone), these observed variables were grouped by logic. The logical process namely in terms of the bibliography regarding the subject teleworking and discretion was applied; more precisely as stated further below, observed variables that followed an identifiable theme or pattern were grouped together to explain an underlying latent construct named in terms of that theme or pattern.

**This logical procedure was not a significant departure from that which would be used for confirmatory factor analysis: indeed, Morganson et al. (2010) developed an understanding of secondary data (Morganson et al., 2010, p.583) and a bibliography of the subject of teleworking before creating newly developed measures (Morganson et al., 2010, p.584) and which incidentally, parallels with the process as per this research study namely that, *latent constructs* were logically created, before being tested with confirmatory factor analysis:**

**'Data examined in this study have not been published elsewhere.'** (Morganson et al., 2010, p.583) and: (over page)

**'Because the measures used in this study have not been used in past research, we performed a confirmatory factor analysis' (Morganson et al., 2010, p.585)**

However, and in contrast to Morganson et al. (2010) measures were utilised that have been used in past research (observed variables of existing theory) as opposed to newly created measures and so, the measures used in this research study have been tried and tested previously. Each unified confirmatory factor analysis model or factor structure is hypothetical (that is and as mentioned earlier, factor structures created out of understanding and bibliography of existing literature) and thus, tested with confirmatory factor analysis (as opposed to exploratory factor analysis where factor structures are not known). An hypothetical model was created for each maturity layer namely, resource, policy and connectivity. Each hypothetical model was created several times in terms of varying and descendant factor structures; in this research study there were:

- 1) 4 factor structures for resource (alternatively, 4 resource models)**
- 2) 6 factor structures for policy (alternatively, 6 resource models)**
- 3) 3 factor structures for connectivity (alternatively, 3 resource models)**

In other words, out of the theoretical build (factor structures of latent variables and latent constructs that is, existing theory and new theory respectively) confirmatory factory analyses were conducted to ascertain plausibility and viability of those hypothetical factor structures. New theory falls into a number of aspects. Aspects in terms of what has constituted new theory is listed in figure 5.3 below and described in the sections below.



Figure 5.3: Seven aspects inclusive to model development in terms of new theory

#### 5.1.3.3.1 Logical grouping (Latent construct)

##### 5.1.3.3.1.1 Development of latent construct

The mapping of observed variables to latent construct in this research study is based on new theory. There were a number of observed variables that stood alone (post Q-sort study) in terms of being the only linkage to a latent variable (existing theory). The names of the latent variables were temporarily disregarded for each of the observed variables before the observed variables were logically grouped; each group a formation of a latent construct (new theory) associated primarily with the details of the Likert statement as opposed to the details or names of the latent variables. Naming each latent construct is described in the next section below.

##### 5.1.3.3.1.2 Naming of latent construct

Following on from the preceding section: in terms of the naming convention regarding latent constructs, the aforementioned and disregarded names of latent variables associated with observed variables (as per existing literature) were re-considered in addition to the written communication of each of the Likert statements and so, a name consistent with or, suited to the observed variables was derivable for each latent construct. In other words, a consistency was sought across the observed measures, a theme or pattern was identified, and a name for that theme or pattern was given to the latent construct in question.

'Factors require some type of designation [label] ... for ... communication of results' (Kline, 2011, p.230). As aforementioned, each latent construct was named as per a theme identifiable out of the group of observed variables. The name (or label) may not precisely reflect the theme identified, however, at the very least serves the aforementioned purpose as stated by Kline (2011, p.230) that is, of communication.

##### 5.1.3.3.2 Development of factor structures

There are a number of factor structures for each model type namely, resource, policy and connectivity. Each factor structure is unique that is, collectively they are representative of new theory. To illustrate this point, a series of six steps follow by taking an example where a factor structure (a CFA model) consists of existing theories only yet collectively representative of new theory:

First, each latent variable (existing theory) maps to observed variables as per existing literature.

Second, the aforementioned mapping is representative of a single existing theory.

Third, factor structures are created (as per the Q-sort study) which uniquely brings together the existing theories that is, latent variables were not collectively together in a single confirmatory factor analysis model, (resource, policy or connectivity) in existing literature.

Fourth, confirmatory factor analyses confirm the validity of the co-existing theories (in other words there is latent factor to factor correlations between the co-existing theories with model-fit statistics to substantiate this further, as detailed later).

Fifth, each factor structure of co-existing theories (a collective set of latent variables) is thus, the first undertaking of its kind.

Sixth, and to conclude, the latent variables collectively represent a factor structure of new theory.

The above illustration is simplified that is, to illustrate factor structures as new theory or more specifically, new theory out of a collective set of existing theories. The addition of latent constructs to factor structures only substantiates the above namely that and more precisely, all factor structures (in terms of their entirety) are new theories. To summarise, the new theory factor structures are a collective set of latent factors, each factor structure consisting of:

- 1) Latent variables only (existing theories alone), or
- 2) Latent variables (existing theories) AND latent constructs (new theories).

The viability of each factor structure is evaluated with model-fit statistics (later discussion). In other words, the utility of each factor structure is tested with confirmatory factor analysis.

#### 5.1.3.3.3 Latent variable aggregation

For some CFA factor structures there exists a high level of convergence between latent variables that is, two latent variables can be regarded as the same in terms of factor correlation and so, the two latent variables were aggregated in terms of a simplification or parsimonious solution that is, grouped together as a single latent construct as per new theory.

#### 5.1.3.3.4 Latent variable clarification

Observed measures that had a linkage to a single latent variable may (identifiably) be divided into two groups of observed measures; each group representative of a distinct yet correlated latent construct. This action adds clarification to the model and contributes to the field of teleworking in terms of new theory.

#### 5.1.3.3.5 Exclusion of statistical ambiguity

There is a Heywood case regarding factor structure A of resource as per this research study (detailed later) and which produces an inadmissible solution regarding the factor structure. Heywood case is a statistical ambiguity and so, the ambiguity in terms of latent factor and observed variables in question was excluded (Hair et al., 2006, p.794) from factor structure A of resource.

#### 5.1.3.3.6 Exclusion of interpretive ambiguity

In reference to the policy model specifically, factor structure B, there are three observed measures that were ambiguous following survey feedback: Likert statements 25a, 25b and 25c had an ambiguous translation to a survey participant and thus the consistency of responses and interpretation of the model are in question and so, the Likert statements and the corresponding latent variable were excluded from subsequent policy model namely, factor structure C (C1 to C4).

#### 5.1.3.3.7 Cut-off criterion of .60 for factor loadings

First and foremost, the very first model namely, factor structure A for each layer, resource, policy and connectivity is created out of all the observed variables Q-sorted to each respective layer. Only after factor structure A, was a cut-off point applied with regards to factor loadings namely,  $\geq .60$ ; to further optimise and refine the model of each layer. Application of the cut-off does impact on the factor structure in terms of a reduction in the number of observed variables and latent factors per model.

Factor loadings are integral to construct validity and model parsimony (in terms of data reduction). As stated by Shu and Chuang (2011, p.35): 'we also examined factor loadings to determine construct validity and for data reduction'. Furthermore, Doll et al. (1995, p.182) state: 'the standard factor loadings of observed variables (items) on latent variables (factors) are estimates of the validity of the observed variables'. In addition, Hair et al. (2006, p.128) state:

'Factor loadings in the range of .30 to .40 are considered to meet the minimal level for interpretation of structure, loadings .50 or greater are considered practically significant ... exceeding .70 are considered indicative of a well-defined structure'. (Hair et al., 2006, p.128)

Harrington (2009, p.46, citing Kline, 2005) suggests using standardised factor loadings of .60 for small to medium sample sizes (in other words, sample sizes less than 200). Kline (2011, p.232) advises that 'when the sample size is not large ... use indicators with relatively high standardised factor loadings (e.g.,  $> .70$ )'.

Furthermore, Kline (2011, p.232, citing Wothke, 1993) states that 'relatively low standardised loadings are more susceptible to Heywood cases'; an outcome as per this research study regarding factor structure A of resource (details provided in the chapter 6). The observed variables (and latent factor) were excluded as per linkages to the Heywood case (Hair et al., 2006, p.794) rather than via a factor loading cut-off straight away, in other words a two-step process followed: firstly, to evaluate the model after the statistical ambiguity is excluded and then secondly, to evaluate the model again after a cut-off was applied.

Hence, the model can be comparatively evaluated, which would not be possible with a cut-off criterion alone. Nonetheless, factor loading cut-off would serve to exclude statistical ambiguity and thus, is a utility regarding factor structure refinement and optimisation.

Doll et al. (1995, p.182 citing Bollen, 1989) state that: 'the larger the factor loading or coefficients ... the stronger is the evidence that the measured variables or factors represent the underlying constructs'. As the confirmatory factor analyses is based on new theory, a higher cut-off value is sought regarding factor loadings to substantiate the new theory in terms of validity or in other words, to evaluate the feasibility of the factor structures in terms of a more stringent cut-off and thus, substantiate new theory more tangibly.

Although there is no absolute cut-off threshold with regards to factor loadings (Doll et al., 1995, p.182), a .60 cut-off value is adopted for factor loadings as per the guidelines above; taking into account:

- 1) a value consistent with sample size of 264 namely less than .70 as per Kline (2011, p.232) regarding small sample sizes and**
- 2) to the same level as that advised per Harrington (2009, p.46, citing Kline, 2005) regarding small sample sizes. In other words, .60 is utilised for a large sample size and thus at a higher standard.**
- 3) potential Heywood cases, and**
- 4) complexity of factor structure A in terms of the number of latent factors namely, 6 for resource, 8 for policy and 6 for connectivity, in addition to the fact that this research is new theory that may be better substantiated with an higher cut-off value.**

A cut-off value for factor loadings of .60 explains 36 percent of variance in the latent factor per observed variable (in terms of the minimum). The aforementioned .60 cut-off is:

- 1) consistent with Kline (2011, p.232) namely that .70 is advised for small sample sizes and so, .60 is acceptable for large sample sizes.**
- 2) a more stringent cut-off value regarding a sample size above 200, namely 264 as per this research study (Harrington, 2009, p.46, citing Kline, 2005).**
- 3) an action to deal with statistical ambiguity namely Heywood cases (Kline, 2011, p.232, citing Wothke, 1993)**
- 4) above the standard of practical significance as stated above per Hair et al. (2006, p.128)**



## 5.1.4 Model evaluation criteria

### 5.1.4.1 Sample size

There is a sample of 264 participants as per the research study and there was no missing data; the sample size meets the requirements for CFA or in other words:

- 1) **above medium as per Kline (2005. *Cited In: Harrington, 2009, p.61*).**
- 2) **large as per Kline (2005. *Cited In: Harrington, 2009, p.46*).**
- 3) **above typical as per Kline (2011, p.12); typical quoted as two hundred.**
- 4) **between the 250 to 500 as per Schumacker and Lomax (2004. *Cited In: Bian, 2012, p.45*).**
- 5) **desirable as per Marsh et al. (1998, p.182); desirable quoted as greater than two hundred.**

### 5.1.4.2 Estimation and assumptions of data normality

Assumptions of normality were made regarding the data. It can be argued that a 7-point scale creates a capacity whereby data can be assumed to be normality distributed; a requirement for confirmatory factor analysis. In other words, a three-point scale 'cannot be normally distributed' (Kline, 2011, p.79).

Maximum Likelihood (ML) is the estimation method utilised with each CFA (Bandalos, 1996 and Russell, 2002. *Cited In: Matsunaga, 2010, p.107*); beneficial in terms of its 'accuracy' (Fan et.al, 1999 and Levine 2005. *Cited In: Matsunaga, 2010, p.107*) and 'robust to minor non-normality' (Harrington, 2009, p.44) and which complements the above stated assumptions of normality. Furthermore, there are Likert statements in this research study, each with a 7-point scale and this is above that which is advised for a ML method (*see Harrington, 2009, p.45*).

### 5.1.4.3 Indicators per latent factor

The theoretical models were inclusive of a minimum of two indicators per latent factor. The number of indicators per latent factor in terms of a minimum is discussed in literature and there is limited consensus as to an absolute minimum that is, opinions vary: many refer to three as a minimum indicators to factor ratio for example, *see ACITS (1995); Brown (2006, p.72); Raubenheimer (2004, p.60); and Wang and Wang (2012, p.60)*. Some authors refer to two as a minimum for example, *see Bian (2012, p.20); and Hayduk (1996, p.30. Cited In: Wang and Wang, 2012)*. Indeed, Morganson et al (2010, p.585) do utilise two as minimum indicators per latent factor in their research study.

Hence, an acknowledgement can be made of a minimum two indicators per factor as per existing research and discussion (as cited above). Kline (2011, p.232) speaks of a 2:1 ratio as potentially problematic in sample sizes that are not large and which can result in Heywood cases. There is a Heywood case regarding factor structure A of resource as per this research study (detailed later). However, the sample size as stated above is not small. Furthermore, 12 of the 13 factor structures (4

for resource, 6 for policy and 3 for connectivity) were admissible or convergent and so, a minimum two indicators per latent factor was not problematic and the statistical ambiguity namely, a Heywood case was excluded (Hair et al., 2006, p.794) that is, the latent factor and observed variables in question was excluded (namely, from factor structure A of the resource model).

#### 5.1.4.4 *Parameter constraint*

For each latent factor, a linkage between a Likert statement (observed variable) to that latent factor is constrained to 1.000: 'this serves to constrain the parameter and define the scale of the latent variable' (Arbuckle, 2006b. *Cited In*: Harrington, 2009, p.63).

In other words, the latent factor is not directly observable and so, a measurement does not exist for latent factors per se. Thus, a measurement scale must be given to the latent and this is achieved via the addition of a parameter constraint as described above that is, a measurement scale consistent to the observed data is taken by the latent factor and therefore allows computation of statistics regarding the latent factor(s) statistically. The measurement scale in this research is namely, a Likert scale of 1 to 7.

#### 5.1.4.5 *Model-fit statistics*

Model-fit statistics regarding CFA (as described further below) allow evaluation of models. However, there can be problems associated with fit statistics (see Hair et al., pp.750-1) and so, a number of fit indices should be reported with each and every model (Harrington, 2009, p.101). The statistics reported in this study are as listed in table 5.3 on page 170 and consistent with advice as stated by Hair et al. (2006, p.752) as follows:

**'... researcher should report at least one incremental index and one absolute index, in addition to the  $\chi^2$  value and the associated degrees of freedom. At least one of the indices should be a badness-of-fit index. A model reporting the  $\chi^2$  value and degrees of freedom, the CFI and RMSEA will often provide sufficient unique information to evaluate a model.'** (Hair et al., 2006, p.752).

Each of the statistics in table 5.3 on page 170 are discussed further below in terms of cut-off values or thresholds for model-fit. The cut-off values are not absolute or well-defined regarding models per se and exist with on-going discussions (see Hair et al., 2006, p.751; and Kline, 2011, p.190). Nonetheless and at the very least fit indices in terms of cut-off values do allow an evaluation to be conducted with models and so, there is a utility to this extent. The fit indices as per the sections that follow below (and as listed in table 5.3 on page 170) were utilised.

Class of statistic	Abbreviation or notation	Model-fit statistic
Absolute fit indices (Harrington, 2009, p.51)	$\chi^2$	Chi-square (A badness-of-fit index as per Kline, 2005. <i>Cited In:</i> Hooper et al., 2008, p.53)
	df	Degrees of freedom
	$p$	Probability level
	RMSEA	Root mean square error of approximation (inclusive of 90 per cent confidence limits) (A badness-of-fit index as per Hair et al., 2006, p.706; and Kline, 2011, p.205)
Incremental fit indices (or Comparative fit indices) (Hair et al., 2006, p.749; and Harrington, 2009, p.52)	CFI	Comparative fit index
	NFI	Normed fit index
	RFI	Relative fit index
Predictive fit indices (Kline, 2011, p.220)	AIC	Akaike Information Criterion

Table 5.3: Model-fit statistics reported in this thesis

#### 5.1.4.5.1 Absolute fit Indices

Absolute fit indices were utilised in the research to evaluate the models. Absolute fit indices are: ‘a measure of how well the model fits in comparison to no model at all’ (Jöreskog and Sörbom, 1993. *Cited In:* Hooper et al., 2008, p.53). The absolute fit indices as shown in table 5.3 above follow in the sections below. Each of the fit indices are described in terms of advice regarding cut-off values or in other words, the empirical standards by which models were evaluated.

##### 5.1.4.5.1.1 Chi-square ( $\chi^2$ ), degrees of freedom (df) and probability level ( $p$ )

Chi-square in terms of CFA is the ‘statistical measure of difference used to compare the observed and estimated covariance matrices’ (Hair et al., 2006, p.706). **A non-significant chi-square where,  $\chi^2$  is small with a p-value that is large (Hair et al., 2006, p.746) or greater than .05 (Hayduk, 1996. *Cited in:* Kline, 2011, p.199; and Hooper at al., 2008, p.58) is regarded as model-fit that is, there is no difference between the aforementioned observed and estimated covariance matrices.** In other words, the model fits the observed data well. However, and as per computation of the formula, expectation would be that chi-square will almost always be insignificant with large samples (Bentler and Bonnet, 1980. *Cited In:* Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In:* Hooper et al., 2008, p.54). Hence, models with large sample sizes may incorrectly be deemed poor or ill fit to observed data.

Furthermore, models have also been evaluated based on *normed chi-square* (Wheaton et al., 1977. *Cited In:* Hooper et al., 2008, p.54). In other words,  $\chi^2$ :df ratio or  $\chi^2 / df$ . In terms of a cut-off regarding normed chi-square, recommendations vary: (over page)

- 1) 2.0 (Tabachnick and Fidell, 2007. *Cited In:* Hooper et al., 2008, p.54) to 5.0 (Wheaton et al., 1977. *Cited In:* Hooper et al., 2008, p.54) and also,
- 2) 3:1 or less (Hair et al., 2006, p.748)

However the above guidelines are regarded as unclear (Kline, 2011, p.204; and thus, not highlighted in bold) and the normed chi-square is not advised (see Kline, 2011, p.204) for model evaluation.

#### 5.1.4.5.1.2 Root mean square error of approximation (RMSEA)

Existing literature as per RMSEA suggests a cut-off value less than .10 for model-fit:

- 1) **Close to or less than .06 is indicative of good model-fit (Hu and Bentler 1999, p.1, p.27; Brown, 2006. *Cited In:* Harrington, 2009, p.75)**
- 2) **less than .08 is reasonable error of approximation (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67; and Biswas, 2009, p.156)**
- 3) **Above .10 is indicative of poor model-fit (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137).**

#### 5.1.4.5.2 Incremental fit Indices

Incremental fit Indices were utilised in the research to evaluate the models. Incremental fit Indices are: 'a group of indices that do not use the chi-square in its raw form but compare the chi-square value to a baseline model' (Hooper et al., 2008, p.55). The incremental fit indices as shown in table 5.3 on page 170 follow in the sections below. Each of the fit indices are described in terms of advice regarding cut-off values or in other words, the empirical standards by which models were evaluated.

##### 5.1.4.5.2.1 Comparative fit index (CFI)

Existing literature as per CFI suggests a cut-off value greater than or equal to .90 for model-fit:

- 1) **Close to .95 (Hu and Bentler 1999, p.1, p.27; and Brown, 2006. *Cited In:* Harrington, 2009, p.75)**
- 2) **Greater than or equal to .90 (Hu and Bentler 1999, p.4; and Hu and Bentler, 1999. *Cited In:* Corn, 2010, p.363)**
- 3) **Poor or ill-fitting model with a CFI value of less than .90 (Hair et al., 2006, p.749)**

##### 5.1.4.5.2.2 Normed fit index (NFI)

Existing literature as per NFI suggests a cut-off value greater than or equal to .90 for model-fit:

- 1) **Greater than or equal to .90 (Bentler and Bonnet, 1980. *Cited In:* Hooper et al., 2008, p.55; and Segars and Grover 1993. *Cited In:* Corn, 2010, p.363).**

- 2) **Greater than or equal to .95 (Hu and Bentler, 1999. *Cited In:* Hooper et al., 2008, p.55) .**
- 3) **NFI with a value of 1.00 (Hair et al., 2006, p.749) can be interpreted as perfect model-fit.**

#### 5.1.4.5.2.3 Relative fit index (RFI)

Existing literature as per RFI suggests a cut-off value greater than .90 for model-fit:

- 1) **Greater than .90 (Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4)**
- 2) **Close to 1.0 (Bollen, 1986. *Cited In:* Corn, 2010, p.363)**

In the next section the measure of parsimony fit indices that was utilised namely, Akaike Information Criterion (AIC) is described; with application to advance the reader, specifically to factor structure C1 to C4 of the policy model (later sections; chapter 6) of this research study.

#### 5.1.4.5.3 Akaike Information Criterion (AIC)

For the policy model (chapter 6) there were factor structures that could be directly compared on a like-by-like basis that is, they contained the same Likert statements and the same number of Likert statements, differentiated only by the arrangement of the Likert statements (observed variables) to latent factors. The AIC statistic was utilised for this type of comparison; in other words, the AIC is:

**'used when comparing non-nested or non-hierarchical models estimated with the same data and indicates to the researcher which of the models is the most parsimonious. Smaller values suggest a good fitting, parsimonious model...'**  
(Hooper et al., 2008, p.56)

Utilisation of the AIC also requires a sample size of 200 (*see* Diamantopoulos and Siguaw, 2000. *Cited In:* Hooper et al., 2008, p.56); thus this research study is consistent with this recommendation as the sample size regarding the research is 264.

#### 5.1.4.6 Composite reliability and Cronbach's alpha

In addition to model-fit statistics, composite reliability (computed via Thinkingstatistics.com, 2014; Raykov, 1997. *Cited In:* Thinkingstatistics.com, 2014) and Cronbach's alpha ( $\alpha$ ) is reported with regards to observed variables for each of the latent factors. This information is to provide more comprehensive statistical information to the reader. A lower limit for each of the two reliability estimates are as follows:

- 1) **A lower limit for composite reliability (CR) is .6 as per Hair et al. (2006, p.778) or .7 as per Hair et al. (2006, p.778); and Worm (2012, p.162).**
- 2) **Cronbach's alpha reported lower limits are: .50 as per Nunnally (1978. *Cited In:* Field, 2013, p.709), .60 as per Robinson et al. (1991, [31]. *Cited In:* Hair et al., 2006, p.137) or .70 as per Field (2013, p.709); and Robinson et al. (1991, [31 and 32]. *Cited In:* Hair et al., 2006, p.137).**

### 5.1.5 Contribution of CFA to theory

The following table summarises the contribution of the confirmatory factor analyses (as per the statistical criteria) with model-fit, namely that existing theory and new theory are confirmed and thus a comprehension of teleworking in terms of socio-factor models is empirically validated.

#	Contribution:	Criteria (for opposite contribution):	Explanatory details:	Conclusion:
1)	Confirmation of existing theory	Statistical significance where $p \leq .05$ for each observed variable	In terms of statistical significance, probability $p \leq .05$ with regards to each link between observed measures and latent variables is required.	Observed measures do explain variance in latent variable and so, existing theory is consistent with literature. In other words, a confirmation of existing theory.
		Factor loadings are $\geq .60$	Each link between observed measures and latent variables has factor loading $\geq .60$	
2)	Contribution in terms of new theory	Statistical significance where $p \leq .05$ for each observed variable	In terms of statistical significance, probability $p \leq .05$ with regards to each link between observed measures and latent variables is required.	Observed variables do explain variance of a latent construct and to the same statistical standards applied as per existing theory (stated in 1 above). Hence, a new, viable theory is substantiated with statistical analyses. In other words, a confirmation of new theory.
		Factor loadings are $\geq .60$	Each link between observed measures and latent variables or latent constructs has factor loading $\geq .60$	
3)	Unified model in terms of comprehension (factor structures per maturity layer)	Statistical significance where probability level $p > .05$ regarding chi-square ( $\chi^2$ )	As per section heading: 'Model-fit statistics' (section 5.1.4.5)	Data shows consistency to the theoretical model namely that there is a viable, working model out of a combination of factors: those belonging to existing theory and those belonging to new theory, together in a single, coherent theoretical build. In other words, there is a comprehension of each layer of maturity statistically substantiated with CFA. In other words, an empirical validation (Garrett and Danziger, 2007, p.29) of socio-factors of the taxonomy per maturity layer (see section 2.1.3.4.3).
		CFA $\geq .90$		
		NFI $\geq .90$		
		RMSEA $< .10$		

Table 5.4: Contribution to the field of teleworking research

This concludes Chapter 5. Chapter 6 discusses the data of the sample 264 participants from the Council-Z report that was analysed in terms of confirmatory factor analysis. As aforementioned, models were built for each layer of maturity namely, *resource*, *policy* and *connectivity*.

## Chapter 6: Results of confirmatory factor analysis

### 6.1 Confirmatory Factor Analysis of remaining sample

#### 6.1.1 Introduction

A sample of 264 participants was considered for the confirmatory factor analysis. To recap thus far, confirmatory factor analyses were conducted in line with the theory chapter: with regards to model 1 socio-factors of teleworking (section 2.1.3.1) and model 2 teleworking maturity (section 2.1.3.2). Model 3 technical factors of teleworking (section 2.1.3.3) as stated earlier was out of scope for this research study. Model 4 taxonomy of teleworking (section 2.1.3.4) provides an overview of the three aforementioned theory models, 1, 2 and 3. To recap further, the theory moved into this analysis phase following the six steps as described below.

**Firstly, socio-factors were identified with regards to the theory that is, model 1 and as shown in earlier theory section 2.1.3.1.**

**Secondly, the socio-factors were grouped in terms of model 2 namely three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity*. Hence, there were potentially three theoretical models of socio-factors that could be created and tested with confirmatory factor analysis.**

**Thirdly, socio-measures were identified in terms of Likert statements with regards to socio-factors (see sections 3.3 and 2.1.3.1.4 respectively) and via a process of reduction in the number of Likert statements, a set of Likert statements (socio-measures) was brought forward for each of the three categories of maturity namely, resource, policy and connectivity.**

**Fourthly, a theoretical model of *resource*, *policy* and *connectivity* was constructed from these socio-measures of socio-factors (as described in earlier section 5.1.3) and the model was named factor structure A. In other words, there were three models named as, factor structure A of resource, factor structure A of policy and factor structure A of connectivity.**

**Fifthly, there were exclusions of socio-measures as per a) statistical ambiguities, b) a cut-off criterion with regards to factor loadings and c) new theory (logically created constructs) as a final step was excluded altogether. In contrast to exclusions, models (where stated) were optimised in terms of latent variable aggregation and clarification too. Following exclusions and optimisations as stated, a number of additional and descendent-type factor structures were identifiable. Thus each of the three models, resource, policy and connectivity had at least three variations in terms of factor structures. These variations or additional factor structures were named B, C and so on. Factor structures of each model, *resource*, *policy* and *connectivity* were tested via confirmatory factor analysis.**

**Sixthly, the confirmatory factor analysis showed a best fitting factor structure for each model, *resource*, *policy* and *connectivity*. A conclusion with regards to factor structures of each model and in terms of best-fitting models follows below.**

6.1.1.1 Best fitting resource model

There were four factor structures of resource namely, A, B, C and D. To conclude the resource model: the first two factor structures A and B had the least consistency with observed data compared to the latter two C and D which had higher standards of fit. Additionally, **factor structure D showed the highest level of convergence of theory to observed data compared to A, B and C. Thus, factor structure D was the best-fitting model. Diagrammatically and statistically, factor structure D is shown in figure 6.1 below, table 6.1 on page 176 and table 6.2 on page 176 (full details in section 6.2.6).**

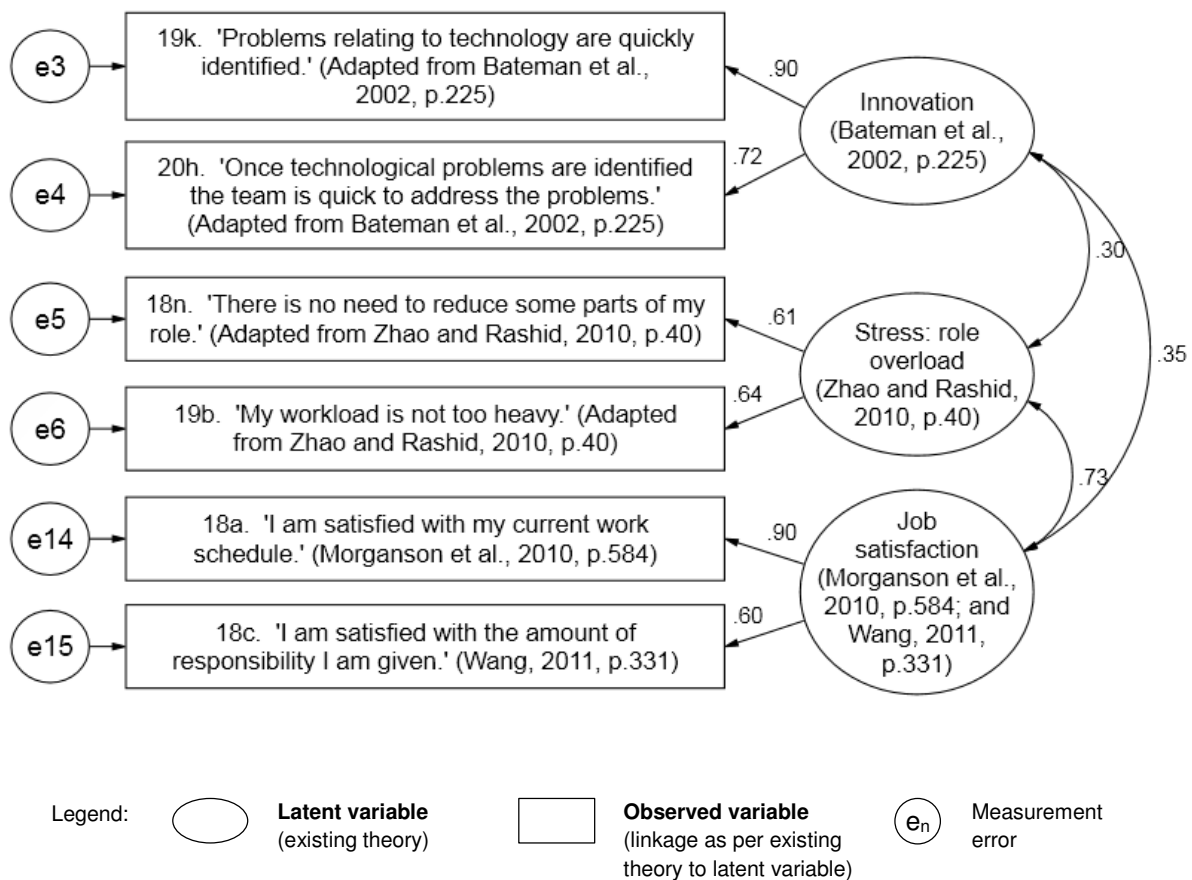


Figure 6.1: Best fitting resource model - factor structure D

Observed variables 18n and 19b are described in terms of stress as per Zhao and Rashid (2010, p.40) yet the Likert statements may be more adequately or precisely described simply as, role overload. To explain, stress may not be induced by job responsibilities per se, rather they may as stated in policy model later (see table 6.28 on page 215) be measured in terms of inconsistencies in human experience for example, 'I do not work under incompatible policies and guidelines.' (Adapted from Zhao and Rashid, 2010, p.40).



OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19k	← Innovation	.901	1.000 <sup>a</sup>	.795	.785
20h	← Innovation	.717	.815***		
18n	← Stress: role overload	.608	1.000 <sup>a</sup>	.558	.558
19b	← Stress: role overload	.636	1.067***		
18a	← Job satisfaction	.897	1.000 <sup>a</sup>	.726	.696
18c	← Job satisfaction	.596	.698***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.1: Factor loadings, CR and  $\alpha$  for factor structure D of resource

Statistics for Resource D	
Chi-square ( $\chi^2$ )	4.438
Degrees of freedom (df)	6
Probability level (p)	.618
CFI	1.000
RFI	.971
NFI	.988
RMSEA (90% CI)	.000 (.000 - .067) <sup>a</sup>

Note. n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.2: Model-fit statistics for factor structure D of resource

6.1.1.2 Best fitting policy model

There were six factor structures of policy; the first two were namely, A and B and the subsequent four factor structures were alternative models regarding C that is, factor structures C1, C2, C3 and C4.

To conclude the policy model: although factor structure A was most favourable in terms of model-fit statistics alone, descendent model and factor structure C2 had a higher level of clarification and simplification. In other words, following exclusion of ambiguities (that were associated with factor structure A), **the best fitting model** thereafter in terms of model-fit statistics **was factor structure C2. Diagrammatically and statistically, factor structure C2 is shown in figure 6.2 below, table 6.3 on page 178 and table 6.4 on page 178 (full details in section 6.3.5.3).**

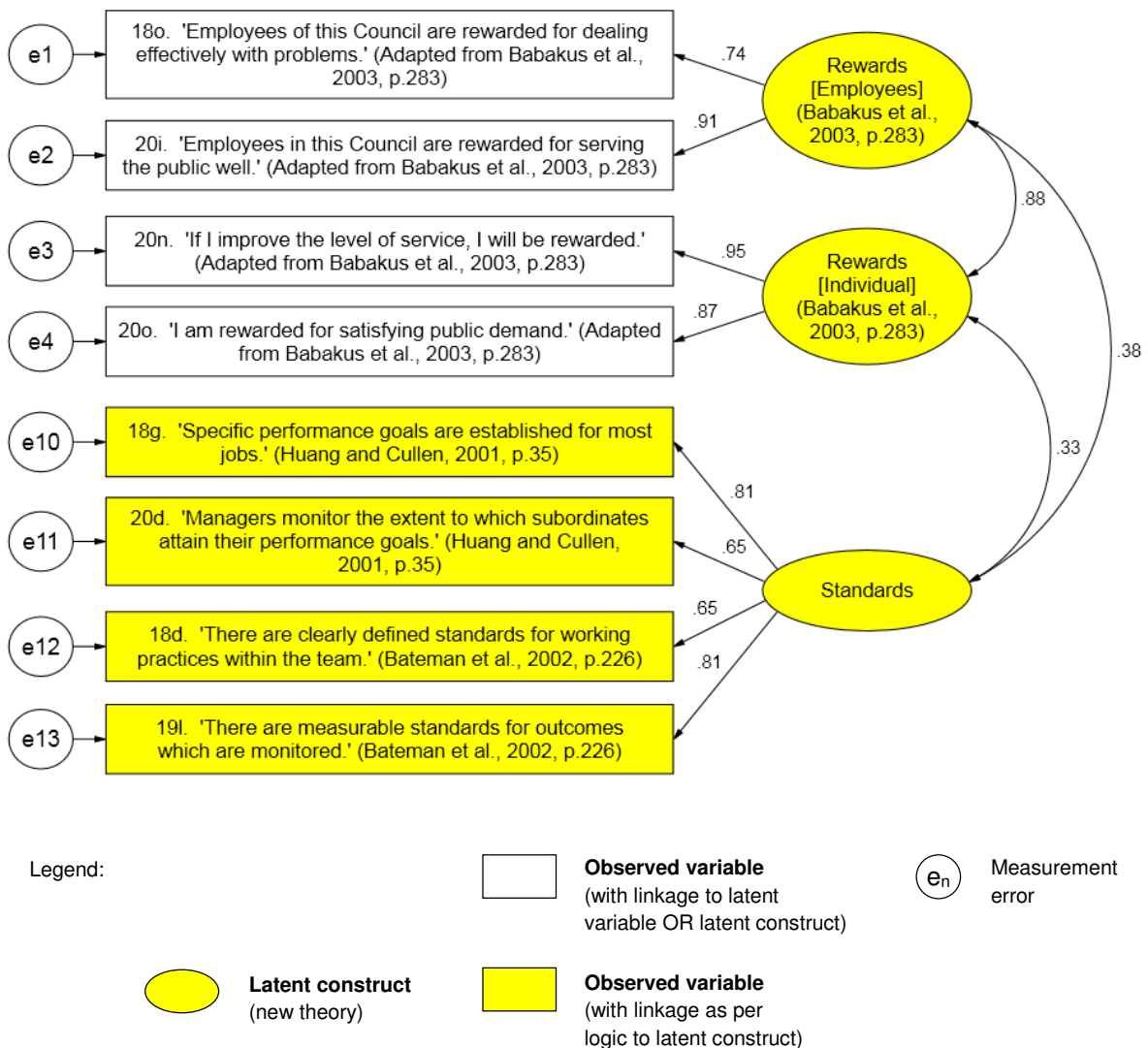


Figure 6.2: Best fitting policy model - factor structure C2

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards [Employees]	.742	1.000 <sup>a</sup>	.815	.804
20i	← Rewards [Employees]	.910	1.126***		
20n	← Rewards [Individual]	.950	1.000 <sup>a</sup>	.906	.904
20o	← Rewards [Individual]	.869	.936***		
18g	← Standards	.806	1.000 <sup>a</sup>	.820	.811
20d	← Standards	.649	.770***		
18d	← Standards	.645	.860***		
19l	← Standards	.810	.901***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint.

<sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.3: Factor loadings, CR and  $\alpha$  for factor structure C2 of policy

Statistics for Policy C2	
Chi-square ( $\chi^2$ )	46.027
Degrees of freedom (df)	17
Probability level ( $p$ )	.000
CFI	.974
RFI	.934
NFI	.960
RMSEA (90% CI)	.081 (.053 - .109) <sup>a</sup>
AIC	100.027

Note. n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.4: Model-fit statistics for factor structure C2 of policy

6.1.1.3 Best fitting connectivity model

There were three factor structures of connectivity namely, A, B and C. To conclude the connectivity: factor structure A was comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable). Contrary to factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values for good model-fit. Factor structure C was consistently within the cut-off values for good model-fit. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies). **Finally, and to conclude the connectivity model, factor structure B was the best fitting model that is, regarded as the most consistent in terms of model theory to observed data. Diagrammatically and statistically, factor structure B is shown in figure 6.3 below, table 6.5 on page 180 and table 6.6 on page 180 (full details in section 6.4.4).**

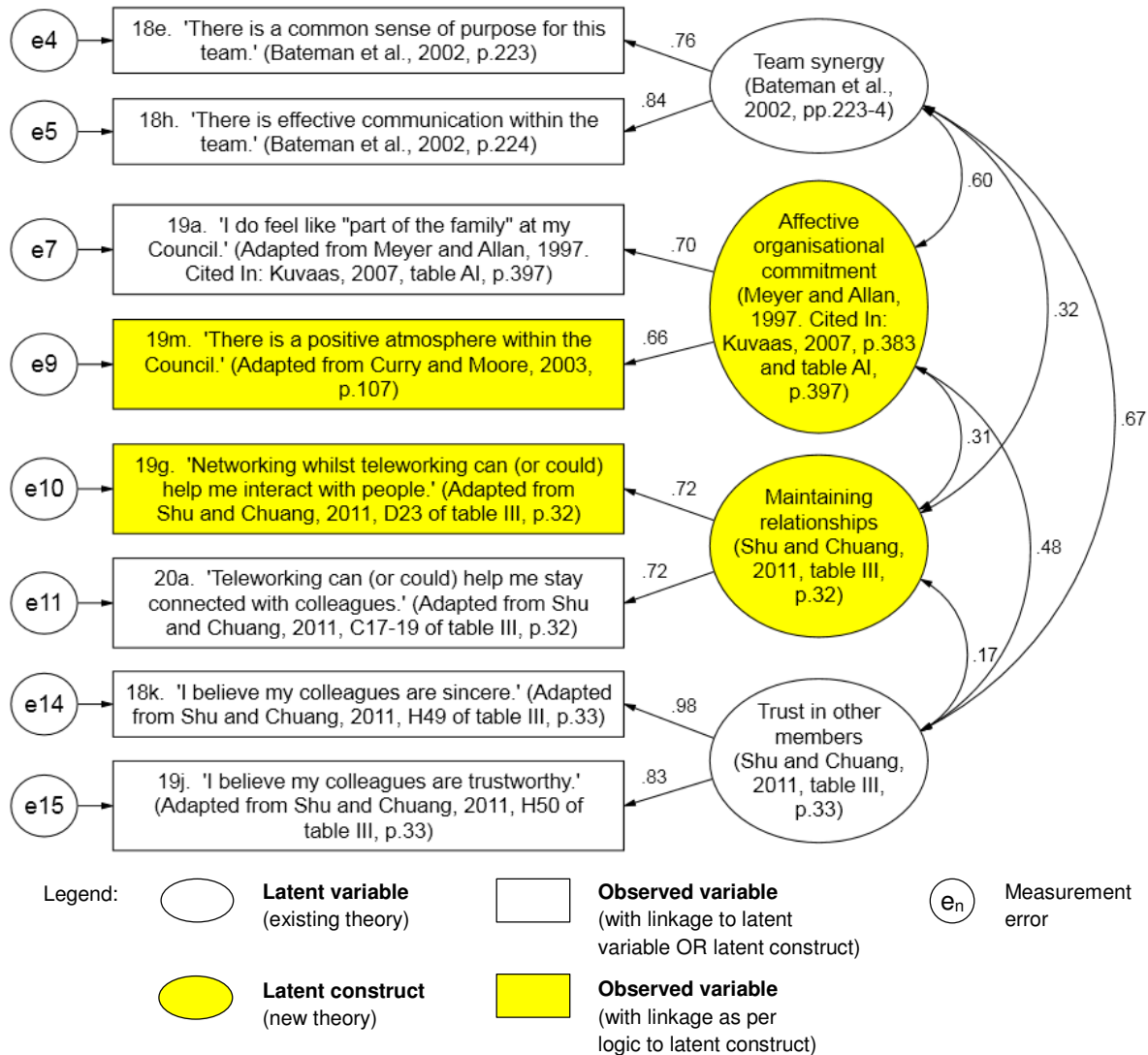


Figure 6.3: Best fitting connectivity model - factor structure B

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18e	← Team synergy	.761	1.000 <sup>a</sup>	.782	.780
18h	← Team synergy	.841	1.163***		
19a	← Affective organisational commitment	.702	1.000 <sup>a</sup>	.631	.630
19m	← Affective organisational commitment	.656	.908***		
19g	← Maintaining relationships	.719	1.000 <sup>a</sup>	.685	.684
20a	← Maintaining relationships	.724	1.043***		
18k	← Trust in other members	.983	1.000 <sup>a</sup>	.904	.898
19j	← Trust in other members	.829	.818***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).  
\*\*\* p < .001.

Table 6.5: Factor loadings, CR and  $\alpha$  for factor structure B of connectivity

Statistics for Connectivity B	
Chi-square ( $\chi^2$ )	10.362
Degrees of freedom (df)	14
Probability level ( $p$ )	.735
CFI	1.000
RFI	.973
NFI	.987
RMSEA (90% CI)	.000 (.000 - .044) <sup>a</sup>

Note. n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

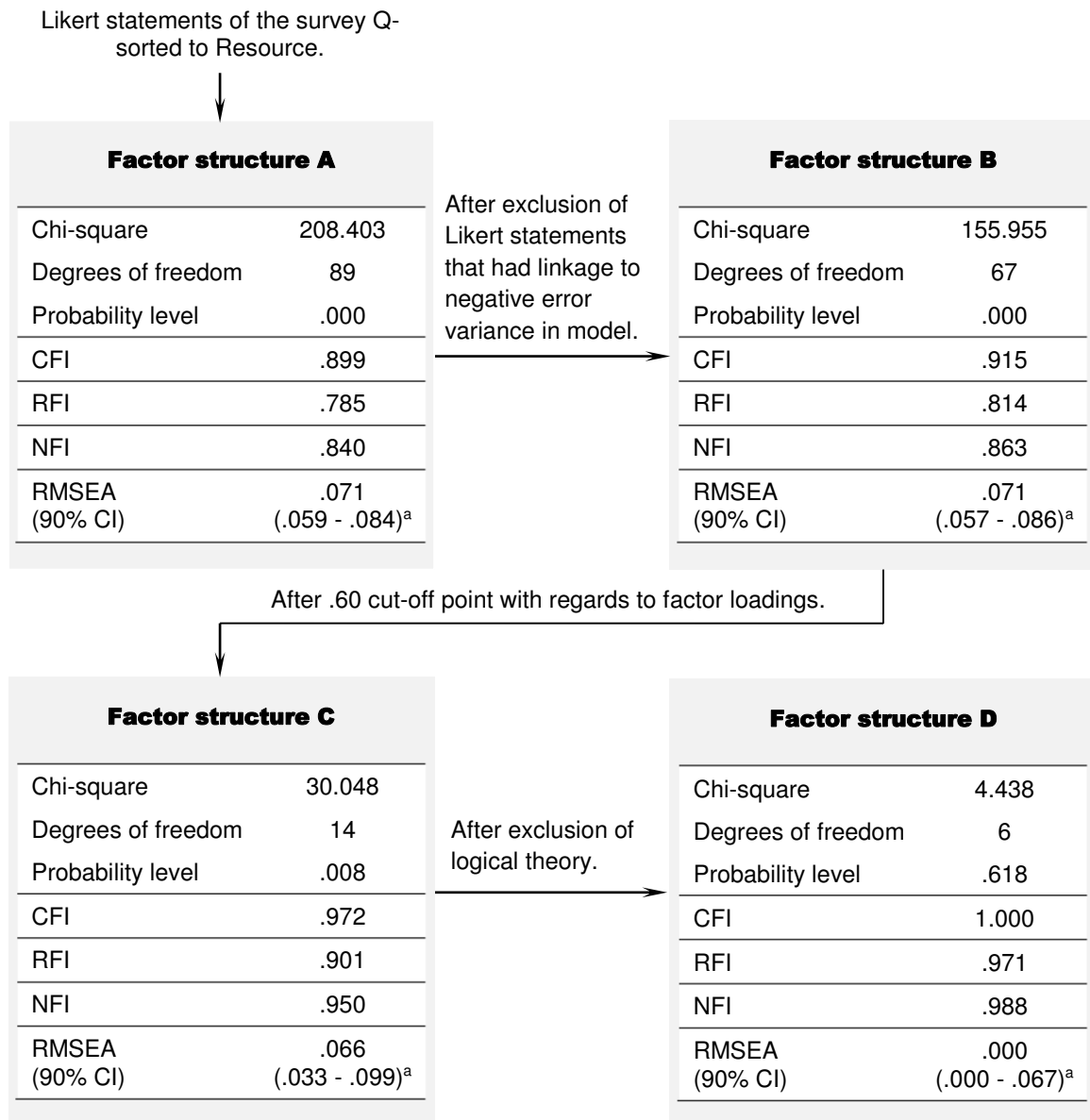
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.6: Model-fit statistics for factor structure B of connectivity

## 6.2 Resource model

### 6.2.1 Summary and conclusions of resource model

The resource model is proposed in terms of four factor structures A, B, C and D as shown in figure 6.4 below. In other words, the model for the resource layer was theoretically defined four times and tested with CFA. Each of the aforementioned factor structures B, C and D are descendent models of A and the process (in terms of a summary) is shown in figure 6.4 below.



Note. n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Figure 6.4: A summary of resource model in terms of four factor structures

Firstly, a CFA was conducted with all Likert statements with linkages to resource (as per the Q-sort study) and so, the first model proposition was factor structure A. A statistical error was identifiable from the output of the model namely, *negative error variance* associated with a single item of a two-item construct. In terms of model-fit, the extent to which there is a firm proposition for resource in terms of factor structure A is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics are below cut-off values suggesting that the model is not as consistent with observed data as may be expected. Furthermore, the aforementioned negative error variance (otherwise known as a Heywood case) presented the model as an inadmissible solution.

Secondly, factor structure B was the resultant model after exclusion of the aforementioned statistical ambiguity. In other words, the Likert statement in question was excluded from the model (and thus the construct too was excluded as per a minimum two item construct requirement as discussed earlier in section 5.1.4.3 on page 168). Again, the extent to which there is a firm proposition for resource in terms of factor structure B is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics were below cut-off values suggesting that the model is not as consistent with observed data as may be expected.

Thirdly, factor structure C was created following a statistical cut-off point namely, factor loadings with .60 or above are retained (as discussed earlier in section 5.1.3.3.7 on page 166). There is a proposition for resource in terms of factor structure C; comparably an improvement over earlier factor structures A and B. Each of the absolute and incremental fit indices were within the parameters associated with model-fit with the exception of chi-square which was found to be significant ( $p$ -value was not greater than .05).

Fourthly, a model was created after exclusion of logical theory and the resultant factor structure D was also a good model-fit. There is a firm proposition for resource in terms of factor structure D; comparably a large improvement over the three earlier models, factor structures A, B and C. For each of the absolute and incremental fit statistics factor structure D was consistently within the cut-off values for good model-fit.

Finally and to conclude the summary, the first two factor structures A and B had the least consistency with observed data compared to the latter two C and D which had higher standards of fit. Additionally, factor structure D showed the highest level of convergence of theory to observed data compared to A, B and C. Thus, factor structure D was the best-fitting model.

## **6.2.2 Introduction to factor structures**

The development of each factor structure for resource is detailed in the following sections. For each factor structure, there is a CFA diagram to show the theoretical build and factor loadings in addition to **a legend to explain the diagram with clarification: (over page)**

- 1) **observed measures (Likert statements) are shown in terms of a rectangle and latent factors, in terms of an oval or circle.**
- 2) **components of the diagram that are representative of a) existing theory are shown with a white background and b) new theory are shown highlighted in yellow.**

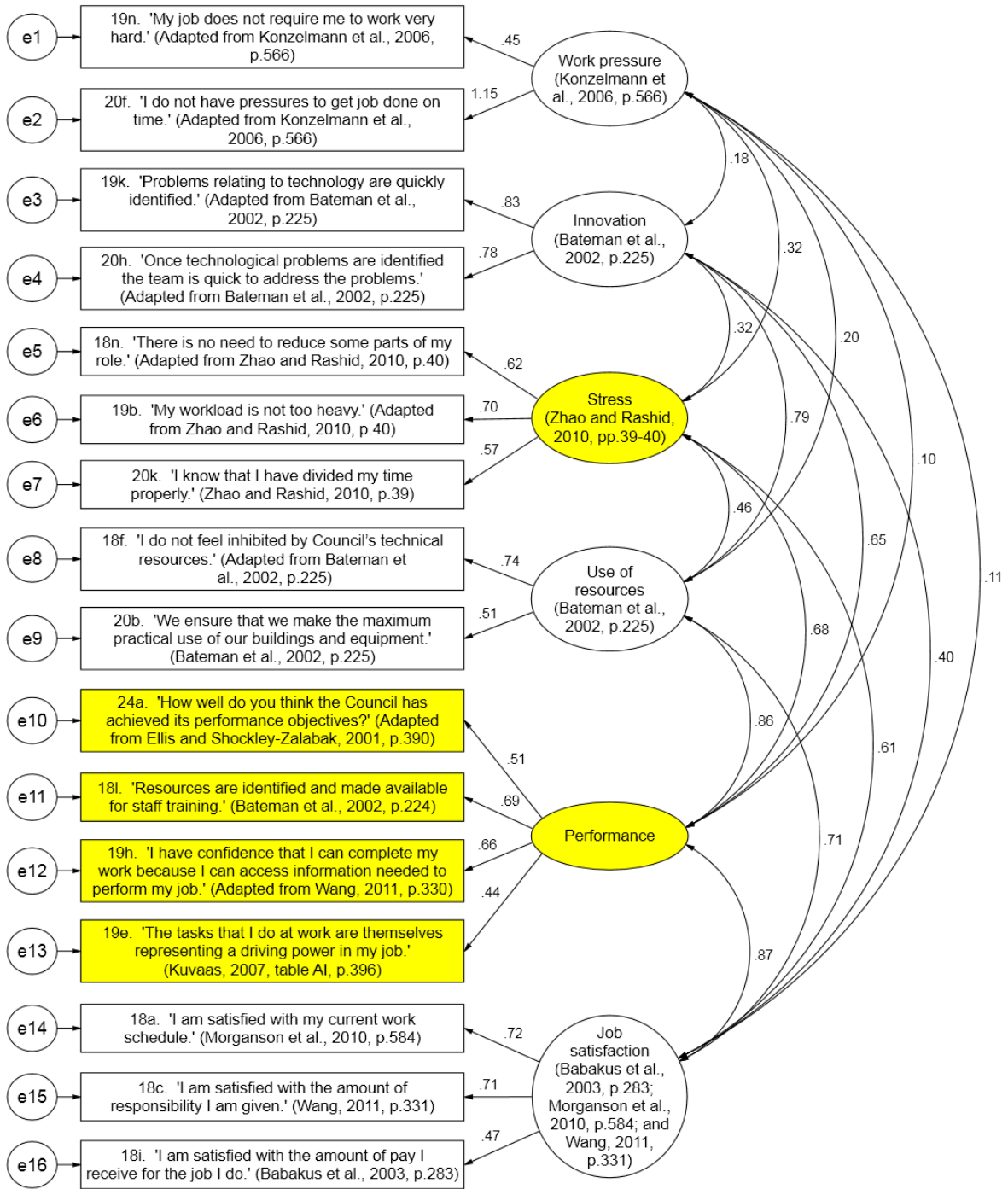
To advance information regarding the following sections: the theoretical build of each factor structure is explained in terms of build aspects – earlier section 5.1.3.2, (heading ‘Existing theory’) on page 161 and section 5.1.3.3 (heading ‘New theory (logical model development)’ on page 162.

### **6.2.3 Factor structure A**

Following the Q-sort study (see earlier section 3.6 on page 128) there were sixteen Likert statements available for creating a resource model. The first CFA was conducted with the sixteen Likert statements and the product is factor structure A as shown diagrammatically in figure 6.5 on page 184 with further statistical information in table 6.7 on page 185.

The theoretical build of factor structure A is explained after the aforementioned figure and table in terms of the two broad categories of explanation: existing theory and new theory (as per earlier sections, 5.1.3.2 on page 161 and 5.1.3.3 on page 162, respectively).





Legend: **Latent variable** (existing theory)      **Observed variable** (with linkage to latent variable OR latent construct)      **Measurement error**

**Latent construct** (new theory)      **Observed variable** (with linkage as per logic to latent construct)

Figure 6.5: Resource - factor structure A

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19n	← Work pressure	.446	1.000 <sup>a</sup>	.843	.676
20f	← Work pressure	1.151	2.380*		
19k	← Innovation	.830	1.000 <sup>a</sup>	.786	.785
20h	← Innovation	.778	.960***		
18n	← Stress	.624	1.000 <sup>a</sup>	.663	.669
19b	← Stress	.697	1.138***		
20k	← Stress	.565	.853***		
18f	← Use of resources	.741	1.000 <sup>a</sup>	.571	.549
20b	← Use of resources	.515	.611***		
24a	← Performance	.512	1.000 <sup>a</sup>	.670	.665
18l	← Performance	.693	2.007***		
19h	← Performance	.661	1.611***		
19e	← Performance	.443	1.019***		
18a	← Job satisfaction	.718	1.000 <sup>a</sup>	.671	.637
18c	← Job satisfaction	.705	1.031***		
18i	← Job satisfaction	.473	.798***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\* p < .05. \*\*\* p < .001.

Table 6.7: Factor loadings, CR and  $\alpha$  for factor structure A of resource

### 6.2.3.1 Theoretical build in terms of existing theory

In this section, existing theory (as applicable to factor structure A) is explained, namely:

- 1) **four latent variables (see figure 6.6 on page 186) and;**
- 2) **the four corresponding aspects of existing theory.**

For a list of all aspects of existing theory see figure 5.2 on page 161. Each section below explains the theoretical build of factor structure A; the sections follow the above protocol namely, that the section is named in terms of the latent variable in question followed by the aspect of existing theory named in parenthesis after the section heading.

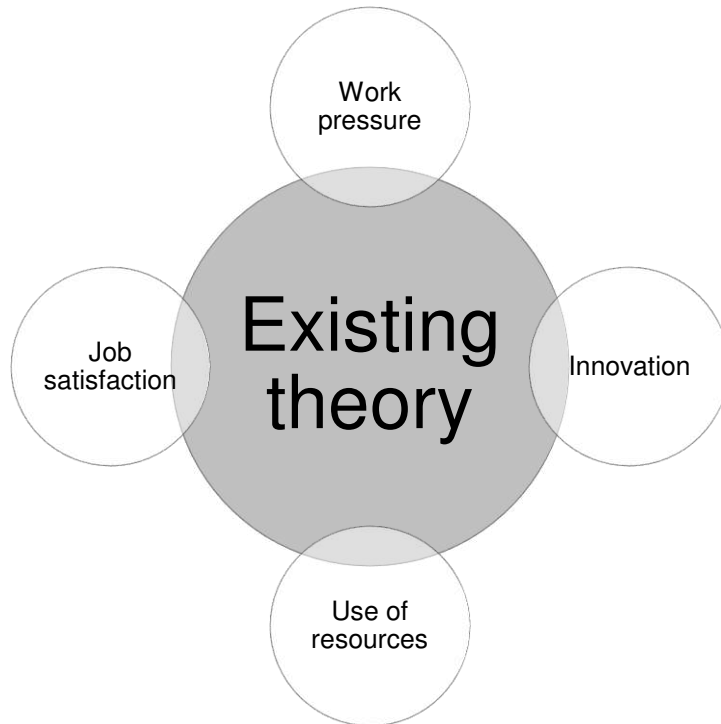


Figure 6.6: Existing theory latent variables as per factor structure A [Resource]

6.2.3.1.1 Work pressure [direct grouping]

Likert statements 19n and 20f (see table 6.8 below; earlier figure 6.5) as per existing theory are defined in terms of work pressure (Konzelmann et al., 2006, p.566). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, work pressure.

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Work pressure</b> (Konzelmann et al., 2006, p.566).	19n	'My job does not require me to work very hard.' (Adapted from Konzelmann et al., 2006, p.566)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	20f	'I do not have pressures to get job done on time.' (Adapted from Konzelmann et al., 2006, p.566)	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.8: Measurement of work pressure

### 6.2.3.1.2 Innovation [direct grouping]

Likert statements 19k and 20h (see table 6.9 below; earlier figure 6.5) as per existing theory are defined in terms of innovation (Bateman et al., 2002, p.225). Hence, the two observed variables are directly grouped from existing literature as an explanation of the underlying latent variable identified as, innovation.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Innovation</b> (Bateman et al., 2002, p.225).	19k	'Problems relating to technology are quickly identified.' (Adapted from Bateman et al., 2002, p.225).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	20h	'Once technological problems are identified the team is quick to address the problems.' (Adapted from Bateman et al., 2002, p.225).	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.9: Measurement of innovation

### 6.2.3.1.3 Use of resources [direct grouping]

Likert statements 18f and 20b (see table 6.10 below; earlier figure 6.5) as per existing theory are defined in terms of innovation (Bateman et al., 2002, p.225). Hence, the two observed variables are directly grouped from existing literature as an explanation of the underlying latent variable identified as, use of resources.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Use of resources</b> (Bateman et al., 2002, p.225).	18f	'I do not feel inhibited by Council's technical resources.' (Adapted from Bateman et al., 2002, p.225)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	20b	'We ensure that we make the maximum practical use of our buildings and equipment.' (Bateman et al., 2002, p.225)	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.10: Measurement of use of resources

#### 6.2.3.1.4 Job satisfaction [re-grouping]

Likert statements 18a, 18c and 18i (see table 6.11 below; earlier figure 6.5) as per existing theory are defined in terms of job satisfaction (Babakus et al., 2003, p.283; Morganson et al., 2010, p.584; and Wang, 2011, p.331, respectively). The grouping of the observed variables does not follow a logically dependent path that is, the observed variables are consistent with existing theory; albeit each observed measure is defined as job satisfaction by a different author. Hence, the three observed measures followed a consistency and thus, re-grouped as per this research study as an explanation of the underlying latent variable identified as, job satisfaction.

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Job satisfaction</b> (Babakus et al., 2003, p.283; Morganson et al., 2010, p.584; and Wang, 2011, p.331)	18a	'I am satisfied with my current work schedule.' (Morganson et al., 2010, p.584).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	18c	'I am satisfied with the amount of responsibility I am given.' (Wang, 2011, p.331).	
	18i	'I am satisfied with the amount of pay I receive for the job I do.' (Babakus et al., 2003, p.283).	

Table 6.11: Measurement of job satisfaction

#### 6.2.3.2 Theoretical build in terms of new theory

In this section, new theory (as applicable to factor structure A) is explained, namely:

- 1) **two latent constructs (see figure 6.7 on page 189) and;**
- 2) **the two corresponding aspects of new theory (see also figure 5.3 on page 163).**

For a list of all aspects of new theory see figure 5.3 on page 163. Each section below explains the theoretical build of factor structure A; the sections follow the above protocol namely, that the section is named in terms of the latent construct in question followed by the aspect of new theory named in parenthesis after the section heading.

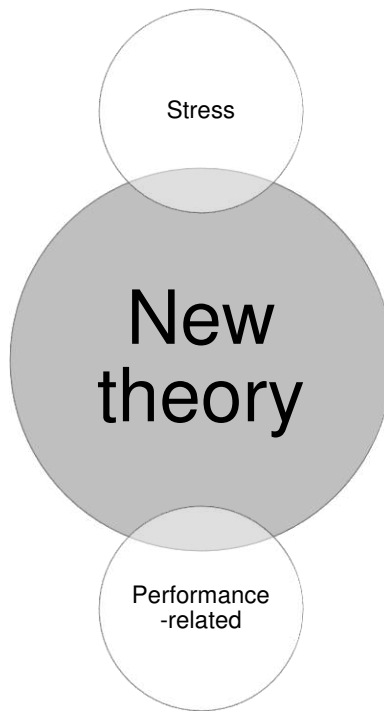


Figure 6.7: New theory latent constructs as per factor structure A [Resource]

#### 6.2.3.2.1 Stress [latent construct]

The three Likert statements, 18n, 19b and 20k (see table 6.12 below; earlier figure 6.5) are identified as indicators of stress (Zhao and Rashid, 2010, pp.39-40). In terms of existing theory, the former two 18n and 19b are linked to role overload and the latter of the three, 20k, is specifically linked to role ambiguity (Zhao and Rashid, 2010, pp.39-40). The Likert statement 20k (regarding role ambiguity) is logically grouped (as per this research study) with 18n and 19b (role overload) regarding an underlying theme named, stress.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Stress</b> (Zhao and Rashid, 2010, pp.39-40)	18n	'There is no need to reduce some parts of my role.' (Adapted from Zhao and Rashid, 2010, p.40)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	19b	'My workload is not too heavy.' (Adapted from Zhao and Rashid, 2010, p.40)	
	20k	'I know that I have divided my time properly.' (Zhao and Rashid, 2010, p.39)	

Table 6.12: Measurement of stress

To note however, Likert statements 18n and 19b may be more adequately or precisely described simply as, role overload. To explain, stress may not be induced by job responsibilities per se, rather they may as stated in policy model later (see table 6.28 on page 215) be measured in terms of inconsistencies in human experience for example, 'I do not work under incompatible policies and guidelines.' (Adapted from Zhao and Rashid, 2010, p.40).

#### 6.2.3.2.2 Performance [latent construct]

The four observed measures namely, Likert statements 24a, 18l, 19h and 19e (see table 6.13; figure 6.5) are not directly grouped as per existing literature; each of the measures belong to different latent variables namely:

- 1) *perceived organisational effectiveness* (Ellis and Shockley-Zalabak, 2001, p.390),
- 2) *skills* (Bateman et al., 2002, p.224),
- 3) *remote-working self-efficacy* (Wang, 2011, p.330) and
- 4) *intrinsic motivation* (Kuvaas, 2007, table A1, p.396), respectively.

The research study firstly looks to the four Likert statements as a collective whole and finds that the statements follow a theme namely, in relation to performance. Secondly and in addition, this research study turns to the latent variables for each Likert statement as listed above and finds a consistency to (and further support) the name as given to the group of four items. Thirdly, the four aforementioned latent variables are taken respectively, in terms of a theoretical proposition (by example), that an organisation will perform well when the following are in place:

- 1) Objective setting practices (*perceived organisational effectiveness*; Ellis and Shockley-Zalabak, 2001, p.390)
- 2) Self-development (*skills*; Bateman et al., 2002, p.224)
- 3) Information accessibility (*remote-working self-efficacy*; Wang, 2011, p.330) and
- 4) Organisational drivers (*intrinsic motivation*; Kuvaas, 2007, table A1, p.396), respectively.

Thus, the four observed variables are logically grouped together to explain an underlying theme consistent with performance as shown in table 6.13 on page 191.

Following the above, the following question is asked in this research study regarding the theoretical build, factor structure A:

**Is the four aforementioned observed measures unique to latent construct performance or alternatively can there be linkages of the observed variables to other latent factors of the model?**

Performance is positively linked to latent variables, *use of resources* and *job satisfaction* as shown in terms of the latent factor to factor correlation scores, .86 and .87 respectively. The strength of the correlation poses two questions:

- 1) Are the correlations scores sufficiently high as to suggest that the observed variables of each factor are measurements of the same factor?
- 2) In other words, can the two factors be simplified in terms of a merger into to a single factor?

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Performance-related</b>	24a	'How well do you think the Council has achieved its performance objectives?' (Adapted from Ellis and Shockley-Zalabak, 2001, p.390).	1 = Completely unachieved 2 = Mostly unachieved 3 = Somewhat unachieved 4 = Unsure, Undecided, Neutral or Indifferent 5 = Somewhat achieved 6 = Mostly achieved 7 = Almost completely achieved
	18l	'Resources are identified and made available for staff training.' (Bateman et al., 2002, p.224).	
	19h	'I have confidence that I can complete my work because I can access information needed to perform my job.' (Adapted from Wang, 2011, p.330).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	19e	'The tasks that I do at work are themselves representing a driving power in my job.' (Kuvaas, 2007, table A1, p.396).	

Table 6.13: Measurement of performance

In short, the answer to the questions above, is that such an action is not advised and the explanation follows: although the two aforementioned latent factor to factor correlations statistics are highly positive, they are not sufficiently high as to warrant merger of the constructs into a single construct; this viewpoint is supported in terms of theory where the factors are distinctly different perceptions.

Furthermore, an example in terms of later policy model and factor structure C1 is brought forward here to clarify the above: policy model C1 contains two latent factor to factor correlations .88 and .96



(see figure 6.16 on page 225). The factors in the model are combined in turn, into a single construct and thereby producing two alternative models, C2 and C3 (see figure 6.17 on page 230 and figure 6.18 on page 235, respectively):

- 1) Factor structure C2 has a merger of two constructs that had a high latent factor to factor correlation namely, .96 in former factor structure C1.
- 2) Factor structure C3 also has a merger of two constructs that had a high latent factor to factor correlation namely, .88 in former factor structure C1.

Factor structure C2 was better fitting (overall and in terms of AIC) compared to Factor structure C3. Factor structure C2 also compared favourably over factor structure C1 where none of the highly correlated factors were merged. Hence, it follows that a comparable latent factor to factor correlation as per the policy model sets an example here in terms of the decision to take: the aforementioned correlation strengths, .86 and .87, regarding factors *use of resources* and *job satisfaction*, respectively are not sufficiently high or not as high as .96, to warrant merger of the latent factors into a single latent construct. In other words, based on the learning outcomes as per the policy model as discussed above, grouping of the two lots of constructs (as would be actioned for factor structure B) would at best not be an improvement over factor structure A.

Following the above explanations in terms of existing theory and new theory regarding the theoretical build of factor structure A, the model is now evaluated in terms of consistency to observed data (model-fit statistics).

#### 6.2.3.3 Model-fit statistics

In terms of consistency of data to the theoretical model, this research study refers to the model-fit statistics in table 6.14 on page 193. Contrary to model-fit, the chi-square ( $\chi^2$ ) statistic was large and significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.14.

CFI value was indicative of model-fit (at the .90 threshold as per Hu and Bentler 1999, p.4; and Hu and Bentler, 1999. *Cited In*: Corn, 2010, p.363). However, the two following fit statistics were below what would be deemed as model-fit namely: 1) NFI (below the .90 threshold as per Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.55; and Segars and Grover 1993. *Cited In*: Corn, 2010, p.363) and 2) RFI (below the .90 threshold as per Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

**Statistics for Resource A**

Chi-square ( $\chi^2$ )	208.403
Degrees of freedom (df)	89
Probability level ( $p$ )	.000
CFI	.899
RFI	.785
NFI	.840
RMSEA (90% CI)	.071 (.059 - .084) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.14: Model-fit statistics for factor structure A of resource

Although, RMSEA was within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137) the ‘solution is not admissible’ was reported in AMOS as per a *negative error variance*. The aforementioned error is a Heywood case (Kline, 2011, p.232) and is linked to latent variable *work pressure* (detailed in the next section regarding descendant model, factor structure B).

#### 6.2.3.4 Key conclusion

To conclude, the extent to which there is a firm proposition for resource in terms of factor structure A is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics are below cut-off values suggesting that the model is not as consistent with observed data as may be expected. Furthermore, a source of the problem associated with poor fit regarding the model is a negative error variance associated with latent variable *work pressure* (otherwise known as a Heywood case); thus, the model was an inadmissible solution.

The observed variable with linkages to the aforementioned Heywood case was excluded (Hair et al., 2006, p.794). Following this refinement and optimisation, the outcome was factor structure B (with improved model-fit statistics) as detailed in the section below.

## 6.2.4 Factor structure B

Factor structure B is shown in figure 6.8 on page 195; the model is the result of exclusion of the latent variable, *work pressure*; details further below. Aspects of new theory are described earlier in figure 5.3 on page 163. In the section below, the aspect of figure 5.3 that apply to factor structure B are identified and stated in parenthesis after the section heading.

### 6.2.4.1 *Work pressure [exclusion of statistical ambiguity]*

Output regarding earlier factor structure A showed that the '*solution is not admissible*': a negative error variance pertained to measurement error, e2. Measurement error, e2 in turn was linked to observed variable and Likert statement, 20f. Furthermore, Likert statement 20f shows a factor loading above 1.00 and this is an statistical ambiguity; more precisely described as a Heywood case (Hair et al., 2006, p.771; Kline, 2011, p.158). For this reason (and at this stage of the research) Likert statement 20f was excluded (Hair et al., 2006, p.794) from factor structure A; the exclusion also results in the associated latent variable, *work pressure* excluded from the model too (as per a minimum two item per factor requirement in factor analyses per se).

The resultant (descendent) model is factor structure B. Factor structure B is shown in figure 6.8 on page 195 with further statistical information in table 6.15 on page 196.

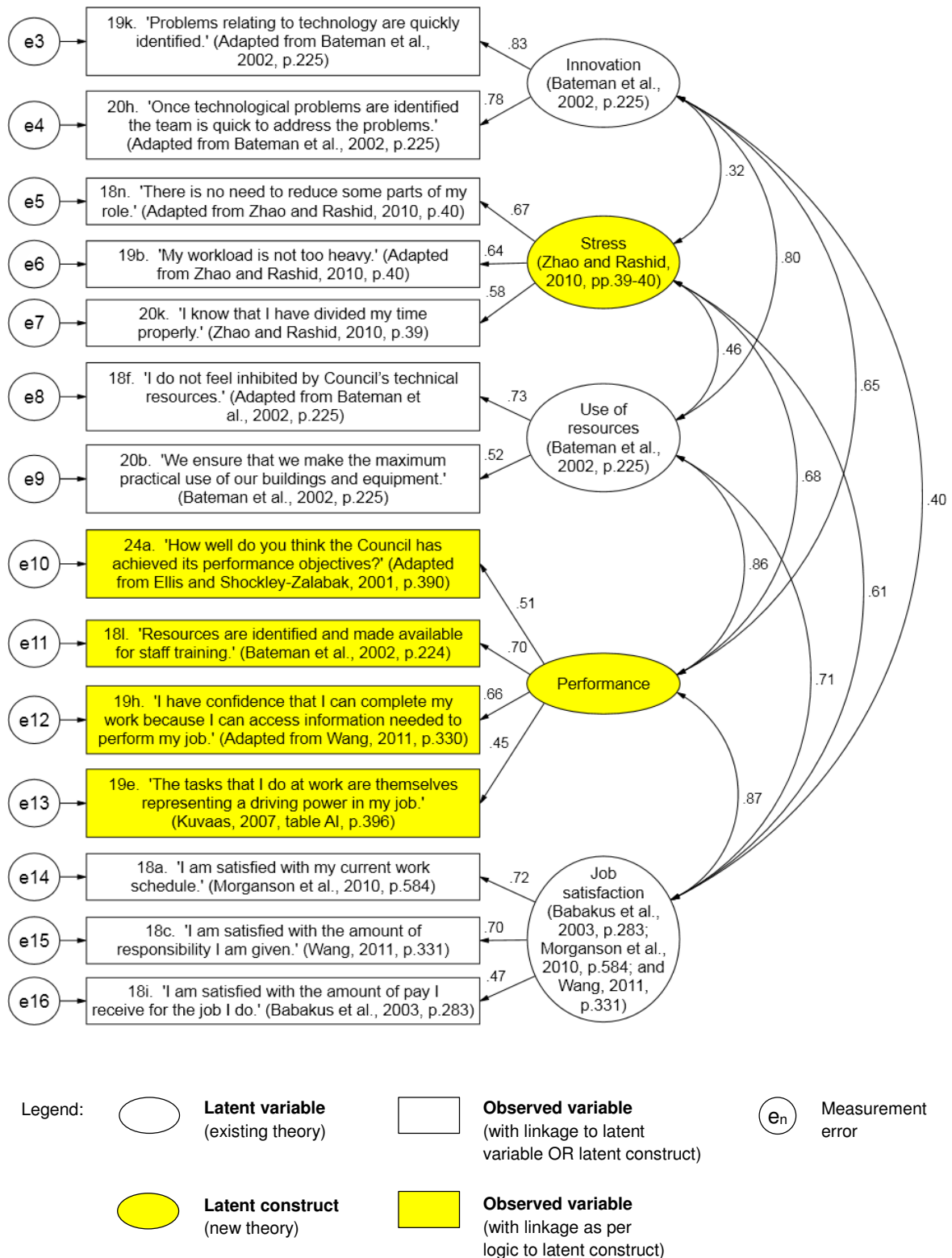


Figure 6.8: Resource - factor structure B

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19k	← Innovation	.827	1.000 <sup>a</sup>	.786	.785
20h	← Innovation	.781	.967***		
18n	← Stress	.674	1.000 <sup>a</sup>	.666	.669
19b	← Stress	.643	.973***		
20k	← Stress	.578	.808***		
18f	← Use of resources	.734	1.000 <sup>a</sup>	.569	.549
20b	← Use of resources	.520	.623***		
24a	← Performance	.512	1.000 <sup>a</sup>	.671	.665
18l	← Performance	.697	2.020***		
19h	← Performance	.657	1.605***		
19e	← Performance	.445	1.027***		
18a	← Job satisfaction	.718	1.000 <sup>a</sup>	.671	.637
18c	← Job satisfaction	.704	1.030***		
18i	← Job satisfaction	.474	.800***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.15: Factor loadings, CR and  $\alpha$  for factor structure B of resource

The above model factor structure B is evaluated in terms of consistency to observed data (model-fit statistics) below.

#### 6.2.4.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.16 on page 197. Contrary to model-fit, the chi-square ( $\chi^2$ ) statistic was large and significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.16 on page 197.

**Statistics for Resource B**

Chi-square ( $\chi^2$ )	155.955
Degrees of freedom (df)	67
Probability level ( $p$ )	.000
CFI	.915
RFI	.814
NFI	.863
RMSEA (90% CI)	.071 (.057 - .086) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.16: Model-fit statistics for factor structure B of resource

Exclusion of the aforementioned latent variable, *work pressure* resulted in an admissible model with marginally improved model-fit statistics. Statistics for factor structure B had improved compared to factor structure A: CFI from .899 to .915, RFI from .785 to .814 and NFI from .840 to .863.

As per earlier factor structure A, the CFI value is indicative of model-fit (above .90 as per Hu and Bentler 1999, p.4; and Hu and Bentler, 1999. *Cited In:* Corn, 2010, p.363). However, the two following fit statistics were below what would be deemed as model-fit namely: 1) NFI (below the .90 threshold as per Bentler and Bonnet, 1980. *Cited In:* Hooper et al., 2008, p.55; and Segars and Grover 1993. *Cited In:* Corn, 2010, p.363) and 2) RFI (below the .90 threshold as per Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4).

RMSEA was within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137).

#### 6.2.4.3 Key conclusion

To conclude, the extent to which there is a firm proposition for resource in terms of factor structure B is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics were below cut-off values suggesting that the model is not as consistent with observed data as may be expected. However, factor structure B was an admissible solution albeit with the caveats as aforementioned above.

## 6.2.5 Factor structure C

Factor structure C is shown in figure 6.9 on page 199; the model is the result of applying the cut-off criterion as detailed below. Aspects of new theory are described earlier in figure 5.3 on page 163. In the section below, the aspect of figure 5.3 that applies to factor structure C is identified and stated in parenthesis after the section heading. An explanation regarding the applicable aspect follows.

### 6.2.5.1 Factor loadings [cut-off criterion]

As aforementioned in the earlier summary, a cut-off criterion is adopted: greater than or equal to .60 (for details see section 5.1.3.3.7 on page 166) with regards to factor loadings. After applying the cut-off to factor structure B, the observed variables as shown in table 6.17 below were excluded:

ID	Likert statement (Observed variable)	Factor loading	Description
20b.	'We ensure that we make the maximum practical use of our buildings and equipment.' (Bateman et al., 2002, p.225).	.52	Less than .60 cut-off criterion thus, excluded.
18f.	'I do not feel inhibited by Council's technical resources.' (Adapted from Bateman et al., 2002, p.225).	.73	Two Likert statements, 20b and 18f explain latent variable, <i>use of resources</i> <sup>a</sup> . Following the above exclusion of the former (20b) and as per 2:1 minimum, indicators to latent factor requirement, Likert statement 18f was thus, necessarily excluded too. Hence, latent variable, <i>use of resources</i> is excluded from the model.
24a.	'How well do you think the Council has achieved its performance objectives?' (Adapted from Ellis and Shockley-Zalabak, 2001, p.390).	.51	Less than .60 cut-off criterion thus, excluded.
19e.	'The tasks that I do at work are themselves representing a driving power in my job.' (Kuvaas, 2007, table AI, p.396).	.45	Less than .60 cut-off criterion thus, excluded.
18i.	I am satisfied with the amount of pay I receive for the job I do.' (Babakus et al., 2003, p.283),	.47	Less than .60 cut-off criterion thus, excluded.

<sup>a</sup>As stated earlier in section 6.2.3.1.3 on page 187 regarding factor structure A.

Table 6.17: Exclusions as applicable to factor structure B [Resource] following cut-off criterion

The resultant model following the above was factor structure C as shown in figure 6.9 below with further statistical information in table 6.18 on page 200.

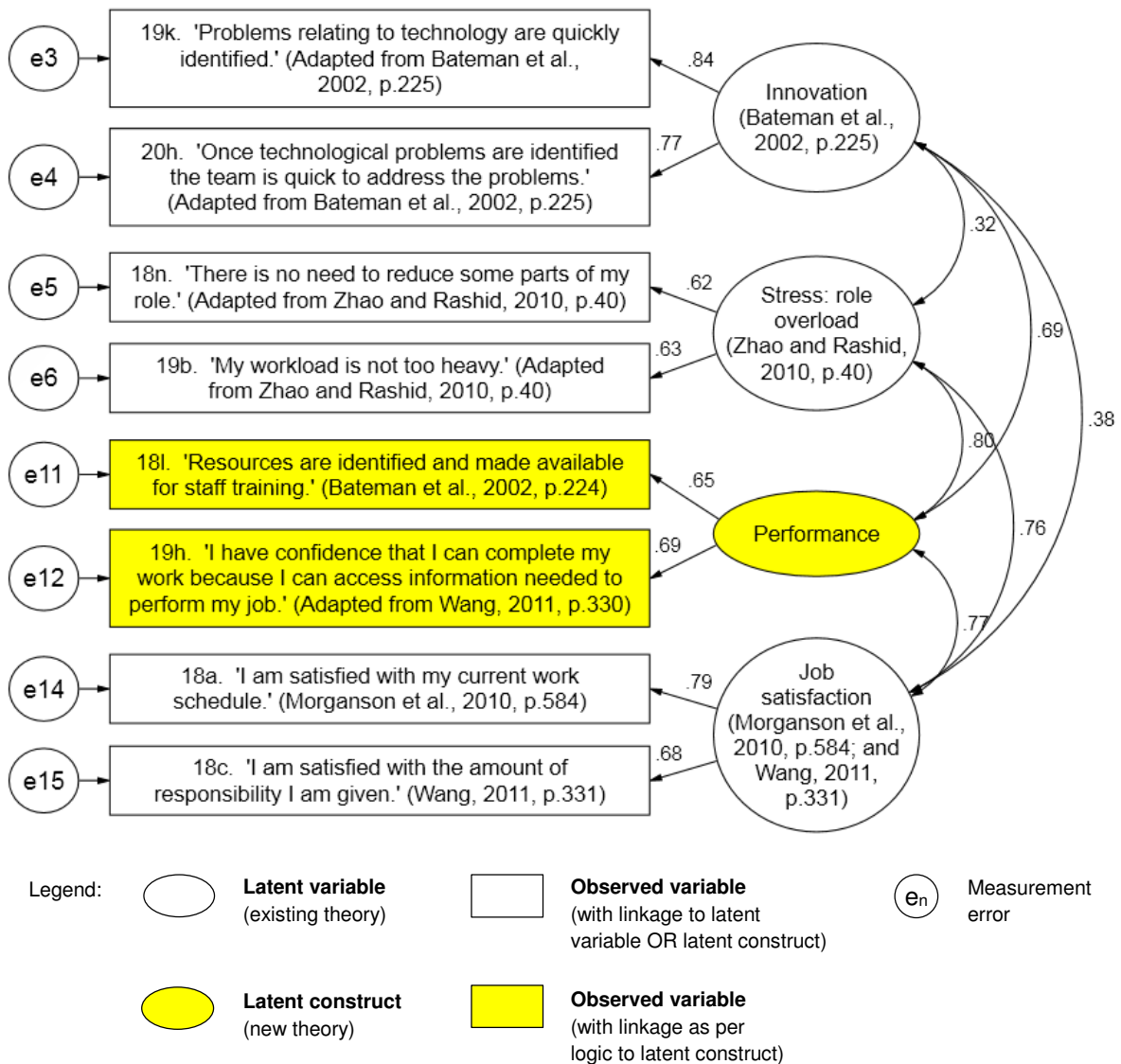


Figure 6.9: Resource - factor structure C



OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19k	← Innovation	.839	1.000 <sup>a</sup>	.786	.785
20h	← Innovation	.770	.940***		
18n	← Stress: role overload	.617	1.000 <sup>a</sup>	.558	.558
19b	← Stress: role overload	.627	1.037***		
18l	← Performance	.653	1.000 <sup>a</sup>	.621	.614
19h	← Performance	.689	.888***		
18a	← Job satisfaction	.791	1.000 <sup>a</sup>	.701	.696
18c	← Job satisfaction	.676	.897***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.18: Factor loadings, CR and  $\alpha$  for factor structure C of resource

The model is evaluated in terms of consistency to observed data (model-fit statistics) below.

### 6.2.5.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.19 on page 201. Although, the chi-square ( $\chi^2$ ) statistic was not large as seen in earlier factor structures (Hair et al., 2006, p.746), contrary to model-fit  $\chi^2$  was significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so the model is evaluated in terms of the additional statistics as provided in table 6.19.

Following the .60 cut-off with regards to factor loadings, statistics for factor structure C had improved comparably to factor structure B that is, an increase in CFI from .915 to .972, RFI from .814 to .901 and NFI from .863 to .950. Contrary to the evaluations of earlier resource models, factor structure C is an acceptable if not, good fit to observed data that is, each of the aforementioned statistics are above the threshold values as stated earlier (see section 5.1.4.5.2 on page 171). Furthermore, RMSEA value of .066 was within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137).

### Statistics for Resource C

Chi-square ( $\chi^2$ )	30.048
Degrees of freedom (df)	14
Probability level ( $p$ )	.008
CFI	.972
RFI	.901
NFI	.950
RMSEA (90% CI)	.066 (.033 - .099) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.19: Model-fit statistics for factor structure C of resource

#### 6.2.5.3 Key conclusion

To conclude, there is a proposition for resource in terms of factor structure C; comparably an improvement over earlier factor structures A and B. Each of the absolute and incremental fit indices namely, CFI, RFI NFI and RMSEA were within the parameters associated with model-fit with the exception of chi-square which was found to be significant ( $p$ -value was not greater than .05) and indicative of an inconsistency between the model and observed data.

### 6.2.6 Factor structure D

Factor structure D is shown in figure 6.10 on page 202. The model is the result of existing theory only as detailed below. Aspects of existing theory are described earlier in figure 5.2 on page 161. In the section below, the aspect of figure 5.2 that was applied to factor structure C (resulting in factor structure D) is identified and stated in parenthesis after the section heading. An explanation regarding the applicable aspect follows.

#### 6.2.6.1 Existing theory [exclusion of latent construct(s)]

As aforementioned in the earlier summary, resource model factor structure C was further refined and optimised by an exclusion of logically created latent constructs with resultant model, factor structure D. In other words, a factor structure was created with existing theory alone as shown in figure 6.10

below with further statistical information in table 6.20 on page 203. The model is evaluated in terms of consistency to observed data (model-fit statistics) after the following figure and table.

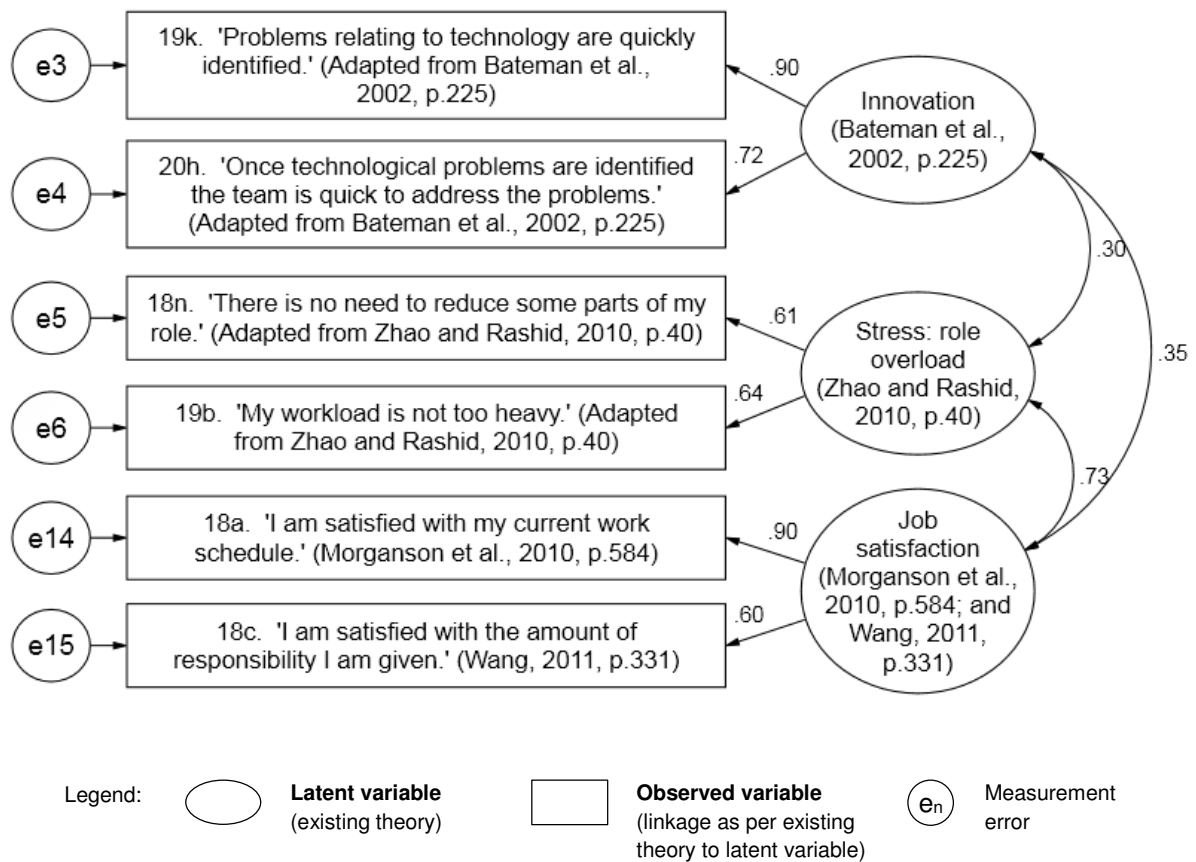


Figure 6.10: Resource - factor structure D

As aforementioned and to note, Likert statements 18n and 19b may be more adequately or precisely described simply as, role overload. To explain, stress may not be induced by job responsibilities per se, rather they may as stated in policy model later (see table 6.28 on page 215) be measured in terms of inconsistencies in human experience for example, 'I do not work under incompatible policies and guidelines.' (Adapted from Zhao and Rashid, 2010, p.40).

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19k	← Innovation	.901	1.000 <sup>a</sup>	.795	.785
20h	← Innovation	.717	.815***		
18n	← Stress: role overload	.608	1.000 <sup>a</sup>	.558	.558
19b	← Stress: role overload	.636	1.067***		
18a	← Job satisfaction	.897	1.000 <sup>a</sup>	.726	.696
18c	← Job satisfaction	.596	.698***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint.

<sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.20: Factor loadings, CR and  $\alpha$  for factor structure D of resource

### 6.2.6.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.21 on page 204. Consistent with model-fit, the chi-square ( $\chi^2$ ) statistic was not large (Hair et al., 2006, p.746) and non-significant (p-value was greater than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58).

CFI value of 1.000 is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). However, a value of 1.000 does not indicate perfect fit that is, CFI will always equal 1 when  $\chi^2 \leq df$  (Kline, 2011, p.208). Nonetheless, NFI value of .988 is indicative of good fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In*: Hooper et al., 2008, p.55). Additionally, the RFI is within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4) and can be regarded as not too distant from the 1.0 upper limit as per Bollen (1986. *Cited In*: Corn, 2010, p.363).

### Statistics for Resource D

Chi-square ( $\chi^2$ )	4.438
Degrees of freedom (df)	6
Probability level ( $p$ )	.618
CFI	1.000
RFI	.971
NFI	.988
RMSEA (90% CI)	.000 (.000 - .067) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.21: Model-fit statistics for factor structure D of resource

RMSEA was absolute zero; in other words, well within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137) and good model-fit in terms of the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). Furthermore, the upper confidence limit of RMSEA is less than the .08 cut-off value for reasonable error of approximation as per Browne and Cudeck (1993. *Cited In:* Harrington, 2009, p.67); and Biswas (2009, p.156).

#### 6.2.6.3 Key conclusion

To conclude, and contrary to earlier factor structures there is a firm proposition for resource in terms of factor structure D; comparably a large improvement over the three earlier models, factor structures A, B and C. For each of the absolute and incremental fit statistics factor structure D was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure D was indicative of good consistency of the model to observed data.

### 6.2.7 Conclusions [Resource model]

To conclude, the first two factor structures A and B had the least consistency with observed data compared to the latter two C and D which had higher standards of fit. Additionally, factor structure D showed the highest level of convergence of theory to observed data compared to A, B and C. Thus, factor structure D was the best-fitting model.

## 6.3 Policy model

### 6.3.1 Summary and conclusions of policy model

The policy model is proposed in terms of three factor structures A, B and C the latter of which is divided into four namely, C1, C2, C3 and C4 as shown in figure 6.11 on page 206 (over page). In other words, the model for the policy layer was theoretically defined six times and tested with CFA. Factor structures B and C are descendent models of A and the process by which they were created is as shown in figure 6.11 on page 206.

Firstly, a CFA was conducted with all Likert statements with linkages to policy (as per the Q-sort study) and so, the first model proposition was factor structure A. Each of the incremental fit statistics of factor structure A was consistently within the cut-off values that is, indicative of model-fit albeit with a significant chi-square and three observed variables that were not statistically significant.

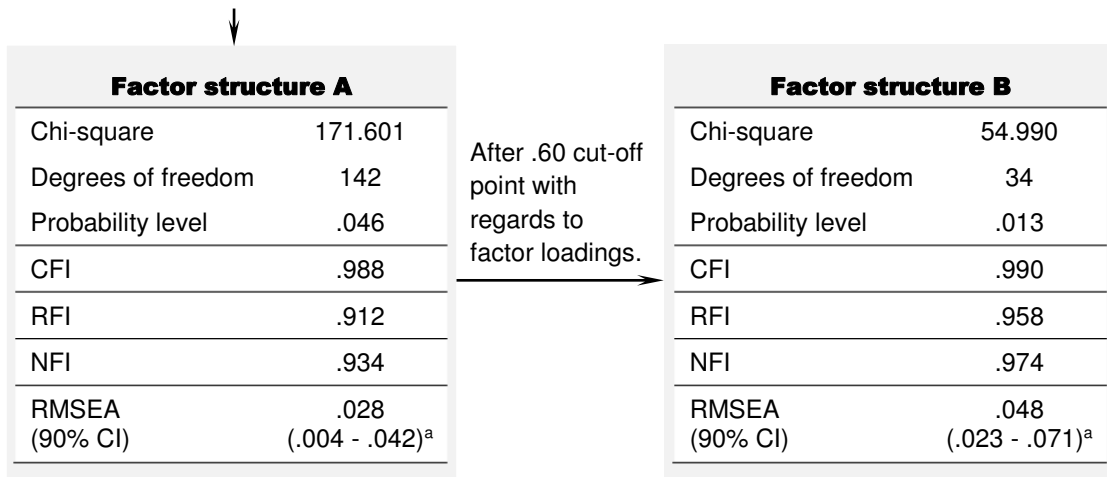
Secondly, factor structure B was created following a statistical cut-off point namely, factor loadings with .60 or above are retained (as discussed earlier in section 5.1.3.3.7 on page 166). Factor structure B was an improvement in terms of incremental fit indices over earlier factor structure A. Additionally, RMSEA was indicative of model-fit however and again, chi-square was significant.

Thirdly, latent variable, *access to resources in terms of telecommuting ethics* was excluded due to interpretive ambiguity (details later in section 6.3.5 on page 223). Following the exclusion of the aforementioned ambiguity the first model was named, factor structure C1. Out of factor structure C1, three alternative factor structures were identifiable and named as, C2, C3 and C4. The latter three factor structures are directly comparable to C1 or in other words, only the arrangement of observed variables to latent factor differed: clarification was sought with regards to the arrangement that would be the most suitable proposition in terms of model-fit statistics and where theory alone would not significantly differentiate the alternatives.

The research study found that factor structures C1 and C2 were comparable in like terms (in other words, not dissimilar in terms of model-fit statistics). Factor structures C3 and C4 were also comparable in like terms (not dissimilar in terms of model-fit statistics). Overall, factor structures C1 and C2 had a higher level of consistency of model theory to observed data compared to C3 and C4. Additionally factor structure C2 had the highest consistency of all four factor structures and was also the best factor structure of all of the policy models.

To conclude, although factor structure A was most favourable in terms of model-fit statistics alone, descendent model and factor structure C2 had a higher level of clarification and simplification. In other words, following exclusion of the ambiguities mentioned earlier (and associated with factor structure A), the best fitting model thereafter in terms of model-fit statistics was factor structure C2.

Likert statements of the survey Q-sorted to Policy.



After exclusion of an ambiguous construct, factor structure C is the result. There are four variations in parallel, factor structures C1, C2, C3 and C4:

Factor structure C1		Factor structure C4	
Chi-square	43.877	Chi-square	77.013
Degrees of freedom	14	Degrees of freedom	19
Probability level	.000	Probability level	.000
CFI	.973	CFI	.948
RFI	.923	RFI	.901
NFI	.962	NFI	.933
RMSEA (90% CI)	.090 (.061 - .121) <sup>a</sup>	RMSEA (90% CI)	.108 (.083 - .133) <sup>a</sup>
AIC	103.877	AIC	127.013

Factor structure C2		Factor structure C3	
Chi-square	46.027	Chi-square	76.242
Degrees of freedom	17	Degrees of freedom	17
Probability level	.000	Probability level	.000
CFI	.974	CFI	.947
RFI	.934	RFI	.890
NFI	.960	NFI	.933
RMSEA (90% CI)	.081 (.053 - .109) <sup>a</sup>	RMSEA (90% CI)	.115 (.090 - .142) <sup>a</sup>
AIC	100.027	AIC	130.242

Note. n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.  
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Figure 6.11: A summary of policy model in terms of six factor structures

### **6.3.2 Introduction to factor structures**

The development of each factor structure for policy is detailed in the following sections. For each factor structure, there is a CFA diagram to show the theoretical build and factor loadings in addition to **a legend to explain the diagram with clarification:**

- 1) observed measures (Likert statements) are shown in terms of a rectangle and latent factors, in terms of an oval or circle.**
  
- 2) components of the diagram that are representative of a) existing theory are shown with a white background and b) new theory are shown highlighted in yellow.**

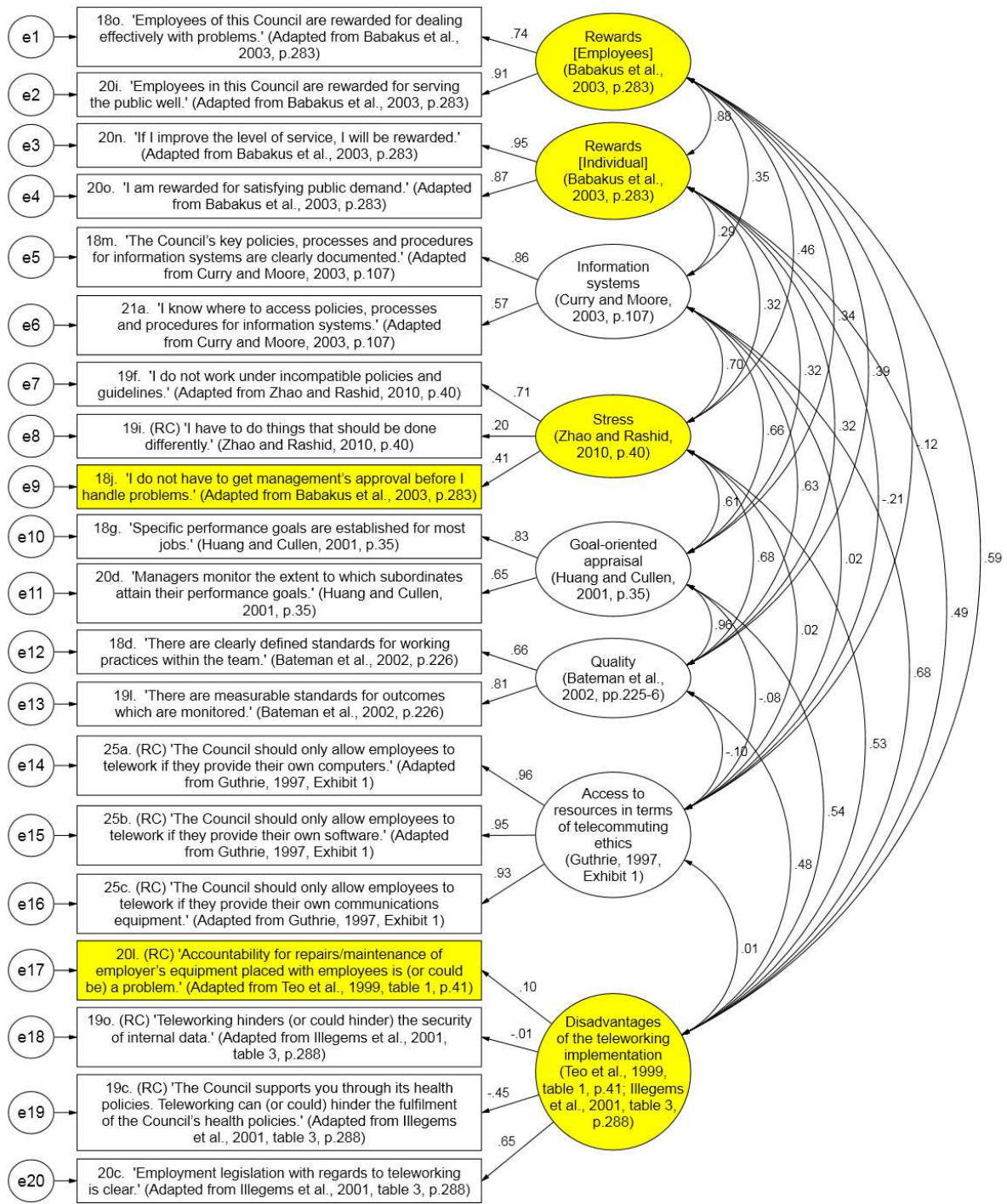
To advance information regarding the following sections: the theoretical build of each factor structure is explained in terms of build aspects – earlier section 5.1.3.2 (heading ‘Existing theory’) on page 161 and section 5.1.3.3 (heading ‘New theory (logical model development)’ on page 162.

### **6.3.3 Factor structure A**

Following the Q-sort study (see earlier section 3.6 on page 128) there were twenty Likert statements available for creating a policy model. The first CFA was conducted with the twenty Likert statements and the product is factor structure A as shown diagrammatically in figure 6.12 on page 208 with further statistical information in table 6.22 on page 209.

The model build follows after the aforementioned figure and table in terms of the two broad categories of explanation: existing theory and new theory (as per earlier sections, 5.1.3.2 on page 161 and 5.1.3.3 on page 162, respectively).





Legend:

- Latent variable (existing theory)
- Observed variable (with linkage to latent variable OR latent construct)
- ⊙<sub>n</sub> Measurement error
- Latent construct (new theory)
- Observed variable (with linkage as per logic to latent construct)
- (RC) Reverse coded

Figure 6.12: Policy - factor structure A

Three of the observed variables in terms of unstandardised factor loadings namely, 19o, 19c and 20c were found not to be statistically significant (p-value was greater than .05) as shown in table 6.22 below.

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards [Employees]	.742	1.000 <sup>a</sup>	.814	.804
20i	← Rewards [Employees]	.909	1.125***		
20n	← Rewards [Individual]	.952	1.000 <sup>a</sup>	.906	.904
20o	← Rewards [Individual]	.867	.932***		
18m	← Information systems	.857	1.000 <sup>a</sup>	.685	.653
21a	← Information systems	.572	.575***		
19f	← Stress	.709	1.000 <sup>a</sup>	.432	.351
19j <sup>c</sup>	← Stress	.204	.292**		
18j	← Stress	.407	.522***		
18g	← Goal-oriented appraisal	.833	1.000 <sup>a</sup>	.711	.700
20d	← Goal-oriented appraisal	.646	.742***		
18d	← Quality	.661	1.000 <sup>a</sup>	.703	.689
19l	← Quality	.808	1.021***		
25a <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.963	1.000 <sup>a</sup>	.963	.963
25b <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.951	.958***		
25c <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.928	.995***		
20j <sup>c</sup>	← Disadvantages of the teleworking implementation	.100 <sup>d</sup>	1.000 <sup>a</sup>	.303	.104
19o <sup>c</sup>	← Disadvantages of the teleworking implementation	.007 <sup>d</sup>	.072 (.922) <sup>e</sup>		
19c <sup>c</sup>	← Disadvantages of the teleworking implementation	.448 <sup>d</sup>	3.816 (.189) <sup>e</sup>		
20c	← Disadvantages of the teleworking implementation	.655	5.464 (.185) <sup>e</sup>		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39). <sup>c</sup>Observed variables that were reverse coded. <sup>d</sup>Factor loading with minus sign excluded for consistency in direction across all factor loadings in the table. <sup>e</sup>P-value above .05 (where applicable) is stated in parenthesis.

\*\* p < .01. \*\*\* p < .001.

Table 6.22: Factor loadings, CR and  $\alpha$  for factor structure A of policy

### 6.3.3.1 Theoretical build in terms of existing theory

In this section, existing theory (as applicable to factor structure A) is explained, namely:

- 1) **four latent variables (see figure 6.13 below) and;**
- 2) **the four corresponding aspects of existing theory.**

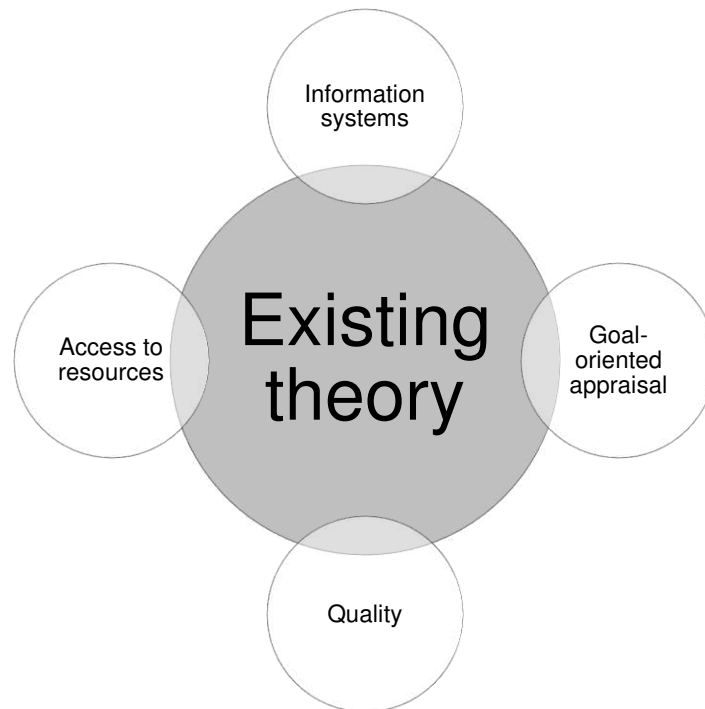


Figure 6.13: Existing theory latent variables as per factor structure A [Policy]

For a list of all aspects of existing theory see figure 5.2 on page 161. Each section below explains the theoretical build of factor structure A; the sections follow the above protocol namely, that the section is named in terms of the latent variable in question followed by the aspect of existing theory named in parenthesis after the section heading.

#### 6.3.3.1.1 Information systems [direct grouping]

Likert statements 18m and 21a (see table 6.23 on page 211; earlier figure 6.12) as per existing theory are defined in terms of information systems (Curry and Moore, 2003, p.107). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, information systems.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Information systems</b> (Curry and Moore, 2003, p.107)	18m	'The Council's key policies, processes and procedures for information systems are clearly documented.' (Adapted from Curry and Moore, 2003, p.107)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	21a	'I know where to access policies, processes and procedures for information systems.' (Adapted from Curry and Moore, 2003, p.107)	1 = Never true 2 = Rarely true 3 = Occasionally true 4 = True about half the time 5 = Usually true 6 = Often true 7 = Always true

Table 6.23: Measurement of information systems

#### 6.3.3.1.2 Goal-oriented appraisal [direct grouping]

Likert statements 18g and 20d (see table 6.24 below; earlier figure 6.12) as per existing theory are defined in terms of goal-oriented appraisal (Huang and Cullen, 2001, p.35). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as goal-oriented appraisal.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Goal-oriented appraisal</b> (Huang and Cullen, 2001, p.35)	18g	'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	20d	'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	

Table 6.24: Measurement of goal-oriented appraisal

### 6.3.3.1.3 Quality [direct grouping]

Likert statements 18d and 19l (see table 6.25 below; earlier figure 6.12) as per existing theory are defined in terms of quality (Bateman et al., 2002, p.225). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, quality.

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Quality</b> (Bateman et al., 2002, p.225)	18d	'There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	19l	'There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226).	

Table 6.25: Measurement of quality

### 6.3.3.1.4 Access to resources in terms of telecommuting ethics [direct grouping]

Likert statements 25a, 25b and 25c (see table 6.26 below; earlier figure 6.12) as per existing theory defines the following: access to resources in terms of telecommuting ethics (adapted from Guthrie, 1997, Exhibit 1). Hence, the three observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as: access to resources in terms of telecommuting ethics.

Latent variable	ID	Likert statement (observed variable)	7-point measurement <sup>b</sup> :
<b>Access to resources in terms of telecommuting ethics</b> (Adapted from Guthrie, 1997, Exhibit 1)	25a	'The Council should only allow employees to telework if they provide their own computers.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	1 = Always acceptable 2 = Often acceptable 3 = Usually acceptable 4 = Unsure, Undecided, Neutral or Indifferent 5 = Occasionally acceptable 6 = Rarely acceptable 7 = Never acceptable
	25b	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	
	25c	'The Council should only allow employees to telework if they provide their own communications equipment.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	

<sup>a</sup>Reverse coded that is, consistent with opposite 7-point measurement as shown; <sup>b</sup>Labels reverse coded as shown.

Table 6.26: Measurement of access to resources in terms of telecommuting ethics

### 6.3.3.2 Theoretical build in terms of new theory

In this section, new theory (as applicable to factor structure A) is explained, namely:

- 1) **four latent constructs (see figure 6.14 below) and;**
- 2) **the four corresponding aspects of new theory.**

For a list of all aspects of new theory see figure 5.3 on page 163. Each section below explains the theoretical build of factor structure A; the sections follow the above protocol namely, that the section is named in terms of the latent construct in question followed by the aspect of new theory named in parenthesis after the section heading.

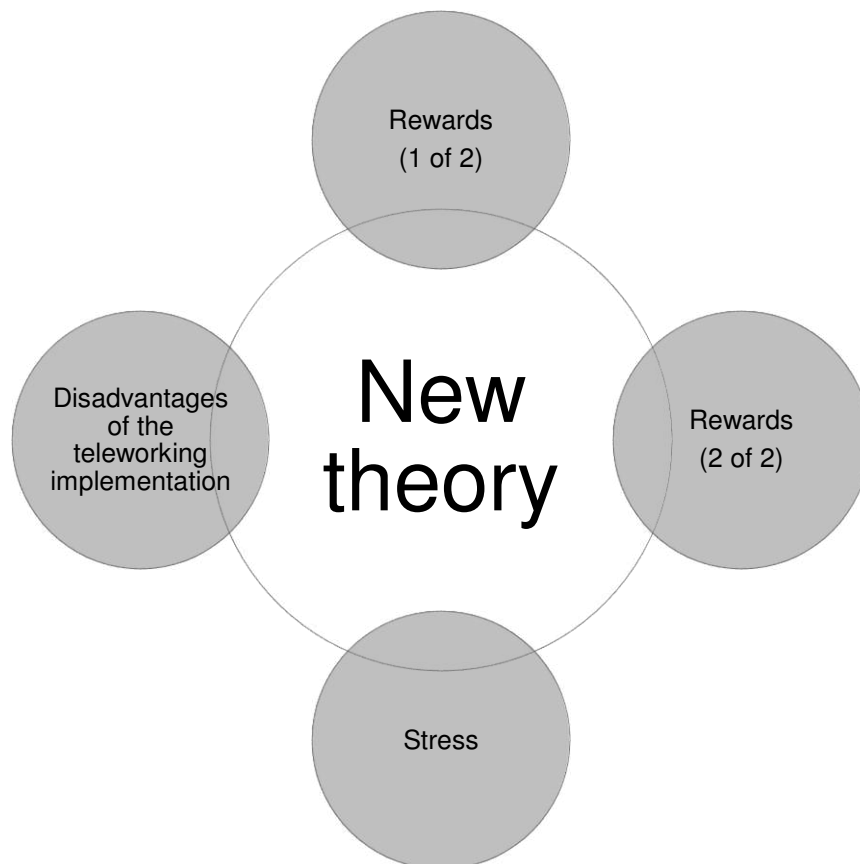


Figure 6.14: New theories latent constructs as per factor structure A [Policy]

#### 6.3.3.2.1 Rewards x 2 [latent variable clarification]

The four Likert statements, 18o, 20i, 20n and 20o (see table 6.27 on page 214; earlier figure 6.5) are identified collectively as an explanation of latent variable, *rewards* (Babakus et al., 2003, p.283). With closer examination regarding the details of the Likert statements, two distinct groups are found in terms of new theory: the former two observed variables 18o and 20i were identified as indicators of rewards relating to employees together for example, teams and departments within the organisation.

In contrast, the latter two observed variables 20n and 20o, were identified as indicators of rewards relating to perceptions at the level of individual.

Latent variable	Latent construct	ID	Likert statement (observed variable)	7-point measurement:
Rewards (Babakus et al., 2003, p.283)	Rewards [Employees] (Babakus et al., 2003, p.283)	18o	'Employees of this Council are rewarded for dealing effectively with problems.' (Adapted from Babakus et al., 2003, p.283).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
		20i	'Employees in this Council are rewarded for serving the public well.' (Adapted from Babakus et al., 2003, p.283).	
	Rewards [Individual] (Babakus et al., 2003, p.283)	20n	'If I improve the level of service, I will be rewarded.' (Adapted from Babakus et al., 2003, p.283).	
		20o	'I am rewarded for satisfying public demand.' (Adapted from Babakus et al., 2003, p.283).	

Table 6.27: Measurement of rewards

Hence, as per latent variable clarification (see figure 5.3), the four aforementioned Likert statements were divided into two groups namely:

- 1) *Rewards - Employees*: referring specifically to the collective aspect of working that is, as a group or team of employees.
- 2) *Rewards - Individual*: referring specifically to the personalised aspect of working that is, as an individual employee.

Following the above, the following question is asked in this research study regarding the theoretical build, factor structure A:

**Is the latent variable explained more feasibly by four Likert statements as per existing theory or in terms of two groups as per new theory?**

As expected the two latent constructs are highly correlated at .88. The high latent factor to factor correlation may suggest as per existing theory that the two latent factors measure the same perceptual dimension. However, conclusions and summaries are brought forward here regarding later sections namely a comparison of alternative policy models, C1 (section 6.3.5.2), C2 (section 6.3.5.3),

C3 (section 6.3.5.4) and C4 (section 6.3.5.5) which support the research study's theoretical division of the latent variable of existing theory into two latent constructs of new theory as described above:

Model-fit statistics showed better model-fit when the four Likert statements were divided into two groups (new theory) as opposed to the four Likert statements grouped together as a measure of a single latent variable (existing theory). Hence, new theory was an improvement over existing theory and the above division and logical grouping supports new theory.

### 6.3.3.2.2 Stress-related [logical grouping]

Three Likert statements 19f, 19i and 18j (see table 6.28 below; earlier figure 6.12) were logically grouped to explain underlying latent construct named, stress. The former two observed variables 19f and 19i measure stress in terms of role conflict as per existing theory (Zhao and Rashid, 2010, p.40). The third observed variable 18j is a logical inclusion to the aforementioned existing theory. Likert statement 18j is a measure of empowerment as per existing theory (Babakus et al., 2003, p.283). Theoretically the proposition is that Likert statement 18j has a linkage to aforementioned latent variable, *stress in terms of role conflict* (Zhao and Rashid, 2010, p.40) and stronger than linkages to all other latent factors of the policy model. The above theoretical viewpoint is supported further after the following table.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Stress-related</b> (Zhao and Rashid, 2010, p.40)	19f	'I do not work under incompatible policies and guidelines.' (Adapted from Zhao and Rashid, 2010, p.40)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	19i	'I have to do things that should be done differently.' (Zhao and Rashid, 2010, p.40). <sup>a</sup>	
	18j	'I do not have to get management's approval before I handle problems.' (Adapted from Babakus et al., 2003, p.283)	

<sup>a</sup>Opposite 7-point measurement reverse coded for this observed variable.

Table 6.28: Measurement of stress in terms of policy

Likert statement 18j is, as stated above, a measure of empowerment as per existing theory (Babakus et al., 2003, p.283) and empowerment would theoretically have linkages to stress alleviation that is, as a person is empowered in their job role and within the workplace, the level of resistance to their job responsibilities and within their network would be comparably reduced with empowerment. The aforementioned reduction in resistance would in turn translate to a comparable reduction in stress.



Thus, to conclude logically, Likert statement 18f shares indication of the latent construct, *stress*. Hence, the three observed variables are logically grouped to explain an underlying latent variable identified as, stress (in terms of policy).

### 6.3.3.2.3 Disadvantages of the teleworking implementation [development of latent construct]

Four Likert statements 20l, 19o, 19c and 20c (see table 6.29 below; earlier figure 6.12) were logically grouped to explain underlying latent construct named: disadvantages of the teleworking implementation.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Disadvantages of the teleworking implementation</b> (Teo et al., 1999, table 1, p.41; Illegems et al., 2001, table 3, p.288)	20l	'Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.' (Adapted from Teo et al., 1999, table 1, p.41). <sup>a</sup>	
	19o	'Teleworking hinders (or could hinder) the security of internal data.' (Adapted from Illegems et al., 2001, table 3, p.288). <sup>a</sup>	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	19c	'The Council supports you through its health policies. Teleworking can (or could) hinder the fulfilment of the Council's health policies.' (Adapted from Illegems et al., 2001, table 3, p.288). <sup>a</sup>	5 = Agree slightly 6 = Agree 7 = Strongly agree
	20c	'Employment legislation with regards to teleworking is clear.' (Adapted from Illegems et al., 2001, table 3, p.288).	

<sup>a</sup>Opposite 7-point measurement reverse coded for this observed variable.

Table 6.29: Measurement of disadvantages of the teleworking implementation

The latter three observed variables 19o, 19c and 20c are measures as per existing theory of latent variable, *disadvantages of the teleworking implementation* (Illegems et al., 2001, table 3, p.288). The former observed variable namely 20l is a logical inclusion to the aforementioned existing theory. Likert statement 20l is a measure as per existing theory of 'perceived disadvantages to individuals' (Teo et al., 1999, table 1, p.41). Hence, the two existing theories, Illegems et al. (2001, table 3, p.288) and Teo et al. (1999, table 1, p.41) have a consistency namely that they refer to the observed variables in terms of disadvantages with regards to teleworking. Hence, the four aforementioned observed variables were logically grouped to explain an underlying latent construct 'disadvantages of the

teleworking implementation' (Teo et al., 1999, table 1, p.41; Illegems et al., 2001, table 3, p.288) - albeit without significant departure from the above stated existing theories.

Following the above explanations in terms of existing theory and new theory regarding the theoretical build of factor structure A, the model is now evaluated in terms of consistency to observed data (model-fit statistics).

### 6.3.3.3 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.30 below. Contrary to model-fit, the chi-square ( $\chi^2$ ) statistic was large and significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.30 below.

<b>Statistics for Policy A</b>	
Chi-square ( $\chi^2$ )	171.601
Degrees of freedom (df)	142
Probability level ( <i>p</i> )	.046
CFI	.988
RFI	.912
NFI	.934
RMSEA (90% CI)	.028 (.004 - .042) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.30: Model-fit statistics for factor structure A of policy

CFI value is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). NFI is indicative of model-fit that is, above the .90 cut-off as per Bentler and Bonnet (1980. *Cited In*: Hooper et al., 2008, p.55); and Segars and Grover (1993. *Cited In*: Corn, 2010, p.363). Additionally, the RFI is within

statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

RMSEA is within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137) and good model-fit in terms of the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). Furthermore, the upper confidence limit of RMSEA is also less than the aforementioned cut-off .06.

However, to evaluate the model more comprehensively, this research study also considers earlier table 6.22 on page 209 with regards to factor loadings namely that the observed variables 19o, 19c and 20c were not statistically significant at  $p < .05$ .

#### 6.3.3.4 *Key conclusion*

To conclude, there is a proposition for policy in terms of factor structure A; for each of the incremental fit statistics factor structure A was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI. RMSEA was also indicative of model-fit with the exception of a significant and large chi-square. Additionally, in terms of exception, three observed variables were not statistically significant at  $p < .05$ . Thus, analysis as per the above regarding factor structure A is indicative of a consistency of the model to observed data with the exceptions stated above.

### 6.3.4 Factor structure B

Factor structure B is shown in figure 6.15 below with further statistical information in table 6.31 on page 220; the model is the result after applying the cut-off criterion to earlier factor structure A – details after the aforementioned figure and table.

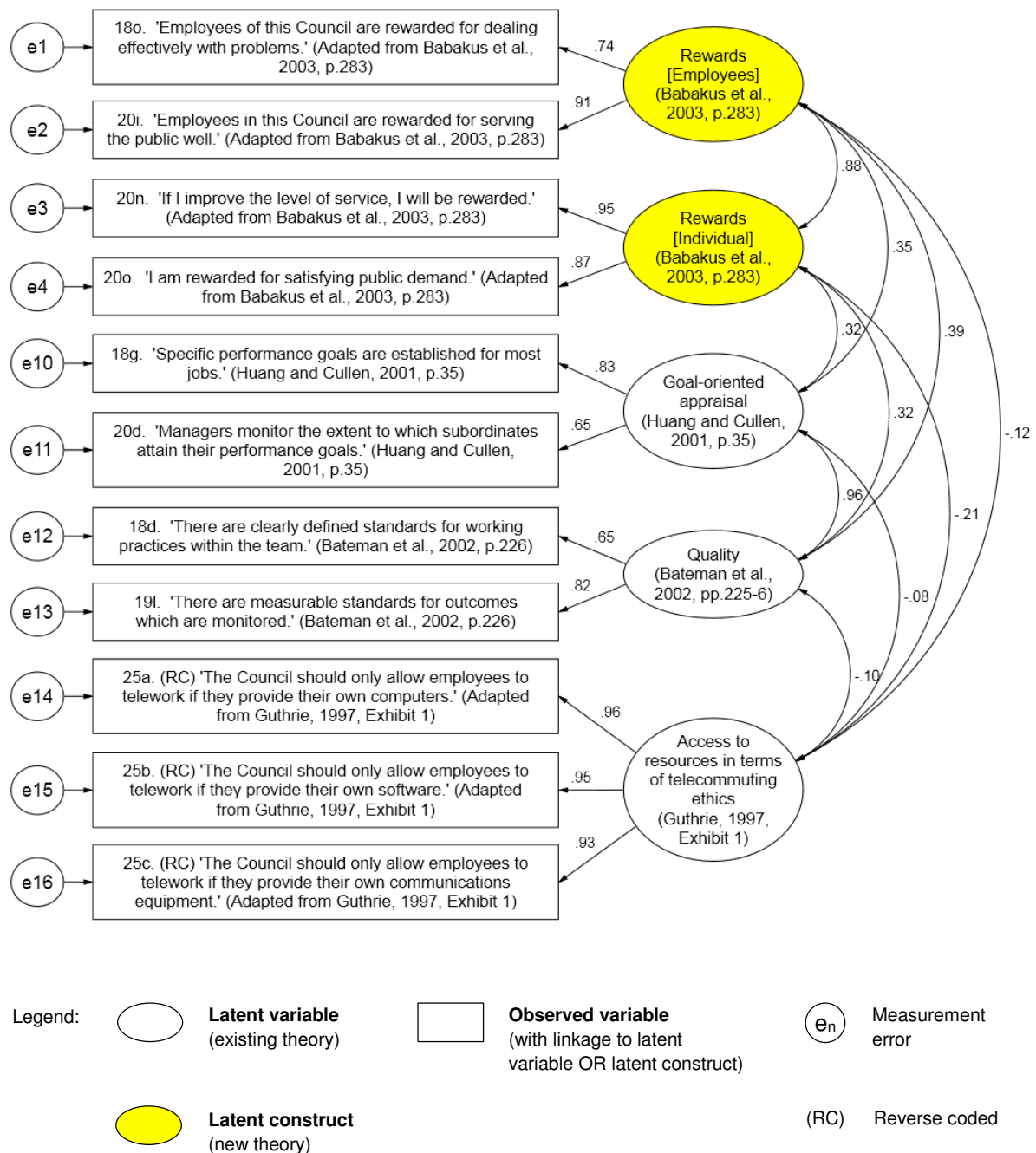


Figure 6.15: Policy - factor structure B

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards [Employees]	.741	1.000 <sup>a</sup>	.814	.804
20i	← Rewards [Employees]	.910	1.128***		
20n	← Rewards [Individual]	.953	1.000 <sup>a</sup>	.906	.904
20o	← Rewards [Individual]	.866	.930***		
18g	← Goal-oriented appraisal	.826	1.000 <sup>a</sup>	.710	.700
20d	← Goal-oriented appraisal	.652	.754***		
18d	← Quality	.649	1.000 <sup>a</sup>	.706	.689
19l	← Quality	.823	1.059***		
25a <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.963	1.000 <sup>a</sup>	.963	.963
25b <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.951	.958***		
25c <sup>c</sup>	← Access to resources in terms of telecommuting ethics	.928	.995***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39). <sup>c</sup>Observed variables that were reverse coded.

\*\*\* p < .001.

Table 6.31: Factor loadings, CR and  $\alpha$  for factor structure B of policy

Aspects of new theory are described earlier in figure 5.3 on page 163. In the section below, the aspect of figure 5.3 that applies to factor structure B is identified and stated in parenthesis after the section heading. As mentioned earlier, factor structure B is the resultant model after applying a cut-off criterion with regards to factor loadings:

#### 6.3.4.1 Factor loadings [cut-off criterion]

As aforementioned in the earlier summary, a cut-off criterion is adopted in this research study: greater than or equal to .60 (for details see section 5.1.3.3.7 on page 166) with regards to factor loadings. After applying the cut-off to factor structure A, the observed variables as shown in table 6.32 on page 221 were excluded:

ID	Likert statement (Observed variable)	Factor loading	Description
21a	'I know where to access policies, processes and procedures for information systems.' (Adapted from Curry and Moore, 2003, p.107).	.57	Less than .60 cut-off criterion thus, excluded.
18m	'The Council's key policies, processes and procedures for information systems are clearly documented.' (Adapted from Curry and Moore, 2003, p.107).	.86	Two Likert statements, 21a and 18m explain latent variable, <i>information systems</i> <sup>b</sup> . Following the above exclusion of the former (21a) in addition to a 2:1 minimum, indicators to latent factor requirement, Likert statement 18m was thus, necessarily excluded too. Hence, latent variable, <i>information systems</i> is excluded from the model.
19i	'I have to do things that should be done differently.' (Zhao and Rashid, 2010, p.40).	.20	Less than .60 cut-off criterion thus, excluded.
18j	'I do not have to get management's approval before I handle problems.' (Adapted from Babakus et al., 2003, p.283).	.41	Less than .60 cut-off criterion thus, excluded.
19f	'I do not work under incompatible policies and guidelines.' (Adapted from Zhao and Rashid, 2010, p.40).	.71	Three Likert statements, 19i, 18j and 19f explain latent construct, <i>stress</i> <sup>c</sup> . Following the above exclusions namely, 19i and 18j in addition to a 2:1 minimum, indicators to latent factor requirement, Likert statement 19f was thus, necessarily excluded too. Hence, latent construct, <i>stress</i> is excluded from the model.
20l	'Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.' (Adapted from Teo et al. (1999, table 1, p.41).	.10	Less than .60 cut-off criterion thus, excluded.
19o	'Teleworking hinders (or could hinder) the security of internal data.' (Adapted from Illegems et al., 2001, table 3, p.288).	.01 <sup>a</sup>	Less than .60 cut-off criterion thus, excluded.
19c	'The Council supports you through its health policies. Teleworking can (or could) hinder the fulfilment of the Council's health policies.' (Adapted from Illegems et al., 2001, table 3, p.288).	.45 <sup>a</sup>	Less than .60 cut-off criterion thus, excluded.
20c	'Employment legislation with regards to teleworking is clear.' (Adapted from Illegems et al., 2001, table 3, p.288).	.65	Four Likert statements, 20l, 19o, 19c and 20c explain latent construct, <i>disadvantages of the teleworking implementation</i> <sup>c</sup> . Following the above exclusions namely, 20l, 19o and 19c in addition to a 2:1 minimum, indicators to latent factor requirement, Likert statement 20c was thus, necessarily excluded too. Hence, latent construct, <i>disadvantages of the teleworking implementation</i> is excluded from the model.

<sup>a</sup>Minus sign before the statistic was excluded in the above table for consistency across factor loadings regarding the application of the cut-off criterion.

<sup>b</sup>As stated earlier in section 6.3.3.1 on page 210 regarding factor structure A.

<sup>c</sup>As stated earlier in section 6.3.3.2.3 on page 216 regarding factor structure A.

Table 6.32: Exclusions as applicable to factor structure A [Policy] following cut-off criterion

The resultant model following the above was factor structure B and the model is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

#### 6.3.4.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.33 below. Although the chi-square ( $\chi^2$ ) statistic was not as large in value compared to earlier factor structure A, contrary to model-fit  $\chi^2$  was significant (p-value was less than .05; Hayduk, 1996. *Cited in:* Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In:* Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In:* Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.33 below.

Chi-square ( $\chi^2$ )	54.990
Degrees of freedom (df)	34
Probability level ( $p$ )	.013
CFI	.990
RFI	.958
NFI	.974
RMSEA (90% CI)	.048 (.023 - .071) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.  
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.33: Model-fit statistics for factor structure B of policy

There was an improvement in factor structure B over earlier factor structure A in terms of incremental fit indices: CFI from .988 to .990, NFI from .934 to .974 and RFI from .912 to .958.

CFI value is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). NFI is also indicative of good model-fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In:* Hooper et al., 2008, p.55). Additionally, the RFI is within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4).

RMSEA is within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137) and good model-fit in terms of the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). Furthermore, the upper confidence limit of RMSEA is also less than .08 regarding reasonable error of approximation (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67; and Biswas, 2009, p.156).

#### 6.3.4.3 Key conclusion

To conclude, there is a proposition for policy in terms of factor structure B; and comparably an improvement in terms of incremental fit indices over earlier factor structure A. In each of the incremental fit statistics factor structure B was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit. An exception was: a significant chi-square value; indicative of inconsistency between model and observed data. Thus, analysis as per the above regarding factor structure B is indicative of a consistency of the model to observed data with the exception as stated above.

#### 6.3.5 Factor structure C x 4

Earlier model, factor structure B was further refined in terms of the following: an exclusion of three observed variables regarding an ambiguous aspect. Aspects of new theory are described earlier in figure 5.3 on page 163. The underlined heading below identifies the latent variable in question; and the aspect that applies to that latent variable (as per figure 5.3) is stated in parenthesis after the heading.

##### Access to resources in terms of telecommuting ethics [exclusion of interpretive ambiguity]

Feedback with regards to three Likert statements 25a, 25b and 25c of the survey as shown in table 6.34 on page 224 indicated that the wording may have ambiguous meaning namely that the word 'they' (**highlighted in green**) could refer to the employer (council) or the employees.

Hence, interpretation of the Likert statements is in question, and the ambiguity would also negatively impact on the clarity to which the policy model can be interpreted as a whole. Thus, the following were excluded from the policy model: the above named observed variables 25a, 25b and 25c inclusive of the corresponding latent variable namely, *access to resources in terms of telecommuting ethics*.



Latent variable	ID	Likert statement (observed variable)	7-point measurement <sup>b</sup> :
<b>Access to resources in terms of telecommuting ethics</b> (Guthrie, 1997, Exhibit 1)	25a	'The Council should only allow employees to telework if they provide their own computers.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	1 = Always acceptable 2 = Often acceptable 3 = Usually acceptable 4 = Unsure, Undecided, Neutral or Indifferent 5 = Occasionally acceptable 6 = Rarely acceptable 7 = Never acceptable
	25b	'The Council should only allow employees to telework if they provide their own software.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	
	25c	'The Council should only allow employees to telework if they provide their own communications equipment.' (Adapted from Guthrie, 1997, Exhibit 1) <sup>a</sup>	

<sup>a</sup>Reverse coded that is, consistent with opposite 7-point measurement as shown; <sup>b</sup>Labels reverse coded as shown.

Table 6.34: Ambiguity regarding observed variables of policy

#### 6.3.5.1 Factor structures C1 to C4

Following the exclusion as stated in the preceding section, the resulting model was factor structure C. Following the exclusion of the above aforementioned ambiguity the first model was named, factor structure C1. Out of factor structure C1, three alternative factor structures were identifiable and named as, C2, C3 and C4. The latter three factor structures are directly comparable to C1 or in other words, all four factor structures C1, C2, C3 and C4 are identical in terms of Likert statements; more specifically, each factor structure has:

- 1) **the same Likert statements (observed variables)**
- 2) **the same number of Likert statements (observed variables)**

The difference between the four factor structures is in the number of latent factors (listed below) or the arrangement of observed variables (not listed below, see figures regarding each factor structure in the sections below):

- 1) **Factor structure C1 has 4 latent factors**
- 2) **Factor structure C2 has 3 latent factors**
- 3) **Factor structure C3 has 3 latent factors**
- 4) **Factor structure C4 has 2 latent factors**

6.3.5.2 Factor structure C1

As mentioned earlier, the following were excluded from policy model factor structure B: three observed variables 25a, 25b and 25c inclusive of the corresponding latent variable, *access to resources in terms of telecommuting ethics*. After exclusion, the resulting model was factor structure C1 as shown in figure 6.16 below with further statistical information in table 6.35 on page 226.

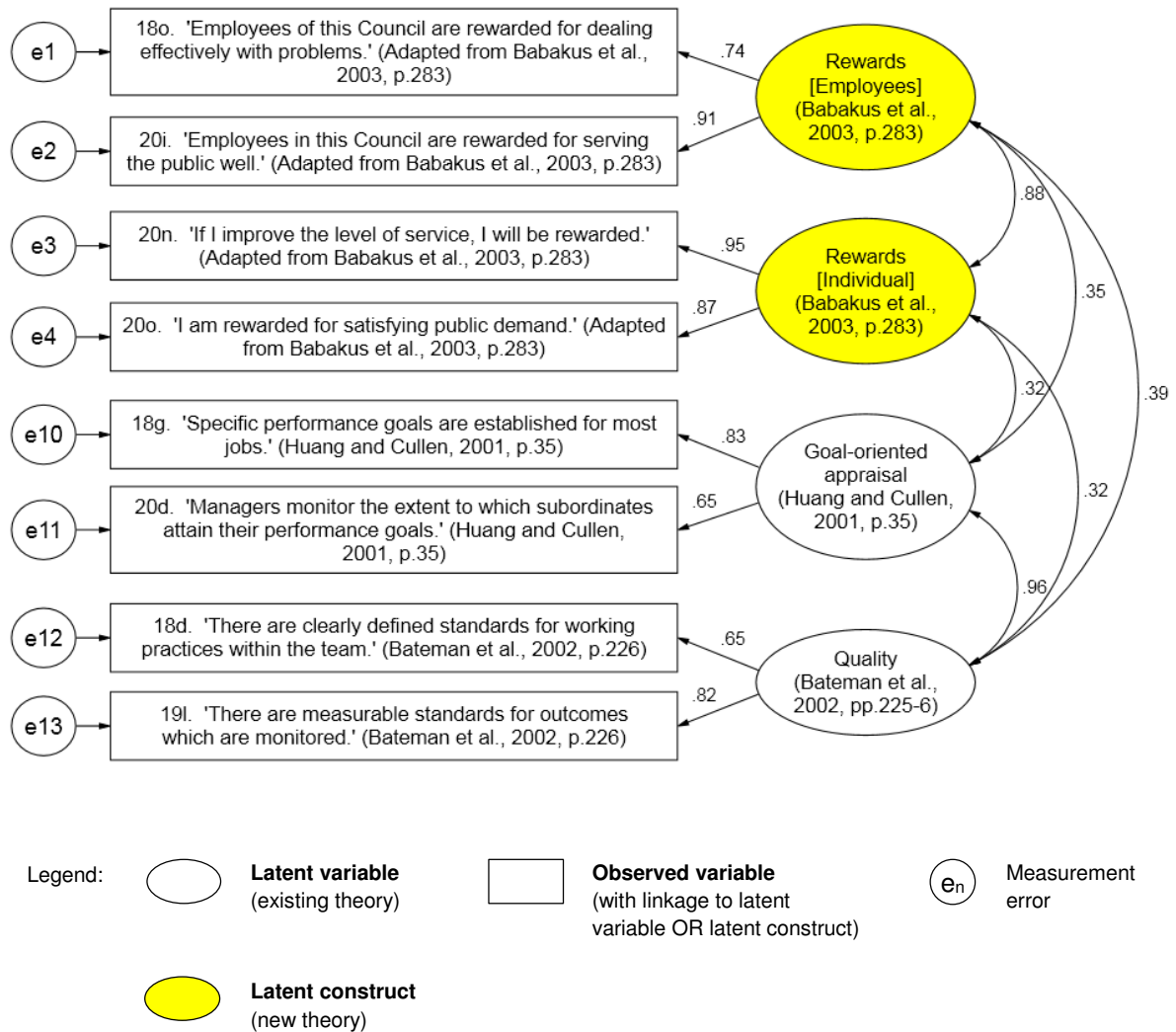


Figure 6.16: Policy - factor structure C1

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards [Employees]	.741	1.000 <sup>a</sup>	.815	.804
20i	← Rewards [Employees]	.911	1.129***		
20n	← Rewards [Individual]	.949	1.000 <sup>a</sup>	.906	.904
20o	← Rewards [Individual]	.869	.937***		
18g	← Goal-oriented appraisal	.826	1.000 <sup>a</sup>	.710	.700
20d	← Goal-oriented appraisal	.652	.755***		
18d	← Quality	.648	1.000 <sup>a</sup>	.707	.689
19l	← Quality	.825	1.063***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.35: Factor loadings, CR and  $\alpha$  for factor structure C1 of policy

#### 6.3.5.2.1 Theoretical build

Each latent factor of the factor structure model is consistent with:

- 1) **an aspect of existing theory (see earlier figure 5.2 on page 161), or**
- 2) **an aspect of new theory (see earlier figure 5.3 on page 163).**

The explanations that follow below for the model build of factor structure C1 is consistent with the above that is, each section heading below follows the following protocol:

**{name of latent factor} [ {existing or new theory} ; {aspect of existing or new theory} ]**

For example, take the following section heading:

**Rewards [existing theory; direct grouping]**

In the above example, the heading refers to the latent variable named, *rewards*, explained in terms of existing theory and more specifically, in terms of the aspect of existing theory named, direct grouping. Further information regarding aspects of theory can be found earlier in this chapter: all aspects of existing theory are described earlier in figure 5.2 on page 161 and all aspects of new theory are described earlier in figure 5.3 on page 163.

The model build of factor structure C1 is explained in the sections below.

#### 6.3.5.2.1.1 Rewards x 2 [new theory; latent variable clarification]

The four Likert statements, 18o, 20i, 20n and 20o (see table 6.36 below; earlier figure 6.16 on page 225 and table 6.35 on page 226) are identified collectively as an explanation of latent variable, *rewards* (Babakus et al., 2003, p.283). With closer examination with regards to the details of the Likert statements, two distinct groups are found in terms of new theory: the former two observed variables 18o and 20i were identified as indicators of rewards relating to employees together for example, teams and departments within the organisation. In contrast, the latter two observed variables 20n and 20o, were identified as indicators of rewards relating to perceptions at the level of individual.

Latent variable	Latent construct	ID	Likert statement (observed variable)	7-point measurement:
Rewards (Babakus et al., 2003, p.283)	Rewards [Employees] (Babakus et al., 2003, p.283)	18o	'Employees of this Council are rewarded for dealing effectively with problems.' (Adapted from Babakus et al., 2003, p.283).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
		20i	'Employees in this Council are rewarded for serving the public well.' (Adapted from Babakus et al., 2003, p.283).	
	Rewards [Individual] (Babakus et al., 2003, p.283)	20n	'If I improve the level of service, I will be rewarded.' (Adapted from Babakus et al., 2003, p.283).	
		20o	'I am rewarded for satisfying public demand.' (Adapted from Babakus et al., 2003, p.283).	

Table 6.36: Measurement of rewards

Hence, as per latent variable clarification (see figure 5.3), the four aforementioned Likert statements were divided into two groups namely:

- 1) **Rewards - Employees:** Referring specifically to the collective aspect of working that is, as a group or team of employees.
- 2) **Rewards - Individual:** Referring specifically to the personalised aspect of working that is, as an individual employee.

6.3.5.2.1.2 Goal-oriented appraisal [existing theory; direct grouping]

Likert statements 18g and 20d (see table 6.37 below; earlier figure 6.16) as per existing theory are defined in terms of goal-oriented appraisal (Huang and Cullen, 2001, p.35). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, goal-oriented appraisal.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Goal-oriented appraisal</b> (Huang and Cullen, 2001, p.35)	18g	'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	20d	'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.37: Measurement of goal-oriented appraisal

6.3.5.2.1.3 Quality [existing theory; direct grouping]

Likert statements 18d and 19l (see table 6.38 below; earlier figure 6.16) as per existing theory are defined in terms of quality (Bateman et al., 2002, p.225). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, quality.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Quality</b> (Bateman et al., 2002, p.225)	18d	'There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	19l	'There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226).	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.38: Measurement of quality

Factor structure C1 as per the above arrangement of observed variables to latent factors is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

### 6.3.5.2.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.39 below. Although the chi-square ( $\chi^2$ ) statistic was not as large in value compared to earlier factor structures A and B, contrary to model-fit the  $\chi^2$  was significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so the model is evaluated in terms of the additional statistics as provided in table 6.39 below.

Chi-square ( $\chi^2$ )	43.877
Degrees of freedom (df)	14
Probability level ( <i>p</i> )	.000
CFI	.973
RFI	.923
NFI	.962
RMSEA (90% CI)	.090 (.061 - .121) <sup>a</sup>
AIC	103.877

*Note.* n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.39: Model-fit statistics for factor structure C1 of policy

CFI value is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). NFI is also indicative of good model-fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In*: Hooper et al., 2008, p.55). Additionally, the RFI is within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

RMSEA is within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137) albeit not to the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). Furthermore, the upper confidence limit of RMSEA exceeds the aforementioned value .10 and so, replication of the model with new data may yield a less reasonable error of approximation (future studies).

### 6.3.5.2.3 Key conclusion

To conclude, there is a proposition for policy in terms of factor structure C1. In each of the incremental fit statistics factor structure C1 was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit albeit at a lower threshold compared to earlier factor structures A and B. An exception as with earlier factor structures was: a significant chi-square value; indicative of inconsistency between model and observed data. Thus, analysis as per the above regarding factor structure C1 is indicative of a consistency of the model to observed data with the exception as stated above.

### 6.3.5.3 Factor structure C2

As mentioned earlier, factor structure C2 is directly comparable to earlier factor structure C1, and later factor structures, C3 and C4 in terms of the identification of Likert statements and the number of Likert statements. Factor structure C2 is as shown in figure 6.17 below with further statistical information in table 6.40 on page 231.

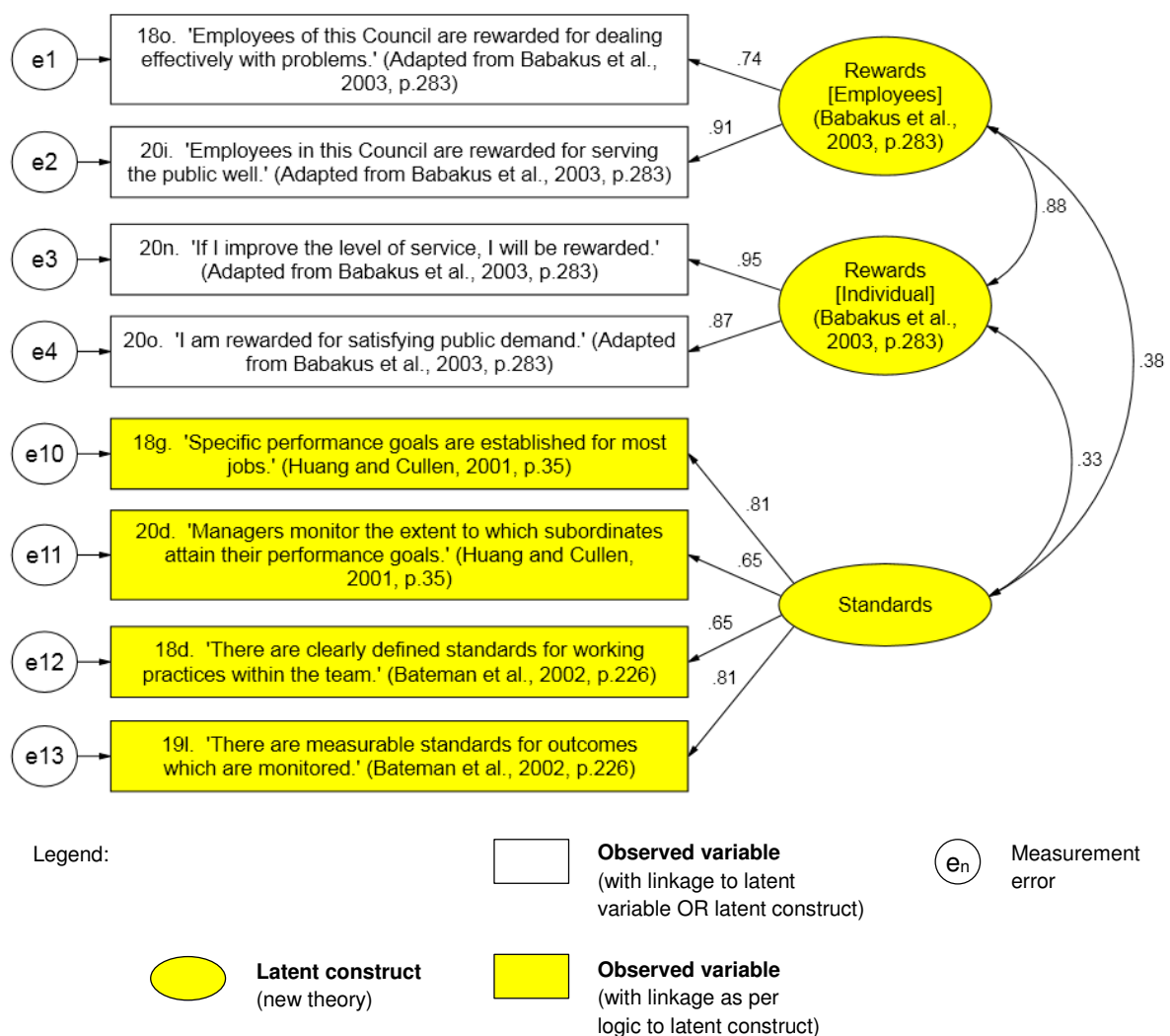


Figure 6.17: Policy - factor structure C2

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards [Employees]	.742	1.000 <sup>a</sup>	.815	.804
20i	← Rewards [Employees]	.910	1.126***		
20n	← Rewards [Individual]	.950	1.000 <sup>a</sup>	.906	.904
20o	← Rewards [Individual]	.869	.936***		
18g	← Standards	.806	1.000 <sup>a</sup>	.820	.811
20d	← Standards	.649	.770***		
18d	← Standards	.645	.860***		
19l	← Standards	.810	.901***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint.

<sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.40: Factor loadings, CR and  $\alpha$  for factor structure C2 of policy

### 6.3.5.3.1 Theoretical build

Each latent factor of the factor structure model is consistent with:

- 1) **an aspect of existing theory (see earlier figure 5.2 on page 161), or**
- 2) **an aspect of new theory (see earlier figure 5.3 on page 163).**

The explanations that follow below for the model build of factor structure C2 is consistent with the above that is, each section heading below follows the following protocol:

**{name of latent factor} [ {existing or new theory} ; {aspect of existing or new theory} ]**

As stated earlier, and for example, take the following section heading:

**Rewards [existing theory; direct grouping]**

In the above example, the heading refers to the latent variable named, *rewards*, explained in terms of existing theory and more specifically, in terms of the aspect of existing theory named, direct grouping. Further information regarding aspects of theory can be found earlier in this chapter: all aspects of existing theory are described earlier in figure 5.2 on page 161 and all aspects of new theory are described earlier in figure 5.3 on page 163.



The model build of factor structure C2 is explained in the sections below.

### 6.3.5.3.1.1 Rewards x 2 [new theory; latent variable clarification]

The four Likert statements, 18o, 20i, 20n and 20o (see table 6.41 below; earlier figure 6.17) are identified as a collective explanation of rewards (Babakus et al., 2003, p.283). With closer examination of the details of the Likert statements, two distinct groups are found in terms of new theory: the former two observed variables 18o and 20i were identified as indicators of rewards relating to employees as a whole for example, teams and departments within the organisation. In contrast, the latter two observed variables 20n and 20o, were identified as indicators of rewards relating to perceptions at the level of the individual.

Latent variable	Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Rewards</b> (Babakus et al., 2003, p.283)	<b>Rewards [Employees]</b> (Babakus et al., 2003, p.283)	18o	'Employees of this Council are rewarded for dealing effectively with problems.' (Adapted from Babakus et al., 2003, p.283).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
		20i	'Employees in this Council are rewarded for serving the public well.' (Adapted from Babakus et al., 2003, p.283).	
	<b>Rewards [Individual]</b> (Babakus et al., 2003, p.283)	20n	'If I improve the level of service, I will be rewarded.' (Adapted from Babakus et al., 2003, p.283).	
		20o	'I am rewarded for satisfying public demand.' (Adapted from Babakus et al., 2003, p.283).	

Table 6.41: Measurement of rewards

Hence, as per latent variable clarification (see figure 5.3), the four aforementioned Likert statements were divided into two groups namely:

- 1) **Rewards - Employees:** referring specifically to the collective aspect of working that is, as a group or team of employees.
- 2) **Rewards - Individual:** referring specifically to the personalised aspect of working that is, as an individual employee.

### 6.3.5.3.1.2 Standards [new theory; latent variable aggregation]

As per figure 6.16 on page 225 of factor structure C1, the latent factor to factor correlation regarding goal-oriented appraisal and quality was .96. The correlation is sufficiently high (very close to 1.00) so as to suggest quite clearly that the observed variables for each of the two latent factors are measurements of the same latent factor. Hence the two latent factors were aggregated; in other words, the four Likert statements 18g, 20d, 18d and 19l were logically grouped as per new theory and as an explanation of an underlying latent construct named as, *standards* (see table 6.42 below; earlier figure 6.17). The name, *standards* was given to the latent construct as it is an identifiable theme consistent with the details of the four aforementioned observed variables.

Latent construct (new theory)	Latent variable (existing theory)	ID	Likert statement (observed variable)	7-point measurement:
<b>Standards</b>	Goal-oriented appraisal	18g	'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
		20d	'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	
	Quality	18d	There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226)	
		19l	There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226)	

Table 6.42: Measurement of standards

Factor structure C2 as per the above arrangement of observed variables to latent factors is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

### 6.3.5.3.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.43 on page 234. Although the chi-square ( $\chi^2$ ) statistic was not as large in value compared to earlier factor structures A and B, and not largely different to alternative factor structure C1, contrary to model-fit the  $\chi^2$  was significant (p-value was less than .05; Hayduk, 1996. *Cited in:* Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation)

is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.43 below.

<b>Statistics for Policy C2</b>	
Chi-square ( $\chi^2$ )	46.027
Degrees of freedom (df)	17
Probability level ( $p$ )	.000
CFI	.974
RFI	.934
NFI	.960
RMSEA (90% CI)	.081 (.053 - .109) <sup>a</sup>
AIC	100.027

*Note.* n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.  
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.43: Model-fit statistics for factor structure C2 of policy

CFI value is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). NFI is also indicative of good model-fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In*: Hooper et al., 2008, p.55). Additionally, the RFI is within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

RMSEA is within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137) albeit not to the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). Furthermore, the upper confidence limit of RMSEA exceeds the aforementioned value .10 and so, replication of the model with new data may yield a less reasonable error of approximation (future studies). Factor structure C2 is a marginal improvement over C1 as denoted by AIC values of 100.027 compared with 103.877, respectively.

### 6.3.5.3.3 Key conclusion

To conclude, there is a proposition for policy in terms of factor structure C2. In each of the incremental fit statistics factor structure C1 was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit albeit at a lower threshold compared to earlier factor structures A and B. An exception as with earlier factor structures was: a significant chi-square value; indicative of inconsistency between model and observed data. Furthermore, factor structure C2 was a marginal improvement over C1 in terms of AIC. Thus, analysis as per the above regarding factor structure C1 is indicative of a consistency of the model to observed data, comparably better than C1 and with the exception as stated above.

### 6.3.5.4 Factor structure C3

As mentioned earlier, factor structure C3 is directly comparable to earlier factor structures C1 and C2 and later factor structure C4 in terms of the identification of Likert statements and the number of Likert statements. Factor structure C3 is as shown in figure 6.18 below with further statistical information in table 6.44 on page 236.

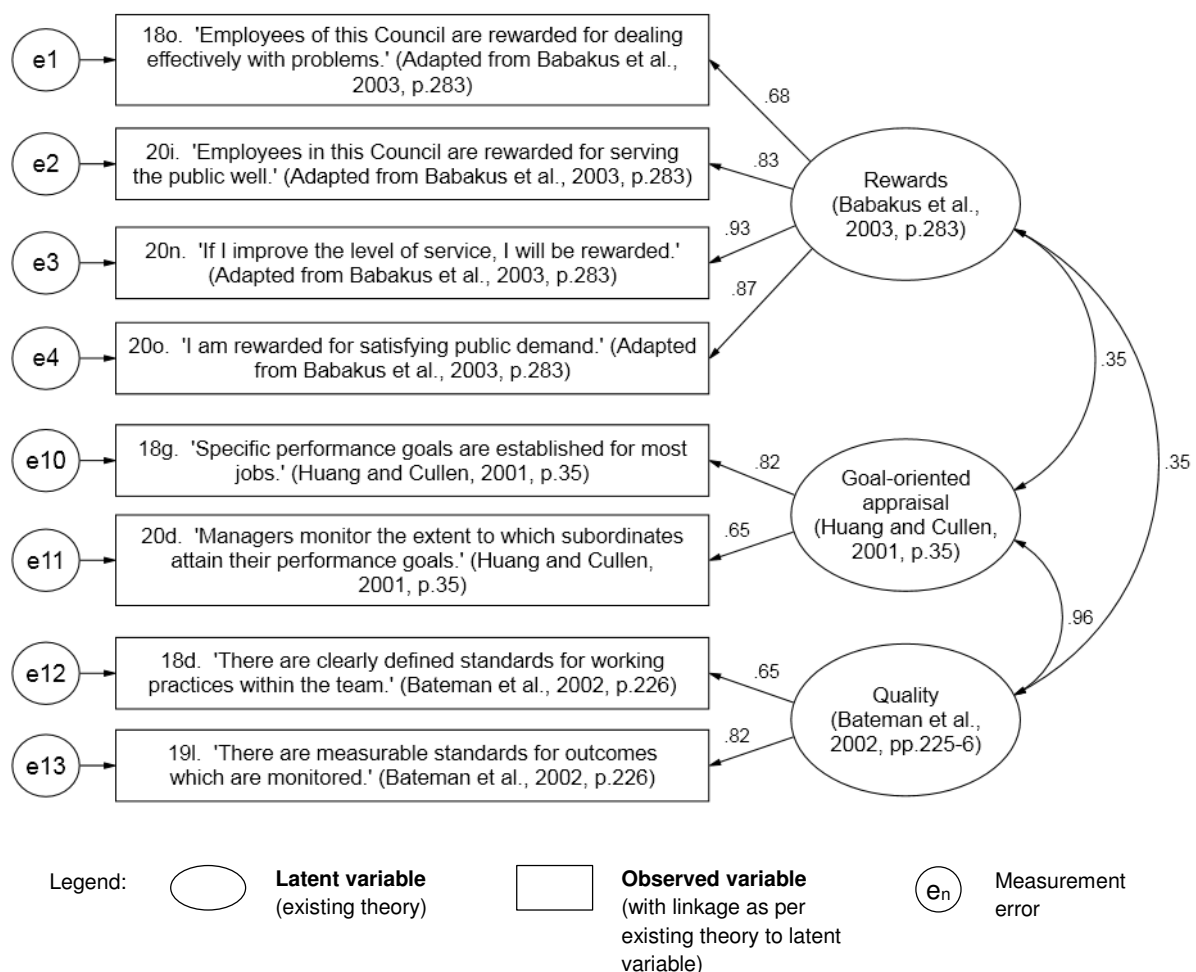


Figure 6.18: Policy - factor structure C3

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards	.677	1.000 <sup>a</sup>		
20i	← Rewards	.831	1.127***	.899	.894
20n	← Rewards	.930	1.296***		
20o	← Rewards	.868	1.237***		
18g	← Goal-oriented appraisal	.825	1.000 <sup>a</sup>		
20d	← Goal-oriented appraisal	.653	.757***	.710	.700
18d	← Quality	.651	1.000 <sup>a</sup>	.705	.689
19l	← Quality	.820	1.052***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.44: Factor loadings, CR and  $\alpha$  for factor structure C3 of policy

#### 6.3.5.4.1 Theoretical build

Each latent factor of the factor structure model is consistent with:

- 1) **an aspect of existing theory (see earlier figure 5.2 on page 161), or**
- 2) **an aspect of new theory (see earlier figure 5.3 on page 163).**

The explanations that follow below for the model build of factor structure C3 is consistent with the above that is, each section heading below follows the following protocol:

**{name of latent factor} [ {existing or new theory} ; {aspect of existing or new theory} ]**

As stated earlier, and for example, take the following section heading:

**Rewards [existing theory; direct grouping]**

In the above example, the heading refers to the latent variable named, *rewards*, explained in terms of existing theory and more specifically, in terms of the aspect of existing theory named, direct grouping. Further information regarding aspects of theory can be found earlier in this chapter: all aspects of existing theory are described earlier in figure 5.2 on page 161 and all aspects of new theory are described earlier in figure 5.3 on page 163.

The model build of factor structure C3 is explained in the sections below. Distinct from policy models C1, C2 and C4: factor structure C3 consists of existing theory only.

#### 6.3.5.4.1.1 Rewards [existing theory; direct grouping]

As per earlier factor structures C1 and C2, the latent variable, *rewards* was divided into two logical groups or latent constructs each measured by two observed variables. However, for factor structure C3 the model was created consistent with existing theory only that is, the latent variable *rewards* was explained in existing literature (Babakus et al., 2003, p.283) in terms of four observed variables (see table 6.45 below; earlier figure 6.18) and as opposed to two groups of two observed variables (as shown in earlier factor structures C1 and C2).

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Rewards</b> (Babakus et al., 2003, p.283)	18o	'Employees of this Council are rewarded for dealing effectively with problems.' (Adapted from Babakus et al., 2003, p.283).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	20i	'Employees in this Council are rewarded for serving the public well.' (Adapted from Babakus et al., 2003, p.283).	
	20n	'If I improve the level of service, I will be rewarded.' (Adapted from Babakus et al., 2003, p.283).	
	20o	'I am rewarded for satisfying public demand.' (Adapted from Babakus et al., 2003, p.283).	

Table 6.45: Measurement of latent variable, *rewards*

#### 6.3.5.4.1.2 Goal-oriented appraisal [existing theory; direct grouping]

Likert statements 18g and 20d (see table 6.46 on page 238; earlier figure 6.18) as per existing theory are defined in terms of goal-oriented appraisal (Huang and Cullen, 2001, p.35). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, goal-oriented appraisal.

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Goal-oriented appraisal</b> (Huang and Cullen, 2001, p.35)	18g	'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	20d	'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.46: Measurement of goal-oriented appraisal

#### 6.3.5.4.1.3 Quality [existing theory; direct grouping]

Likert statements 18d and 19l (see table 6.47 below; earlier figure 6.18) as per existing theory are defined in terms of quality (Bateman et al., 2002, p.225). Hence, the two observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, quality.

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Quality</b> (Bateman et al., 2002, p.225)	18d	'There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	19l	'There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226).	5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.47: Measurement of quality

Factor structure C3 as per the above arrangement of observed variables to latent factors is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

#### 6.3.5.4.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.48 on page 239. Contrary to model-fit the chi-square ( $\chi^2$ ) statistic was large in value compared to earlier factor structures B and C1, and significant (p-value was less than .05;

Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.48 below.

<b>Statistics for Policy C3</b>	
Chi-square ( $\chi^2$ )	76.242
Degrees of freedom (df)	17
Probability level ( $p$ )	.000
CFI	.947
RFI	.890
NFI	.933
RMSEA (90% CI)	.115 (.090 - .142) <sup>a</sup>
AIC	130.242

*Note.* n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.  
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.48: Model-fit statistics for factor structure C3 of policy

CFI value is indicative of good model-fit that is, meeting the .95 cut-off value (rounded to two decimal places) as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). NFI is also indicative of model-fit albeit above the lower .90 threshold as per Bentler and Bonnet (1980. *Cited In*: Hooper et al., 2008, p.55); and Segars and Grover (1993. *Cited In*: Corn, 2010, p.363). Additionally, the RFI is close to statistical parameters with regards to model-fit namely, .90 threshold (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

RMSEA is above the .10 threshold (Browne and Cudeck, 1993. *Cited In*: Harrington, 2009, p.67, and *Cited In*: Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In*: Munro, 2005, p.365; and Little et al., 2007, p.137). Thus, indicative of poor fit. However, the lower limit of the confidence level is within the aforementioned .10 statistical parameter for model-fit.

The AIC pertaining to factor structure C3 is higher (130.242) than earlier and alternative factor structures C2 (100.027) and C1 (103.877). Hence, factor structure C3 had the least consistency of model to observed data compared to alternative factor structures C1 and C2.



### 6.3.5.4.3 Key conclusion

To conclude, there is **not** a firm proposition for policy in terms of factor structure C3. In each of the incremental fit statistics factor structure C3 was consistently weaker compared to C1 and C2 and met model-fit at a lower threshold for NFI and RFI. Additionally, RMSEA was indicative of poor fit. Certainly as with earlier factor structures, chi-square value was significant; indicative of inconsistency between model and observed data. Furthermore, the model is weaker than factor structures C1 and C2, as per the AIC. Hence, existing theory as per factor structure C3 had the least consistency to observed data compared factor structures C1 and C2; new theory as per the latter two (C1 and C2) created more favourable models compared to existing theory (C3).

### 6.3.5.5 Factor structure C4

As mentioned earlier, factor structure C4 is directly comparable to earlier factor structures C1 to C3 in terms of the identification of Likert statements and the number of Likert statements. Factor structure C4 is as shown in figure 6.19 below with further statistical information in table 6.49 on page 241.

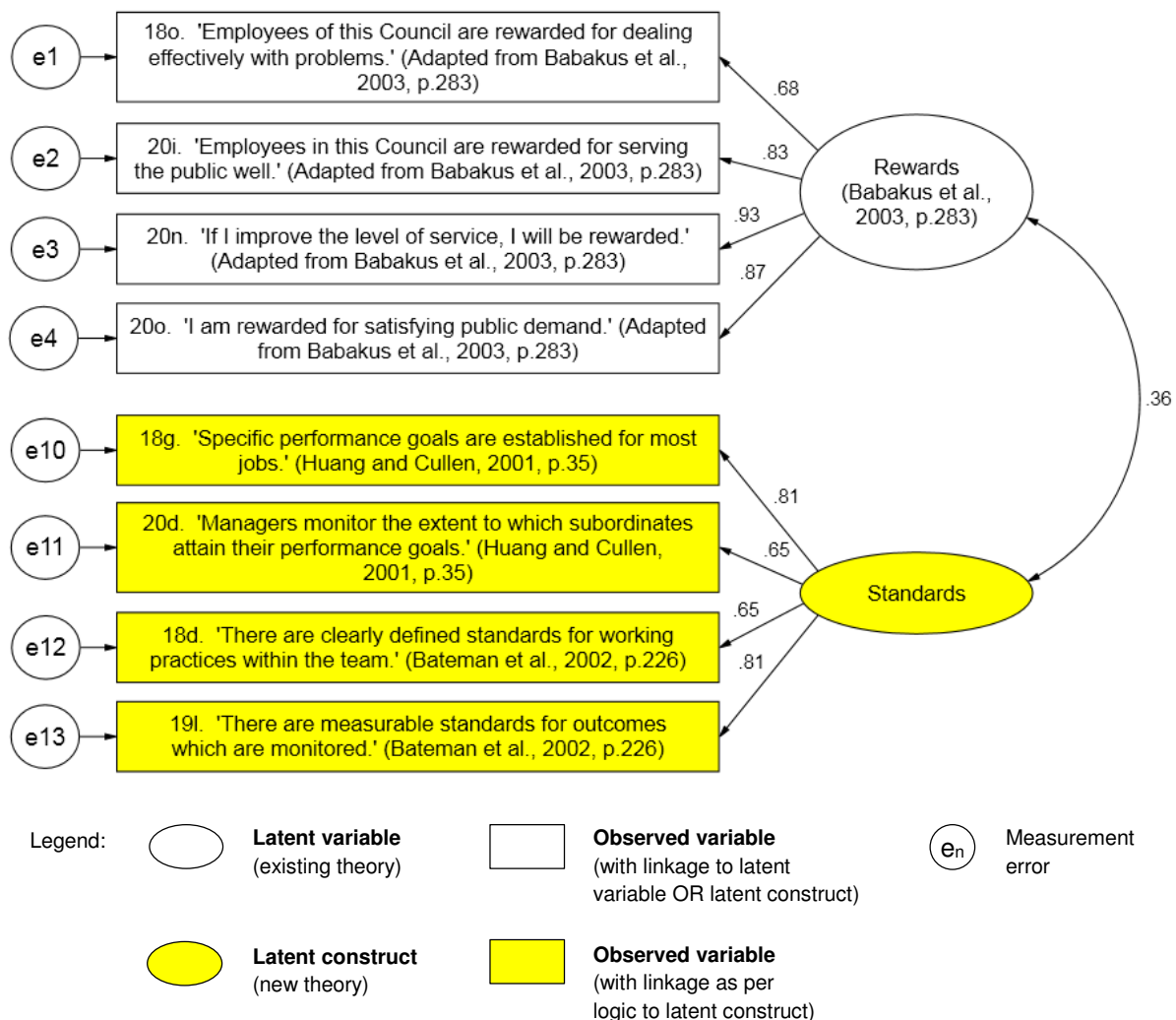


Figure 6.19: Policy - factor structure C4

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18o	← Rewards	.677	1.000 <sup>a</sup>		
20i	← Rewards	.831	1.127***	.899	.894
20n	← Rewards	.930	1.296***		
20o	← Rewards	.868	1.237***		
18g	← Standards	.810	1.000 <sup>a</sup>		
20d	← Standards	.647	.764***	.820	.811
18d	← Standards	.646	.856***		
19l	← Standards	.806	.892***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.49: Factor loadings, CR and  $\alpha$  for factor structure C4 of policy

#### 6.3.5.5.1 Theoretical build

Each latent factor of the factor structure model is consistent with:

- 1) **an aspect of existing theory (see earlier figure 5.2 on page 161), or**
- 2) **an aspect of new theory (see earlier figure 5.3 on page 163).**

The explanations that follow below for the model build of factor structure C4 is consistent with the above that is, each section heading below follows the following protocol:

**{name of latent factor} [ {existing or new theory} ; {aspect of existing or new theory} ]**

As stated earlier and for example, take the following section heading:

**Rewards [existing theory; direct grouping]**

In the above example, the heading refers to the latent variable named, *rewards*, explained in terms of existing theory and more specifically, in terms of the aspect of existing theory named, direct grouping. Further information regarding aspects of theory can be found earlier in this chapter: all aspects of existing theory are described earlier in figure 5.2 on page 161 and all aspects of new theory are described earlier in figure 5.3 on page 163.

The model build of factor structure C4 is explained in the sections below.

#### 6.3.5.5.1.1 Rewards [existing theory; direct grouping]

As per earlier factor structure C1 and C2, the latent variable, *rewards* was divided into two logical groups or latent constructs each measured by two observed variables. However, for factor structure C4 the model was created consistent with existing theory only that is, the latent variable *rewards* was explained in terms of four observed variables (see table 6.50 below; earlier figure 6.19).

Latent variable	ID	Likert statement (observed variable)	7-point measurement:
<b>Rewards</b> (Babakus et al., 2003, p.283)	18o	'Employees of this Council are rewarded for dealing effectively with problems.' (Adapted from Babakus et al., 2003, p.283).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	20i	'Employees in this Council are rewarded for serving the public well.' (Adapted from Babakus et al., 2003, p.283).	
	20n	'If I improve the level of service, I will be rewarded.' (Adapted from Babakus et al., 2003, p.283).	
	20o	'I am rewarded for satisfying public demand.' (Adapted from Babakus et al., 2003, p.283).	

Table 6.50: Measurement of latent variable, *rewards*

#### 6.3.5.5.1.2 Standards [new theory; latent variable aggregation]

As per earlier figure 6.17 on page 230 regarding factor structure C1, the latent factor to factor correlation regarding goal-oriented appraisal and quality was .96. The correlation is sufficiently high (very close to 1.00) so as to suggest quite clearly that the observed variables for each of the two latent factors are measurements of the same latent factor. Hence the two latent factors were aggregated; in other words, the four Likert statements 18g, 20d, 18d and 19l were logically grouped as per new theory and as an explanation of an underlying latent construct named as, *standards* (see table 6.51 on page 243; earlier figure 6.19). Standards was the name given to the latent construct as it is an identifiable theme consistent with the details of the four aforementioned observed variables.

Latent construct (new theory)	Latent variable (existing theory)	ID	Likert statement (observed variable)	7-point measurement:
<b>Standards</b>	Goal-oriented appraisal	18g	'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
		20d	'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	
	Quality	18d	There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226)	
		19l	There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226)	

Table 6.51: Measurement of standards

Factor structure C4 as per the above arrangement of observed variables to latent factors is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

#### 6.3.5.5.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.52 on page 244. Contrary to model-fit the chi-square ( $\chi^2$ ) statistic was large in value compared to earlier factor structures B, C1 and C2 and not dissimilar to C3. Additionally,  $\chi^2$  was significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so, the model is evaluated in terms of the additional statistics as provided in table 6.52 on page 244.

CFI value is indicative of good model-fit that is, meeting the .95 cut-off value (rounded to two decimal places) as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In*: Harrington, 2009, p.75). NFI is also indicative of model-fit albeit at the lower .90 threshold as per Bentler and Bonnet (1980. *Cited In*: Hooper et al., 2008, p.55); and Segars and Grover (1993. *Cited In*: Corn, 2010, p.363). Additionally, the RFI is within the statistical parameter with regards to model-fit namely, .90 threshold (Marsh and Hau, 1996. *Cited In*: Hu and Bentler, 1999, p.4).

**Statistics for Policy C4**

Chi-square ( $\chi^2$ )	77.013
Degrees of freedom (df)	19
Probability level ( $p$ )	.000
CFI	.948
RFI	.901
NFI	.933
RMSEA (90% CI)	.108 (.083 - .133) <sup>a</sup>
AIC	127.013

*Note.* n = 264; AIC = Akaike Information Criterion; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.52: Model-fit statistics for factor structure C4 of policy

RMSEA is close to .10 threshold (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137). Thus, indicative of near model-fit.

The AIC (127.013) pertaining to factor structure C4 is a marginal improvement over comparable factor structure C3 (130.242) and a less fitting model compared to factor structures, C1 (103.877) and C2 (100.027).

#### 6.3.5.5.3 Key conclusion

To conclude, there is **not** a firm proposition for policy in terms of factor structure C4. In each of the incremental fit statistics factor structure C4 was consistently weaker compared to C1 and C2 and met model-fit at a lower threshold for NFI and RFI. Additionally, RMSEA was indicative of near fit. Certainly as with earlier factor structures, chi-square value was significant; indicative of inconsistency between model and observed data. Furthermore, the model is weaker than factor structures C1 and C2, as per the AIC and comparable in like terms to C3.

#### 6.3.5.6 Conclusions [factor structures C1 to C4]

Factor structures C1 and C2 were comparable in like terms (not dissimilar in terms of model-fit statistics). Factor structures C3 and C4 were also comparable in like terms (not dissimilar in terms of model-fit statistics).

Overall, factor structure C2 had a higher level of consistency of model theory to observed data. Factor structure C2 is the better of the four models that is the structure is most consistent with new theory:

##### 6.3.5.6.1 Latent variable clarification (new theory)

Explanation of the latent variable namely, *rewards* is improved when the latent factor is divided into two logical groups representative of a) the individual and b) employees. Additionally, the above further supports the premise that .88 correlations between latent factors (as shown in factor structure C1, figure 6.16 on page 225; and factor structure C2, figure 6.17 on page 230) is not sufficiently high so as to warrant merger of the latent factors (into a single latent factor).

##### 6.3.5.6.2 Latent variable aggregation (new theory)

Observed variables regarding latent variables namely, *goal-oriented appraisal* and *quality* should be logically grouped to explain a single, latent construct named, *standards*. In other words, the .96 correlations that exist between the two aforementioned latent variables (as shown in factor structure C1, figure 6.16 on page 225; and factor structure C3, figure 6.18 on page 235) is sufficiently high so as to warrant a merger of the latent factors (into a single latent factor).

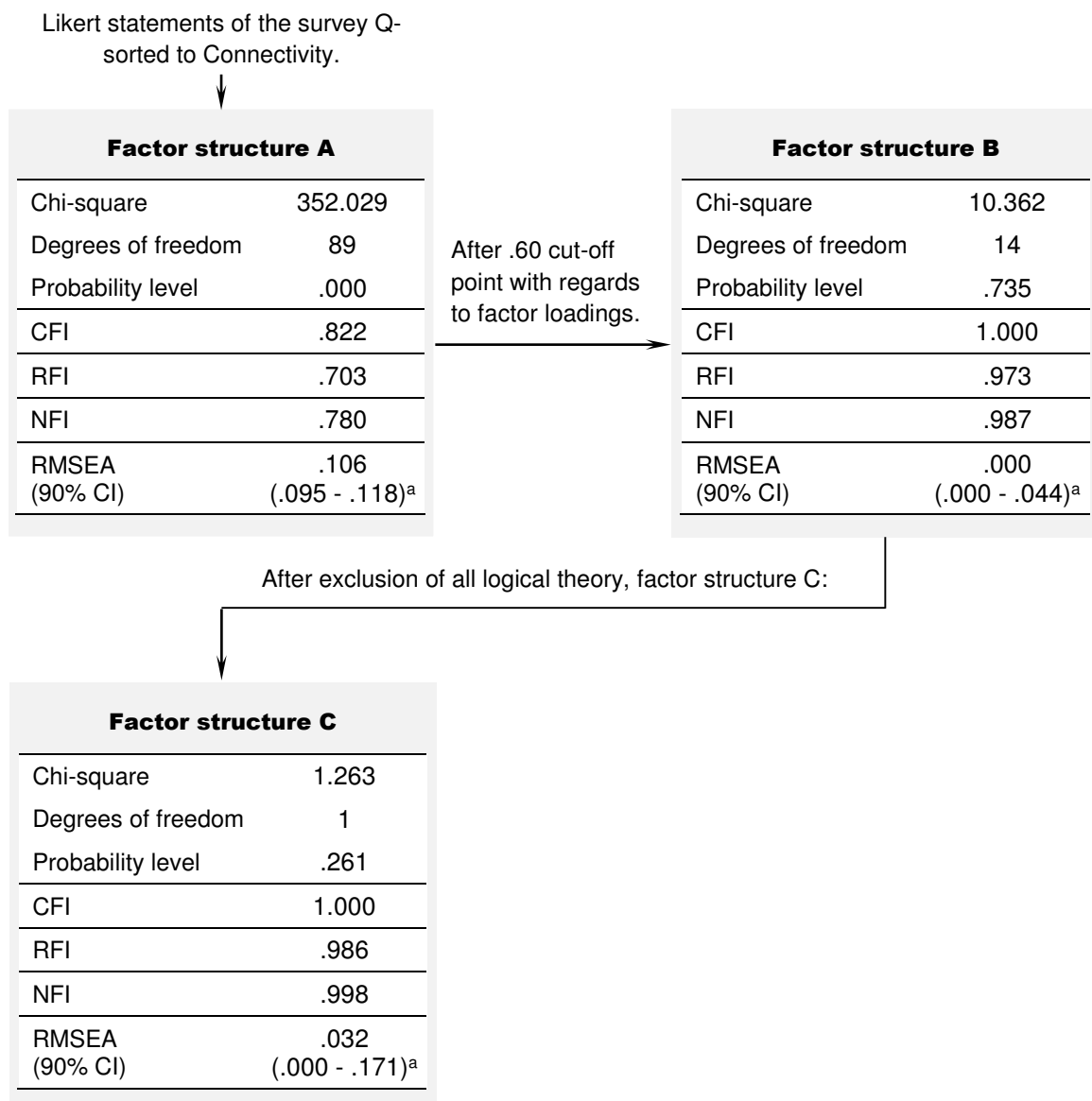
### 6.3.6 Conclusions [Policy model]

To conclude, although factor structure A was most favourable in terms of model-fit statistics alone, descendent model and factor structure C2 had a higher level of clarification and simplification. In other words, following exclusion of the ambiguities mentioned earlier (and associated with factor structure A), the best fitting model thereafter in terms of model-fit statistics was factor structure C2.

## 6.4 Connectivity model

### 6.4.1 Summary and conclusions of policy model

The connectivity model is proposed in terms of three factor structures A, B and C as shown in figure 6.20 below. In other words, the model for the connectivity layer was theoretically defined three times and tested with CFA. Aforementioned factor structures B and C are descendent models of A and the process (in terms of a summary) is shown in figure 6.20 below.



*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Figure 6.20: A summary of connectivity model in terms of three structures

Firstly, a CFA was conducted with all Likert statements with linkages to connectivity (as per the Q-sort study) and so, the first model proposition was factor structure A. Although the model was admissible that is, without error in addition to an RMSEA that was close to model-fit threshold, all other model-fit statistics were consistently and notably below cut-off values; comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable).

Secondly, factor structure B was created following a statistical cut-off point namely, factor loadings with .60 or above are retained (as discussed earlier in section 5.1.3.3.7 on page 166). Contrary to earlier factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values for good model-fit.

Thirdly, a model was created after exclusion of logical theory and the resultant factor structure C was also a good model-fit. Again, and contrary to earlier factor structure A there is a proposition for connectivity in terms of factor structure C. For each of the absolute and incremental fit statistics factor structure C was consistently within the cut-off values for good model-fit. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

Hence, factor structure B was the best fitting model that is, regarded as the most consistent in terms of model theory to observed data.

#### **6.4.2 Introduction to factor structures**

The development of each factor structure for connectivity is detailed in the following sections. For each factor structure, there is a CFA diagram to show the theoretical build and factor loadings in addition to **a legend to explain the diagram with clarification:**

- 1) observed measures (Likert statements) are shown in terms of a rectangle and latent factors, in terms of an oval or circle.**
- 2) components of the diagram that are representative of a) existing theory are shown with a white background and b) new theory are shown highlighted in yellow.**

To advance information regarding the following sections: the theoretical build of each factor structure is explained in terms of build aspects – earlier section 5.1.3.2 (heading ‘Existing theory’) on page 161 and section 5.1.3.3 (heading ‘New theory (logical model development)’ on page 162.



### 6.4.3 Factor structure A

Factor structure A is as shown diagrammatically in figure 6.21 below with further statistical information in table 6.53 on page 249. Details follow after the aforementioned figure and table.

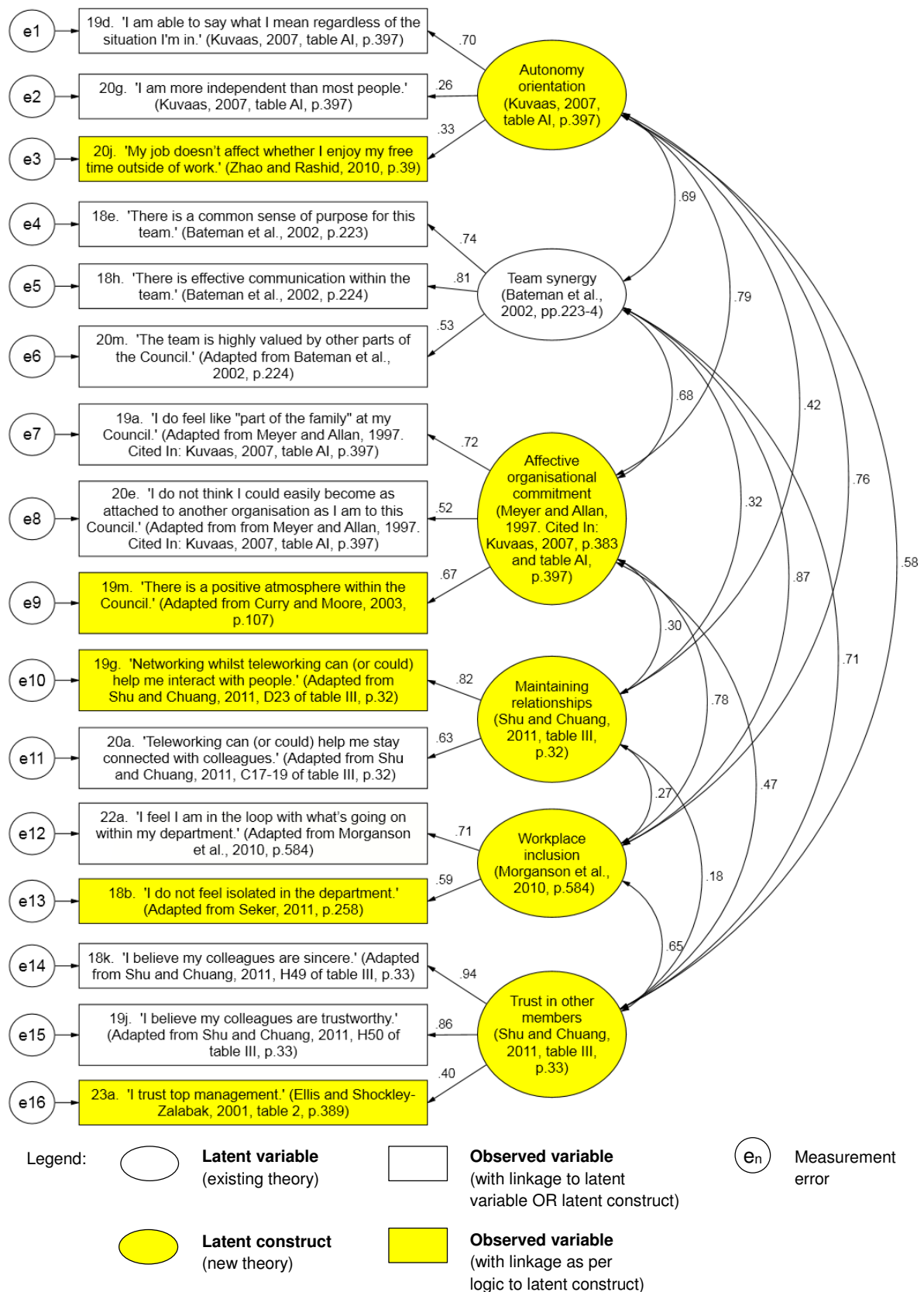


Figure 6.21: Connectivity - factor structure A

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
19d	← Autonomy orientation	.703	1.000 <sup>a</sup>		
20g	← Autonomy orientation	.257	.343***	.417	.399
20j	← Autonomy orientation	.332	.582***		
18e	← Team synergy	.738	1.000 <sup>a</sup>		
18h	← Team synergy	.809	1.154***	.739	.707
20m	← Team synergy	.527	.741***		
19a	← Affective organisational commitment	.720	1.000 <sup>a</sup>		
20e	← Affective organisational commitment	.521	.795***	.676	.673
19m	← Affective organisational commitment	.674	.908***		
19g	← Maintaining relationships	.824	1.000 <sup>a</sup>	.696	.684
20a	← Maintaining relationships	.631	.794***		
22a	← Workplace inclusion	.711	1.000 <sup>a</sup>	.595	.589
18b	← Workplace inclusion	.587	.865***		
18k	← Trust in other members	.944	1.000 <sup>a</sup>		
19j	← Trust in other members	.857	.881***	.800	.716
23a	← Trust in other members	.401	.521***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.53: Factor loadings, CR and  $\alpha$  for factor structure A of connectivity

Following the Q-sort study (see earlier section 3.6 on page 128) there were sixteen Likert statements available for creating a connectivity model. The first CFA was conducted with the sixteen Likert statements and the product is factor structure A as shown earlier in figure 6.21 on page 248 and table 6.53 above.

#### 6.4.3.1 Theoretical build in terms of existing theory

The following section heading refers to the latent variable named, *team synergy*, explained in terms of existing theory and more specifically, in terms of the aspect of existing theory named, *direct grouping*.

Further information regarding all aspects of existing theory are described earlier in figure 5.2 on page 161.

#### 6.4.3.1.1 Team synergy [direct grouping]

Likert statements 18e, 18h and 20m (see table 6.54 below; earlier figure 6.21) as per existing theory are defined in terms of team synergy (Bateman et al., 2002, pp.223-4). Hence, the three observed variables are grouped directly from existing literature as an explanation of the underlying latent variable identified as, team synergy.

<b>Latent variable</b>	<b>ID</b>	<b>Likert statement (observed variable)</b>	<b>7-point measurement:</b>
<b>Team synergy</b> (Bateman et al., 2002, pp.223-4).	18e	'There is a common sense of purpose for this team.' (Bateman et al., 2002, p.223).	1 = Strongly disagree
	18h	'There is effective communication within the team.' (Bateman et al., 2002, p.224).	2 = Disagree
	20m	'The team is highly valued by other parts of the Council.' (Adapted from Bateman et al., 2002, p.224).	3 = Disagree slightly
			4 = Neutral, Not sure or Undecided
			5 = Agree slightly
			6 = Agree
			7 = Strongly agree

Table 6.54: Measurement of team synergy

#### 6.4.3.2 Theoretical build in terms of new theory

In this section, new theory (as applicable to factor structure A) is explained, namely:

- 1) **two latent constructs (see figure 6.7 on page 189) and;**
- 2) **the two corresponding aspects of new theory (see description in parenthesis following each section heading further below).**

The name of each section heading further below is as per the following protocol:

**{name of latent construct} [ {aspect of new theory} ]**

For example, take the following section heading:

**Autonomy [logical grouping]**

In the above example, the heading refers to the latent variable named, *autonomy*, explained in terms of new theory and more specifically, in terms of the aspect of new theory named, *logical grouping*. Further information regarding all aspects of new theory are described earlier in figure 5.3 on page 163.

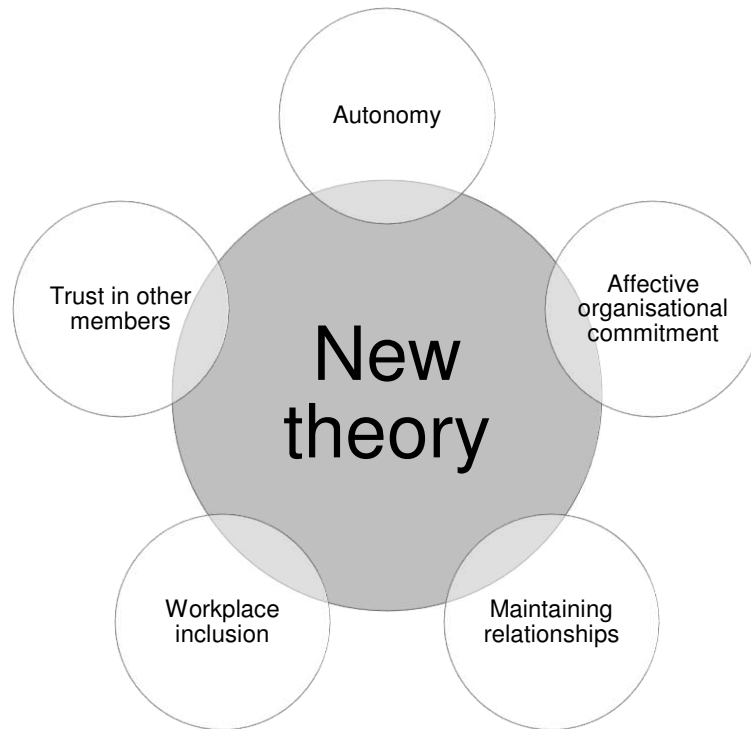


Figure 6.22: New theory latent constructs as per factor structure A [Connectivity]

#### 6.4.3.2.1 Autonomy orientation [logical grouping]

The three Likert statements, 19d, 20g and 20j (see table 6.55 below; earlier figure 6.21) were logically grouped to explain underlying latent construct named, *autonomy orientation*. The former two observed variables 19d and 20g are identified as indicators of autonomy orientation as per existing theory (Kuvaas, 2007, table AI, p.397). The third observed variable 20j is a logical inclusion to the aforementioned existing theory. Likert statement 20j is a measure of *work-leisure conflict* in terms of retention-likelihood (Zhao and Rashid, 2010, p.39).

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Autonomy orientation</b> (Kuvaas, 2007, table AI, p.397)	19d	'I am able to say what I mean regardless of the situation I'm in.' (Kuvaas, 2007, table AI, p.397).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	20g	'I am more independent than most people.' (Kuvaas, 2007, table AI, p.397).	
	20j	'My job doesn't affect whether I enjoy my free time outside of work.' (Zhao and Rashid, 2010, p.39).	

Table 6.55: Measurement of autonomy orientation

Theoretically this research proposes that Likert statement 20j has a linkage to aforementioned latent variable, *autonomy orientation*. Likert statement 20j is, as stated above a measure of *work-leisure conflict* in terms of retention-likelihood (Zhao and Rashid, 2010, p.39) and *work-leisure conflict* would theoretically have linkages to autonomy orientation that is, the greater the level of power and control a worker can exercise over and within their job role, the greater capacity to separate spheres of work and leisure and thus, experience work-life balance.

Thus, to conclude logically, the three observed variables were consistent with explanation of an underlying latent construct identified as, *autonomy orientation*. Hence, three observed variables were logically grouped.

#### 6.4.3.2.2 Affective organisational commitment [logical grouping]

The three Likert statements, 19a, 20e and 19m (see table 6.56 below; earlier figure 6.21) were logically grouped to explain underlying latent construct named, *affective organisational commitment*. The former two observed variables, 19a and 20e are identified as indicators of *affective organisational commitment* as per existing theory (Meyer and Allan, 1997. Cited In: Kuvaas, 2007, table AI, p.397). The third observed variable 19m is a logical inclusion to the aforementioned existing theory.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Affective organisational commitment</b> (Meyer and Allan, 1997. Cited In: Kuvaas, 2007, p.383 and table AI, p.397).	19a	'I do feel like "part of the family" at my Council.' (Adapted from Meyer and Allan, 1997. Cited In: Kuvaas, 2007, table AI, p.397).	1 = Strongly disagree
	20e	'I do not think I could easily become as attached to another organisation as I am to this Council.' (Adapted from Meyer and Allan, 1997. Cited In: Kuvaas, 2007, table AI, p.397).	2 = Disagree
	19m	'There is a positive atmosphere within the Council.' (Adapted from Curry and Moore, 2003, p.107).	3 = Disagree slightly
			4 = Neutral, Not sure or Undecided
			5 = Agree slightly
			6 = Agree
			7 = Strongly agree

Table 6.56: Measurement of affective organisational commitment

Theoretically the proposition is that Likert statement 19m has a linkage to aforementioned latent variable, *affective organisational commitment*. Likert statement 19m is a measure of environment as per existing theory (Curry and Moore, 2003, p.107). As per the details of 19m (as shown in table 6.56) the Likert statement refers to working atmosphere which hypothetically stems from working relationships. Furthermore, the details pertaining to 19a and 20e also refer to working relationships. Thus hypothetically, workers that do feel like part of the family at the organisation (19a), and thus,

could not easily become as attached to another organisation (20e), would also have positive perceptions regarding work environment namely that, the atmosphere is positive (19m).

Thus, to conclude logically, the three observed variables 19a, 20e and 19m are consistent with explanation of an underlying latent construct identified as, *affective organisational commitment*. Hence, the three aforementioned observed variables were logically grouped.

#### 6.4.3.2.3 Maintaining relationships [logical grouping]

The two Likert statements, 19g and 20a (see table 6.57 below; earlier figure 6.21) were logically grouped to explain underlying latent construct named, *maintaining relationships*.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Maintaining relationships</b> (Shu and Chuang, 2011, table III, p.32)	19g	'Networking whilst teleworking can (or could) help me interact with people.' (Adapted from Shu and Chuang, 2011, D23 of table III, p.32).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree
	20a	'Teleworking can (or could) help me stay connected with colleagues.' (Adapted from Shu and Chuang, 2011, C17-19 of table III, p.32).	

Table 6.57: Measurement of maintaining relationships

The two Likert statements were adapted from existing theory (Shu and Chuang, 2011, table III, p.32); as per existing theory, the Likert statement regarding 19g aligned to latent variable, *understanding and learning* and Likert statement regarding 20a to latent variable, *maintaining relationships*. Furthermore, the former was one of 6 items and the latter, one of 7 items in existing theory (before Shu and Chuang, 2011, applied .cut-off criterion with regards to factor loadings), that collectively explain the aforementioned latent variables (respectively). In contrast, the two observed variables as per the research study are taken in isolation, that is outside of the existing theory groups. In isolation, a theoretical correlation can be identified logically: the former observed variable 19g is a linkage to interaction and the latter 20a is a linkage to connectivity; thus the two observed variables are consistent in terms of latent construct named, *maintaining relationships*.

Hence, hypothetically *maintaining relationships* is an overarching latent construct being explained by the two aforementioned observed variables, 19g and 20a.

#### 6.4.3.2.4 Workplace inclusion [logical grouping]

The two Likert statements, 22a and 18b (see table 6.58 below; earlier figure 6.21) were logically grouped to explain underlying latent construct named, *workplace inclusion*.

The research study firstly looked to the details of the two Likert statements and found that as a collective set or pair, the statements follow a theme namely, in relation to *isolation*. Secondly and in addition, this research study turns to the existing theory regarding each Likert statement to derive a name for the latent construct that hypothetically would be explained by the observed variables in question. As per existing theory Likert statement 22a had linkage to variable, *workplace inclusion* and 18b to *loneliness* (the latter namely due to the fact that word, *isolated* was utilised as opposed to the word 'loneliness' used by Şeker, 2011, p.258). Nonetheless, the two observed variables follow a theme consistent to *isolation* or rather, in terms of positive viewpoint, *workplace inclusion*. Hence, hypothetically *workplace inclusion* was the underlying latent construct explained by the two aforementioned observed variables, 22a and 18b.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
<b>Workplace inclusion</b> (Morganson et al., 2010, p.584)	22a	'I feel I am in the loop with what's going on within my department.' (Adapted from Morganson et al., 2010, p.584).	1 = Very little 2 = Little 3 = Marginally (negative) 4 = Unsure, Undecided, Neutral or Impartial 5 = Marginally (positive) 6 = Much 7 = Very much
	18b	'I do not feel isolated in the department.' (Adapted from Şeker, 2011, p.258).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided 5 = Agree slightly 6 = Agree 7 = Strongly agree

Table 6.58: Measurement of workplace inclusion

#### 6.4.3.2.5 Trust in other members [logical grouping]

The three Likert statements, 18k, 19j and 23a (see table 6.59 on page 255; earlier figure 6.21) were logically grouped to explain underlying latent construct named, *trust in other members*. The former two observed variables, 18k and 19j are identified as indicators of *trust in other members* as per existing theory (Shu and Chuang, 2011, p.33). The third observed variable 23a is a logical inclusion to the aforementioned existing theory.

Theoretically the proposition is that Likert statement 23a has a linkage to aforementioned latent variable, *trust in other members*. Likert statement 23a is a measure of *trust in top management* (Ellis and Shockley-Zalabak, 2001, table 2, p.389). As per the details of 23a (as shown in table 6.59) the Likert statement follows a theme consistent with the former two Likert statements 18k and 19j namely, *trust* and there is consistency also with the name of the latent variable of existing theory namely, *trust in other members*; specifically, members of top management. Hence, the three observed variables were logically grouped to explain an underlying latent construct named, *trust in other members*.

Latent construct	ID	Likert statement (observed variable)	7-point measurement:
Trust in other members (Shu and Chuang, 2011, table III, p.33).	18k	'I believe my colleagues are sincere.' (Adapted from Shu and Chuang, 2011, H49 of table III, p.33).	1 = Strongly disagree 2 = Disagree 3 = Disagree slightly 4 = Neutral, Not sure or Undecided
	19j	'I believe my colleagues are trustworthy.' (Adapted from Shu and Chuang, 2011, H50 of table III, p.33).	5 = Agree slightly 6 = Agree 7 = Strongly agree
	23a	'I trust top management.' (Ellis and Shockley-Zalabak, 2001, table 2, p.389).	1 = Very little 2 = Little 3 = Marginally (negative) 4 = Unsure, Undecided, Neutral or Impartial 5 = Marginally (positive) 6 = Greatly 7 = Very greatly

Table 6.59: Measurement of trust in other members

Following the above explanations in terms of existing theory and new theory regarding the theoretical build of factor structure A, the model is now evaluated in terms of consistency to observed data (model-fit statistics).

#### 6.4.3.3 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.60 on page 256. Contrary to model-fit the chi-square ( $\chi^2$ ) statistic was large in value and significant (p-value was less than .05; Hayduk, 1996. *Cited in*: Kline, 2011, p.199; and Hooper et al., 2008, p.58). However as mentioned earlier,  $\chi^2$  (by calculation) is sensitive to sample size (Bentler and Bonnet, 1980. *Cited In*: Hooper et al., 2008, p.54; and Jöreskog and Sörbom, 1993. *Cited In*: Hooper et al., 2008, p.54) and so the model is evaluated in terms of the additional statistics as provided in table 6.60 on page 256.



### Statistics for Connectivity A

Chi-square ( $\chi^2$ )	352.029
Degrees of freedom (df)	89
Probability level ( $p$ )	.000
CFI	.822
RFI	.703
NFI	.780
RMSEA (90% CI)	.106 (.095 - .118) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.60: Model-fit statistics for factor structure A of connectivity

CFI value was indicative of poor fit (below .90 threshold as per Hu and Bentler 1999, p.4; and Hu and Bentler, 1999. *Cited In:* Corn, 2010, p.363). In addition, the two following fit statistics were also below what would be deemed as model-fit namely: 1) NFI (below the .90 threshold as per Bentler and Bonnet, 1980. *Cited In:* Hooper et al., 2008, p.55; and Segars and Grover 1993. *Cited In:* Corn, 2010, p.363) and 2) RFI (below the .90 threshold as per Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4).

RMSEA was close to the statistical parameter with regards to model-fit that is, .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137).

#### 6.4.3.4 Key conclusion

To conclude, there is **not** a clear proposition for connectivity in terms of factor structure A: although the model was admissible that is, without error in addition to an RMSEA that was close to model-fit threshold, all other model-fit statistics were consistently and notably below cut-off values; comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable).

### 6.4.4 Factor structure B

Factor structure B is as shown diagrammatically in figure 6.23 below with further statistical information in table 6.61 on page 258; the model is the result after applying the cut-off criterion to earlier factor structure A – details follow after the aforementioned figure and table.

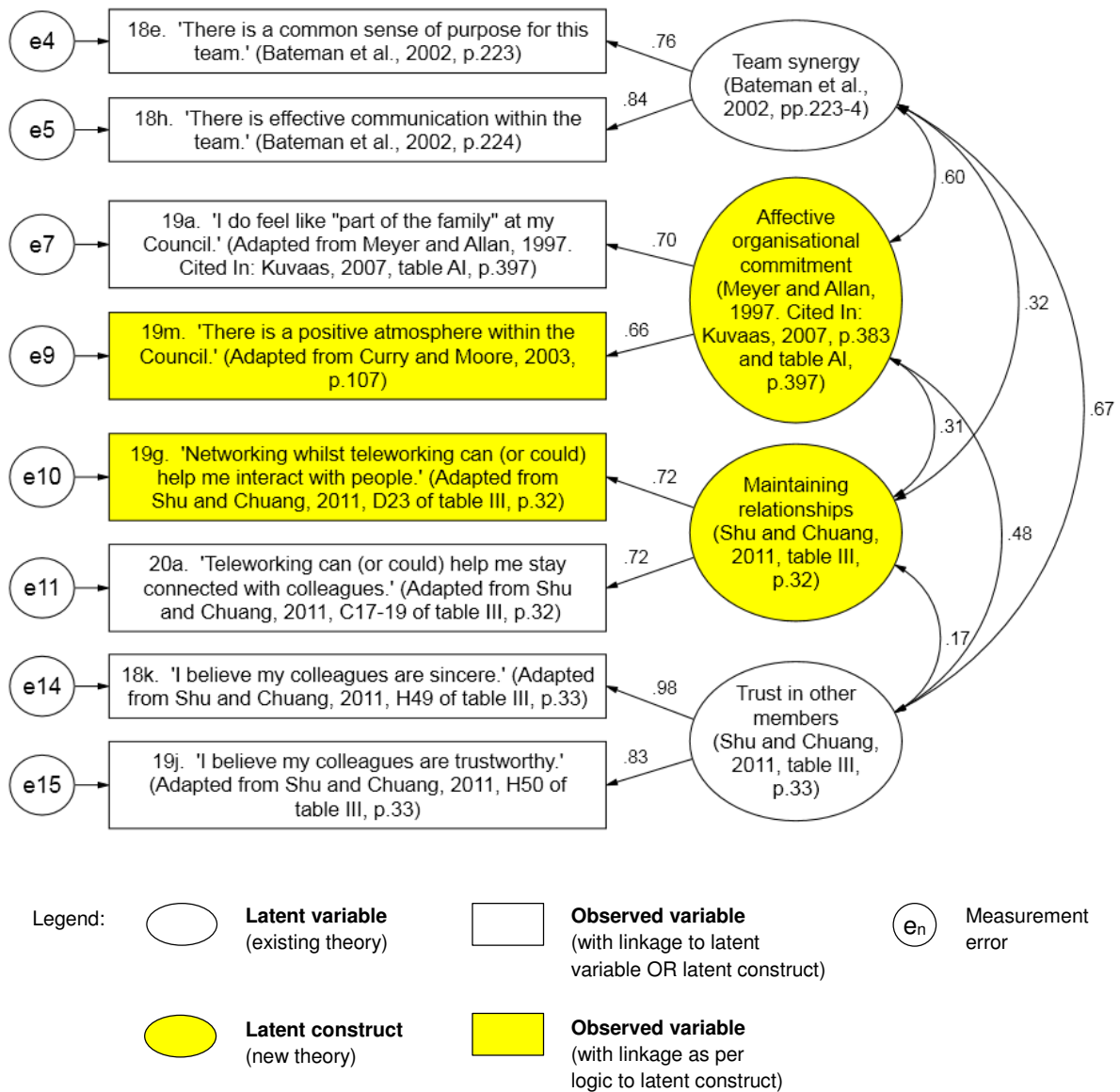


Figure 6.23: Connectivity - factor structure B

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18e	← Team synergy	.761	1.000 <sup>a</sup>	.782	.780
18h	← Team synergy	.841	1.163***		
19a	← Affective organisational commitment	.702	1.000 <sup>a</sup>	.631	.630
19m	← Affective organisational commitment	.656	.908***		
19g	← Maintaining relationships	.719	1.000 <sup>a</sup>	.685	.684
20a	← Maintaining relationships	.724	1.043***		
18k	← Trust in other members	.983	1.000 <sup>a</sup>	.904	.898
19j	← Trust in other members	.829	.818***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.61: Factor loadings, CR and  $\alpha$  for factor structure B of connectivity

Aspects of new theory are described earlier in figure 5.3 on page 163. In the section below, the aspect of figure 5.3 that applies to factor structure B is identified and stated in parenthesis after the section heading. As mentioned earlier, factor structure B is the resultant model after applying a cut-off criterion with regards to factor loadings:

#### 6.4.4.1 Factor loadings [cut-off criterion]

As aforementioned in the earlier summary, a cut-off criterion is adopted in this research study: greater than or equal to .60 (for details see section 5.1.3.3.7 on page 166) with regards to factor loadings. After applying the cut-off to factor structure A, the observed variables as shown in table 6.62 on page 259 were excluded:

ID	Likert statement (Observed variable)	Factor loading	Description
19d	'I am able to say what I mean regardless of the situation I'm in.' (Kuvaas, 2007, table AI, p.397).	.70	Three Likert statements, 19d, 20g and 20j explain latent construct, <i>autonomy orientation</i> <sup>a</sup> . Following the above exclusions namely, 20g and 20j in addition to a 2:1 minimum, indicators to latent factor requirement, Likert statement 19d was thus, necessarily excluded too. Hence, latent construct <i>autonomy orientation</i> is excluded from the model.
20g	'I am more independent than most people.' (Kuvaas, 2007, table AI, p.397)	.26	Less than .60 cut-off criterion thus, excluded.
20j	'My job doesn't affect whether I enjoy my free time outside of work.' (Zhao and Rashid, 2010, p.39).	.33	Less than .60 cut-off criterion thus, excluded.
20m	'The team is highly valued by other parts of the Council.' (Adapted from Bateman et al., 2002, p.224).	.53	Less than .60 cut-off criterion thus, excluded.
20e	'I do not think I could easily become as attached to another organisation as I am to this Council.' (Adapted from Meyer and Allan, 1997. <i>Cited In</i> : Kuvaas, 2007, table AI, p.397).	.52	Less than .60 cut-off criterion thus, excluded.
22a	'I feel I am in the loop with what's going on within my department.' (Adapted from Morganson et al., 2010, p.584).	.71	Two Likert statements 22a and 18b explain latent construct, <i>workplace inclusion</i> <sup>b</sup> . Following the above exclusion of 18b in addition to a 2:1 minimum, indicators to latent factor requirement, Likert statement 22a was thus, necessarily excluded too. Hence, latent construct, <i>workplace inclusion</i> is excluded from the model.
18b	'I do not feel isolated in the department.' (Adapted from Şeker, 2011, p.258).	.59	Less than .60 cut-off criterion thus, excluded.
23a	'I trust top management.' (Ellis and Shockley-Zalabak, 2001, table 2, p.389).	.40	Less than .60 cut-off criterion thus, excluded.

<sup>a</sup>As stated earlier in section 6.4.3.2.1 on page 251 regarding factor structure A.

<sup>b</sup>As stated earlier in section 6.4.3.2.4 on page 254 regarding factor structure A.

Table 6.62: Exclusions as applicable to factor structure A [Connectivity] following cut-off criterion

The resultant model following the above was factor structure B and the model is evaluated in terms of consistency to observed data (model-fit statistics) in the following section.

#### 6.4.4.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.63 below. Consistent with model-fit, the chi-square ( $\chi^2$ ) statistic was not large (Hair et al., 2006, p.746) and non-significant (p-value was greater than .05; Hayduk, 1996. *Cited in:* Kline, 2011, p.199; and Hooper et al., 2008, p.58).

Chi-square ( $\chi^2$ )	10.362
Degrees of freedom (df)	14
Probability level ( <i>p</i> )	.735
CFI	1.000
RFI	.973
NFI	.987
RMSEA (90% CI)	.000 (.000 - .044) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.  
<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.63: Model-fit statistics for factor structure B of connectivity

CFI value of 1.000 is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). However, a value of 1.000 does not indicate perfect fit that is, CFI will always equal 1 when  $\chi^2 \leq df$  (Kline, 2011, p.208). Nonetheless, NFI value of .987 is indicative of good fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In:* Hooper et al., 2008, p.55). Additionally, the RFI value of .973 was within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4) and can be regarded as not too distant from the 1.0 upper limit as per Bollen (1986. *Cited In:* Corn, 2010, p.363).

RMSEA was absolute zero; in other words, well within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137) and good model-fit in terms of the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). Furthermore, the upper

confidence limit of RMSEA is less than the .08 cut-off value for reasonable error of approximation as per Browne and Cudeck (1993. *Cited In*: Harrington, 2009, p.67); and Biswas (2009, p.156).

#### 6.4.4.3 Key conclusion

To conclude, and contrary to earlier factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure B was indicative of good consistency of the model to observed data.

#### 6.4.5 Factor structure C

Factor structure C is shown in figure 6.24 below with further statistical information in table 6.64 on page 262. The model is the result of utilising existing theory only as detailed in the section after the aforementioned figure and table.

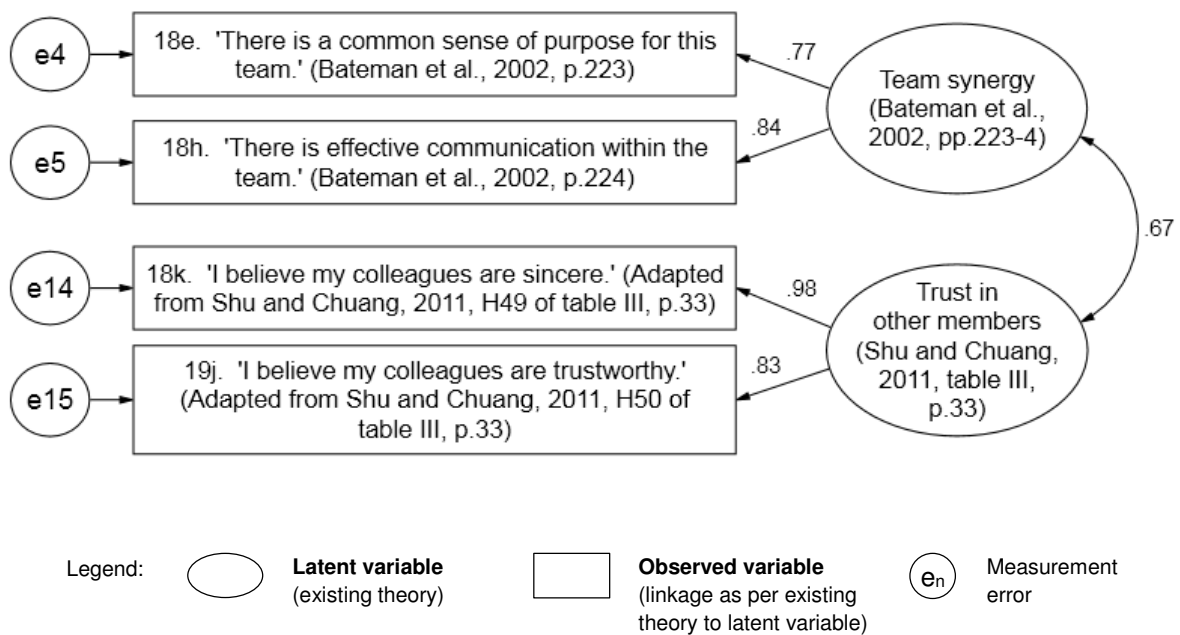


Figure 6.24: Connectivity - factor structure C

OV	Latent factor	Factor loadings		CR	$\alpha$
		Standardised	Unstandardised <sup>b</sup>		
18e	← Team synergy	.765	1.000 <sup>a</sup>	.782	.780
18h	← Team synergy	.836	1.150***		
18k	← Trust in other members	.983	1.000 <sup>a</sup>	.904	.898
19j	← Trust in other members	.829	.818***		

Note. n = 264; OV = Observed variable; CR = Composite reliability;  $\alpha$  = Cronbach's alpha.

<sup>a</sup>Parameter constraint between the opposite observed variable and latent factor that is, constrained to 1.000. In other words, opposite latent factor was scaled to opposite observed variable (Harrington, 2009, figure 2.1, p.22). Furthermore, p-value was not computed as per the aforementioned constraint. <sup>b</sup>P-values in this column (where stated) are AMOS output for unstandardised factor loadings; and are used to determine the statistical significance of the opposite standardised factor loadings (Paswan, 2009, p.39).

\*\*\* p < .001.

Table 6.64: Factor loadings, CR and  $\alpha$  for factor structure C of connectivity

Aspects of existing theory are described earlier in figure 5.2 on page 161; in the section below, the aspect of figure 5.2 that was applied to earlier factor structure B (resulting in factor structure C) is identified and stated in parenthesis after the section heading.

#### 6.4.5.1 Existing theory [exclusion of latent construct(s)]

As aforementioned in the earlier summary, connectivity model factor structure B was further refined and optimised by an exclusion of logically created latent constructs with resultant model, factor structure C. In other words, a factor structure was created with existing theory only. Factor structure C is as shown in figure 6.24 on page 261 and table 6.64 above. The model is evaluated in terms of consistency to observed data (model-fit statistics) below.

#### 6.4.5.2 Model-fit statistics

In terms of consistency of data to the theoretical model, the research study refers to the model-fit statistics in table 6.65 on page 263. Consistent with model-fit, the chi-square ( $\chi^2$ ) statistic was small (Hair et al., 2006, p.746) and non-significant (p-value was greater than .05; Hayduk, 1996. Cited in: Kline, 2011, p.199; and Hooper et al., 2008, p.58). In addition and notably, the model had 1 degree of freedom.

**Statistics for Connectivity C**

Chi-square ( $\chi^2$ )	1.263
Degrees of freedom (df)	1
Probability level ( $p$ )	.261
CFI	1.000
RFI	.986
NFI	.998
RMSEA (90% CI)	.032 (.000 - .171) <sup>a</sup>

*Note.* n = 264; CFI = Comparative fit index; CI = Confidence interval; NFI = Normed fit index; RFI = Relative fit index; RMSEA = Root mean square error of approximation.

<sup>a</sup>Stated in parentheses are lower and upper limits of confidence interval, respectively.

Table 6.65: Model-fit statistics for factor structure C of connectivity

CFI value of 1.000 is indicative of good model-fit that is, above the higher .95 cut-off value as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). NFI value of .998 was indicative of good fit that is, above the higher .95 cut-off as per Hu and Bentler (1999. *Cited In:* Hooper et al., 2008, p.55). Additionally, the RFI value .986 was within statistical parameters with regards to model-fit that is, greater than .90 (Marsh and Hau, 1996. *Cited In:* Hu and Bentler, 1999, p.4) and can be regarded as not too distant from the 1.0 upper limit as per Bollen (1986. *Cited In:* Corn, 2010, p.363).

RMSEA was within the statistical parameters with regards to model-fit that is, less than .10 (Browne and Cudeck, 1993. *Cited In:* Harrington, 2009, p.67, and *Cited In:* Brown, 2006, p.87; Bachand and Beard, 1995. *Cited In:* Munro, 2005, p.365; and Little et al., 2007, p.137) and good model-fit in terms of the higher standard of less than .06 as per Hu and Bentler (1999, p.1, p.27); and Brown (2006. *Cited In:* Harrington, 2009, p.75). However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

#### 6.4.5.3 Key conclusion

To conclude, and contrary to earlier factor structure A there is a proposition for connectivity in terms of factor structure C. For each of the absolute and incremental fit statistics factor structure C was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition



to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure C was indicative of good consistency of the model to observed data. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

#### **6.4.6 Conclusions [Connectivity model]**

Factor structure A was comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable). Contrary to factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values for good model-fit. Factor structure C was consistently within the cut-off values for good model-fit too. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

Finally, and to conclude the connectivity model, factor structure B was the best fitting model that is, regarded as the most consistent in terms of model theory to observed data.

## Chapter 7: Conclusions

### 7.1 Teleworking theory

#### 7.1.1 Definitions of teleworking

The definition of teleworking is one that is unclear in existing literature. Definitions of telework posited by research studies vary to such an extent that there is no standard unit of measure or consensus. It was thus, important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also.

Teleworking was defined in terms of:

- 1) ***root definition (indirectness and distance),***
- 2) ***conceptual definition and***
- 3) ***abstraction.***

In other words, teleworking was defined in terms of comprehension and so, the aforementioned ambiguity over the definition as stated earlier can be alleviated and subsequent modelling of the definitions could be achieved and to a quality and standard that may otherwise not be feasible.

There were four models of the above definitions of teleworking namely:

- 1) **Socio-factors of teleworking [Model 1 of 4]**
- 2) **Maturity model of teleworking [Model 2 of 4]**
- 3) **Technical factors of teleworking [Model 3 of 4]**
- 4) **Taxonomy of teleworking [Model 4 of 4]**

Conclusions regarding each of the four theoretical models as stated above, follows below.

#### 7.1.2 Socio-factors of teleworking [Model 1 of 4]

There were a number of socio-factors identified as per existing literature with regards to teleworking. The factors were grouped in terms of minor and major socio-factors. Subsequently, major socio-factors were identifiably grouped in terms of three broad socio-categories: *resourcing*, *governance* and *networking*. Following, this categorisation, the three broad categories were identifiably linked to the first three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity*. The additional two layers of the teleworking maturity was out of scope for this research study namely process and strategy.

### 7.1.3 Maturity model of teleworking [Model 2 of 4]

The first three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity* were consistent with the three broad socio-categories stated above. Thus, the three layers of the maturity model were applicable to this research study and hence utilised. The maturity model provides a context and meaning to the research study in terms of teleworking maturity and development. Teleworking is a socio-technical working practice and the socio-aspect (in addition to linkages to maturity) were studied. The research then turned to the technical aspect.

### 7.1.4 Technical factors of teleworking [Model 3 of 4]

Teleworking is currently embedded with ambiguity over definition and so, technical factors (*dimensions, attributes and organisational roles*) were identified to simplify and clarify the definitions of teleworking. **Although, the technical aspect of teleworking is out of scope for this research study in terms of analysis, data was collected for potential future work.** In terms of theory, there were 11 dimensions identifiable with two attributes for each dimension. The dimensions are stated in bold and attributes in parenthesis as follows: **content** (*electronic and physical*), **orientation** (*task and time*), **hardware location** (*dependent and independent*), **software deployment** (*server and stand-alone*), **ICT usage** (*regularly and irregularly*), **spatial locality** (*on-site and off-site*), **gateways** (*too few and too many*), **contextual constraints** (*high and low*), **response or responsiveness** (*prompt and untimely*), **activity** (*asynchronous and synchronous*), and **networking capacity** (*online and offline*). Furthermore, three organisational roles in terms of existing literature regarding business, work and employees, were identified as applicable to types of teleworking practices. The three organisational roles identified were, **intra**, **inter** and **extra-organisational**.

In terms of future work data may be utilised to identify types of teleworking practice (or indications of). Potential utility following the identification of types of teleworking is to address a complexity that is, mapping of types of teleworking practices to types of jobs or job roles (profiling of teleworking practices; Hill and Menda, 1998, figure 5, p.58) in terms of a positivist viewpoint (Saunders et al., 2012, figure 4.1, p.128).

### 7.1.5 Taxonomy of teleworking [Model 4 of 4]

The above three models were brought together in terms of a taxonomy of teleworking. The taxonomy of teleworking as shown earlier in this thesis in figure 2.46 on page 116 is an amalgamation of the following: socio and technical factors of teleworking in addition to the layers of the maturity model. Furthermore, the taxonomy coherently encapsulates the theory chapter namely, each of the models of teleworking; described as manifest definitions of teleworking. The taxonomy has a consistency to the viewpoint of Garrett and Danziger (2007, p.29) in terms of being a model that is conceptually guided.

## 7.2 Confirmatory factor analyses

Confirmatory factor analyses were conducted with regards to model 1 and model 2 of the theory stated above. Model 3 as stated earlier was out of scope for this research study namely, technical factors of teleworking. Model 4 provides an overview of the three aforementioned theory models, 1, 2 and 3. The analysis followed the six steps as described below.

**Firstly, socio-factors were identified with regards to the theory that is, model 1** and as shown in earlier theory section 2.1.3.1.

**Secondly, the socio-factors were grouped in terms of model 2 namely three layers of the teleworking maturity model namely, *resource*, *policy* and *connectivity*. Hence, there were potentially three theoretical models of socio-factors that could be created and tested with confirmatory factor analysis.**

**Thirdly, socio-measures were identified in terms of Likert statements with regards to socio-factors (see sections 3.3 and 2.1.3.1.4 respectively) and via a process of reduction in the number of Likert statements, a set of Likert statements (socio-measures) was brought forward for each of the three categories of maturity namely, resource, policy and connectivity.**

**Fourthly, a theoretical model of *resource*, *policy* and *connectivity* was constructed from these socio-measures of socio-factors (as described in earlier section 5.1.3) and the model was named factor structure A. In other words, there were three models named as, factor structure A of resource, factor structure A of policy and factor structure A of connectivity.**

**Fifthly, there were exclusions of socio-measures as per a) statistical ambiguities, b) a cut-off criterion with regards to factor loadings and c) new theory (logically created constructs) as a final step was excluded altogether. In contrast to exclusions, models were optimised in terms of latent variable aggregation and clarification. Following exclusions and optimisations as stated, a number of additional and descendent-type factor structures were identifiable. Thus each of the three models, resource, policy and connectivity had at least three variations in terms of factor structures. These variations or additional factor structures were named B, C and so on. Factor structures of each model, *resource*, *policy* and *connectivity* were tested via confirmatory factor analysis.**

**Sixthly, the confirmatory factor analysis showed a best fitting factor structure for each model, *resource*, *policy* and *connectivity*. A conclusion with regards to factor structures of each model and in terms of best-fitting model follows below.**

## 7.2.1 Resource model

There were four factor structures of resource namely, A, B, C and D. To conclude the resource model: the first two factor structures A and B had the least consistency with observed data compared to the latter two C and D which had higher standards of fit. Additionally, **factor structure D showed the highest level of convergence of theory to observed data compared to A, B and C. Thus, factor structure D was the best-fitting model. Diagrammatically and statistically, factor structure D is shown in figure 6.10 on page 202; and as per table 6.20 on page 203 and model-fit statistics in table 6.21 on page 204.**

A conclusion per factor structure follows below.

### 7.2.1.1 Factor structure A

To conclude, the extent to which there is a firm proposition for resource in terms of factor structure A is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics are below cut-off values suggesting that the model is not as consistent with observed data as may be expected. Furthermore, a source of the problem associated with poor fit regarding the model is a negative error variance associated with the latent variable *work pressure* (otherwise known as a Heywood case); thus, the model was an inadmissible solution.

The observed variable with linkages to the aforementioned Heywood case was excluded (Hair et al., 2006, p.794). Following this refinement and optimisation, the outcome was factor structure B (with improved model-fit statistics) as per the section below.

### 7.2.1.2 Factor structure B

To conclude, the extent to which there is a firm proposition for resource in terms of factor structure B is limited: although CFI and RMSEA for this model are indicative of model-fit, contrarily other fit statistics were below cut-off values suggesting that the model is not as consistent with observed data as may be expected. However, factor structure B was an admissible solution albeit with the caveats as aforementioned above.

### 7.2.1.3 Factor structure C

To conclude, there is a proposition for resource in terms of factor structure C; comparably an improvement over earlier factor structures A and B. Each of the absolute and incremental fit indices namely, CFI, RFI NFI and RMSEA were within the parameters associated with model-fit with the exception of chi-square which was found to be significant (p-value was not greater than .05) and indicative of an inconsistency between the model and observed data.

#### 7.2.1.4 *Factor structure D*

To conclude, and contrary to earlier factor structures there is a firm proposition for resource in terms of factor structure D; comparably a large improvement over the three earlier models, factor structures A, B and C. For each of the absolute and incremental fit statistics factor structure D was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure D was indicative of good consistency of the model to observed data.

### 7.2.2 **Policy model**

There were six factor structures of policy; the first two were namely, A and B and the subsequent four factor structures were alternative models regarding C that is, factor structures C1, C2, C3 and C4.

To conclude the policy model: although factor structure A was most favourable in terms of model-fit statistics alone, descendent model and factor structure C2 had a higher level of clarification and simplification. In other words, following exclusion of ambiguities (that were associated with factor structure A), **the best fitting model** thereafter in terms of model-fit statistics **was factor structure C2. Diagrammatically and statistically, factor structure C2 is shown in figure 6.17 on page 230; and as per table 6.40 on page 231 and model-fit statistics in table 6.43 on page 234.**

A conclusion per factor structure follows below.

#### 7.2.2.1 *Factor structure A*

To conclude, there is a proposition for policy in terms of factor structure A; for each of the incremental fit statistics factor structure A was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI. RMSEA was also indicative of model-fit with the exception of a significant and large chi-square. Additionally, in terms of exception, three observed variables that not statistically significant at  $p < .05$ . Thus, analysis as per the above regarding factor structure A is indicative of a consistency of the model to observed data with the exceptions stated above.

#### 7.2.2.2 *Factor structure B*

To conclude, there is a proposition for policy in terms of factor structure B; and comparably an improvement in terms of incremental fit indices over earlier factor structure A. In each of the incremental fit statistics factor structure B was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit. An exception was: a significant chi-square value; indicative of inconsistency between model and observed data. Thus, analysis as per the above regarding factor structure B is indicative of a consistency of the model to observed data with the exception as stated above.

#### 7.2.2.3 *Factor structure C1*

To conclude, there is a proposition for policy in terms of factor structure C1. In each of the incremental fit statistics factor structure C1 was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit albeit at a lower threshold compared to earlier factor structures A and B. An exception as with earlier factor structures was: a significant chi-square value; indicative of inconsistency between model and observed data. Thus, analysis as per the above regarding factor structure C1 is indicative of a consistency of the model to observed data with the exception as stated above.

#### 7.2.2.4 *Factor structure C2*

To conclude, there is a proposition for policy in terms of factor structure C2. In each of the incremental fit statistics factor structure C1 was consistently within the cut-off values: good model-fit regarding CFI, NFI and RFI and additionally, RMSEA was indicative of model-fit albeit at a lower threshold compared to earlier factor structures A and B. An exception as with earlier factor structures was: a significant chi-square value; indicative of inconsistency between model and observed data. Furthermore, factor structure C2 was a marginal improvement over C1 in terms of AIC. Thus, analysis as per the above regarding factor structure C1 is indicative of a consistency of the model to observed data, comparably better than C1 and with the exception as stated above.

#### 7.2.2.5 *Factor structure C3*

To conclude, there is **not** a firm proposition for policy in terms of factor structure C3. In each of the incremental fit statistics factor structure C3 was consistently weaker compared to C1 and C2 and met model-fit at a lower threshold for NFI and RFI. Additionally, RMSEA was indicative of poor fit. Certainly as with earlier factor structures, chi-square value was significant; indicative of inconsistency between model and observed data. Furthermore, the model is weaker than factor structures C1 and C2, as per the AIC. Hence, existing theory as per factor structure C3 had the least consistency to observed data compared factor structures C1 and C2; new theory as per the latter two (C1 and C2) created more favourable models compared to existing theory (C3).

#### 7.2.2.6 *Factor structure C4*

To conclude, there is **not** a firm proposition for policy in terms of factor structure C4. In each of the incremental fit statistics factor structure C4 was consistently weaker compared to C1 and C2 and met model-fit at a lower threshold for NFI and RFI. Additionally, RMSEA was indicative of near fit. Certainly as with earlier factor structures, chi-square value was significant; indicative of inconsistency between model and observed data. Furthermore, the model is weaker than factor structures C1 and C2, as per the AIC and comparable in like terms to C3.

### 7.2.3 Connectivity model

There were three factor structures of connectivity namely, A, B and C. To conclude the connectivity: factor structure A was comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable). Contrary to factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values for good model-fit. Factor structure C was consistently within the cut-off values for good model-fit. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

**Finally, and to conclude the connectivity model, factor structure B was the best fitting model that is, regarded as the most consistent in terms of model theory to observed data. Diagrammatically and statistically, factor structure B is shown in figure 6.23 on page 257; and as per table 6.61 on page 258 and model-fit statistics in table 6.63 on page 260.**

A conclusion per factor structure follows below.

#### 7.2.3.1 *Factor structure A*

To conclude, there is not a clear proposition for connectivity in terms of factor structure A: although the model was admissible that is, without error in addition to an RMSEA that was close to model-fit threshold, all other model-fit statistics were consistently and notably below cut-off values; comprehensively indicative of a model that would require an (if not large) improvement (before consistency with observed data would be identifiable).

#### 7.2.3.2 *Factor structure B*

To conclude, and contrary to earlier factor structure A there is a firm proposition for connectivity in terms of factor structure B; comparably a large improvement over earlier factor structure A. For each of the absolute and incremental fit statistics factor structure B was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure B was indicative of good consistency of the model to observed data.

#### 7.2.3.3 *Factor structure C*

To conclude, and contrary to earlier factor structure A there is a proposition for connectivity in terms of factor structure C. For each of the absolute and incremental fit statistics factor structure C was consistently within the cut-off values: good model-fit regarding CFI, NFI, RFI and RMSEA in addition



to a non-significant and small chi-square value. Thus, analysis as per the above regarding factor structure C was indicative of good consistency of the model to observed data. However, there was a wide confidence level, with an upper limit far exceeding the aforementioned .10 threshold for model-fit and signifying a degree of unpredictability regarding model replication (future studies).

## **7.3 Utility of study**

### **7.3.1 Utility of teleworking theory**

As mentioned earlier, the definition of teleworking is one that is unclear in existing literature. It was thus, important to determine a clear theoretical area of investigation to reduce ambiguity not only in theoretical development but for the decision-making in practical elements of research also. The utility (stated earlier in this thesis in figure 2.2 on page 28) of the three definitions as stated in this study namely, root definition, conceptual definitions and abstraction definition is as follows:

- 1) clarification to the research investigation,**
- 2) a comprehension of teleworking and thus,**
- 3) improvement potentially with regards to the level of consensus among researchers over the definitions of teleworking,**
- 4) improvement in the measurement capacity of teleworking that is an extensive number of factors of teleworking were identified as per the theoretical modelling process,**
- 5) improvements in research quality (as per this thesis for example), and**
- 6) potential improvement following the modelling process in terms of probabilities of data extrapolation that is, the generalisation of research findings of this study to teleworking practices at other or similar organisations.**

Four theoretical models (manifest definitions) were created as stated below:

- 1) Socio-factors of teleworking**
- 2) Maturity model of teleworking**
- 3) Technical factors of teleworking**
- 4) Taxonomy of teleworking**

The latter, taxonomy of teleworking coherently encapsulated the former three models and so, the utility of the taxonomy (in terms of the former three models) is as follows:

#### Utility of taxonomy of teleworking

There is utility with regards to the taxonomy of teleworking in terms of a coherent and co-ordinated structure. The taxonomy can be utilised at the very least in terms of language and awareness of potential benefits and driving forces of teleworking in addition to potential drawbacks and restraining

forces of teleworking. In addition, further identification of factors of teleworking will add to the potential socio and technical measures of teleworking. Building on the work of taxonomy is a process of maturity and will improve over time such that further development may standardise the taxonomy. Hence, there is potential for greater consistency across researchers in terms of utilisation of measures pertinent to teleworking and types of teleworking. Publications may improve in terms of comparability (and which is currently infeasible as authors utilise different definitions of teleworking without a backdrop of a standardised taxonomy).

### **7.3.2 Utility for organisations**

A utility of this study is that the confirmatory factor analyses have produced stable models for each layer of the maturity model and as put forward in this thesis the models are:

- 1) factor structure D of resource,
- 2) factor structure C2 of policy and
- 3) factor structure B of connectivity.

The three best models are representative of manifest definitions of teleworking (manifest in terms of socio-factors and alignment to maturity layers categorisation). The three models together are a comprehension of teleworking and so, studies of teleworking incorporating the questions of each of the best CFA models will present organisations with an awareness and socio-measure of teleworking for decision-making. For example, perceptions of teleworking that are weak (or low statistically) with regards Likert statements of resource such as innovation and job satisfaction are indicative of decisions that need to be actioned with regards to technical support and work schedules respectively. A technical support team that can support workers whilst off-site for example may improve teleworking practices. Time management as stated in this thesis (Chapter 2) is found to be a negative impact of teleworking and task-oriented work as opposed to time-oriented may be more compatible with teleworking. Thus, work schedules that are oriented more so to task may improve perceptions of teleworking and thus job satisfaction too.

### **7.3.3 Selection of organisation**

The research study adopted a positivist approach that is, data in empirical form was tested with advanced statistical analysis and which confirmed a proposition for each of the layers of the maturity model. Had the research adopted a more qualitative approach for example, findings based on interviews at Council-Z for example, the results may be less easily generalised to other council organisations that is, perceptions may differ in different environments and areas and so, applicability of one qualitative study (specific to a group of people) may not be easily extrapolated (or have a transferrable capacity) directly to workers of other councils.

A positivist approach however may offer an approach to bridge the gap between different councils in terms of the applicability of findings that is, model-fit statistics confirm propositions for models: D of resource, C2 of policy and B of connectivity. Thus, the models can be adopted by other council organisations that is, there is a set of questions that can be asked in surveys with employees. Weakness for each layer can be identified and strengthened to improve the capacity to which teleworking can mature and create a more capable organisation. Although the research study was at a council, this does not limit the extent to which the findings can be applied to other types of organisations for example businesses of the private sector. In other words, there is a set of questions that are not specific to councils (the word *council*, where applicable can be changed to the word *organisation* or the name of the business). To illustrate a non-council organisation is taken as an example below. Further discussion regarding applicability to organisations can be found in limitations section.

Yahoo! is an organisation that in the past year banned teleworking (Amerland, 2013; Ryan, 2013). The CFA models here may identify the layer within which perceptions of teleworking need to be improved. Certainly the decision is spoken of in terms of policy and thus, following the maturity model of this thesis, successful implementation of teleworking is dependent on the resource layer as much as the policy layer and in terms of macro development (that is the sequential development of layers), the announcement by Yahoo! suggests issues at the resource layer. Furthermore the call for employees to work onsite may additionally be a call to restore connectivity, specifically collaboration (Tkaczyk, 2013) which they feel has been lost to an extent from remote working practices.

It may be apparent that the resource layer does not provide sufficient support for the existence of subsequent model layers of policy and connectivity. Thus investment in technical support and software investment to accommodate collaborative working practices offsite would be inferred from factor structure A of resource. In addition, a shift to a task-oriented approach (factor structure A of resource; and as per the resource-related segments of the taxonomy) may significantly improve innovative practices via teleworking: a culture positive to teleworking, can create the required co-ordination, accumulation and maturity of resources, that are in line with the needs of the organisation such that over time, the resources may facilitate and accommodate (new) methods of idea generation and innovation prosperity. With success at the resource layer, policy initiatives can be implemented to secure resources to the organisation in terms of patents, intellectual property and copyright. Following success at the policy layer, Yahoo! may feasibly shift into the sought after connectivity paradigm, out of which innovation can arise and benefit the company.

At the policy layer, a rewards system (factor structure C2) would vastly improve the innovative consistency of workers in addition to a system that can monitor employees. Investment in resource and policy initiatives will serve the connectivity layer – the layer at which success is sought. At the connectivity layer (factor structure B), team synergy, affective organisational commitment, maintaining relationships and trust will improve and thus, benefit the company. In essence there would be cultural

maturity and a representativeness of teleworking (out of connectivity) that may also set forth example to other organisations or departments within Yahoo! The three CFA models are three sets of questions for each layer of teleworking maturity and should be utilised to ensure (as per the responses to the questions) which of the three layers needs to be addressed. The maturity model in terms of macro-development is a long term process and so, investment and re-investment may allow an organisation such as Yahoo! to grow in terms of teleworking, whilst complementing physical working practices.

#### **7.3.4 Utility for researchers**

For researchers, the benefit of the comprehensive definition of telework is that it is inclusive of the many facets of teleworking; socio and technical models of teleworking in the context of a capability maturity provides a rich picture to teleworking study and perspective that allows researchers to drill down on specific aspects of the models whilst being aware of how each of the factors connect across the models. Manifest definitions of teleworking (socio, technical and maturity models) are not in isolation; rather linkages have been identified between them and to an extent not in existing literature.

Furthermore, the technical factors of teleworking facilitate identification of teleworkers from sample data. The data of teleworkers can be subdivided with comprehension; surveys inclusive of technical questions (as per this research study) allows for data to be divided in several ways for a more comprehensive comparative analysis between groups of people. As per the dimensions and attributes of technical factors, data can be divided into onsite workers versus offsite workers, regular versus irregular teleworkers, task-oriented versus time-oriented workers, location dependent versus location independent workers, employees working with high impact constraints versus those working with low impact constraints. Further cross-dimension analysis may yield contribution. The technical dimensions and attributes allows for many different analyses to be conducted from a single sample and thus, reduce the number of separate studies each focusing on a different manifest definition of teleworking; the research process would be thus, improved in terms of efficiency. Additional manifest definitions of teleworking over time (standardisation) may further improve the above in terms of reliability of measures.

#### **7.3.5 Utility to explain growth of teleworking**

A layered model of organisational change is an important inclusion to an investigation of teleworking development that is, expectations of adoption rates of homeworking can be explained by context: although there are resources available to operate at a distance from the employer organisation there exists policy issues which in turn create a level of resistance to those adoption rates. For example homeworking is not a requirement upon organisations as a method of working; and this has taken a change in terms of encouragement (requests for flexible working) only recently in terms of law (Gov.UK, 2014). Policy as a layer of organisational development is relevant and provides ample context to explain the aforementioned slow growth. Without government initiatives as described,

organisations may thus, remain fixed within traditions of working and the impetus for change does not materialise; in other words, standards as per policy factor structure C2 do not materialise.

Lewin's (1951a and 1951b) models of organisational change were adopted due to their simplified nature: the model covers a cycle of change from unfreeze to change to refreeze. Recent government encouragement for teleworking practices as aforementioned helps to unfreeze an organisation into adoption of new working practices. Maslow's (1943) model in its original form is motivation theory; focused on a layered approach to explaining the individual. The model has been adapted and interpreted to organisation level and so, an insight can be gained into development of an organisation in a simplified way; an organisation can be explained by a five layered approach to development and which in turn provides context to teleworking maturity and capability.

### **7.3.6 Utility of confirmatory factor analyses**

To further substantiate the utility as listed above, the best-fitting models as per the confirmatory factor analyses namely, factor structure D of resource, factor structure C2 of policy and factor structure B of connectivity, have applicability at other or similar organisations. In other words, there are a number of socio-factor measures confirmed for each of the three layers of teleworking maturity and these measures can be utilised in surveys at other or similar organisations.

Furthermore, data as per the surveys for each of the three best-fitting models can be utilised by management in terms of an identification of worker perceptions of each layer of teleworking maturity and so, teleworking initiatives can be implemented accordingly. Thus, it follows that identification can also be made as to which of the three layers needs to be strengthened. Each of the layers can be viewed as concurrent at the micro-level (earlier figure 2.41 in this thesis, on page 88) that is, the layers *resource*, *policy* and *connectivity* are inter-related. For example, resource may be identifiably a weak layer in terms of perceptions and so, aspirations may include investment in resource infrastructure.

Additionally, policy-related initiatives and connectivity-related initiatives should be concurrently put forward in line with new investment such that agreements concerning how new resources will be utilised can filter out unnecessary or infeasible investments propositions; inclusion of a number of stakeholders as per the different layers creates a healthier decision-making process. Concurrent objectives (objectives of stakeholders; mapping to different layers of the model) may identify collective aspirations too. Hence, the models serve as a tool for management in terms of awareness, decision-making and improvement to working practices. Over the long term and out of continuous micro level (concurrent) operations, a strengthened macro layer can materialise and thus shift an organisation into a new, succeeding paradigm (for example from resource to policy). The more layers that are inclusive to work objectives at the micro level (in line with resource, policy and connectivity together), the healthier the organisation in terms of moving forward and its macro-level development. Absence

of objectives for any of the three layers is theoretically a resistance to teleworking which may manifestly and relatively, result in slow growth.

Negative perceptions of:

- 1) *resource in terms of factor structure D* may be indicative of potential investment in training to rectify and correct technological-related problems more quickly (improved resilience). Furthermore, awareness of stress levels and negative perceptions of job satisfaction levels of employees may be resolved or alleviated via improvements in socio-measures as per:
- 2) *policy in terms of factor structure C2*: negative perceptions may be indicative of implementation or improvement to systems related to rewards and standards, that is the capability to a) benefit employees and b) monitor progress and thus in turn, improve the level at which objectives are met satisfactorily.
- 3) *connectivity layer in terms of factor structure B*: negative perceptions may be indicative of decision making with regards to promoting the use of technologies designed for networking and teamwork.

## **7.4 Key limitations of study**

Limitations include the extent to which findings can be applied to other organisations and to different types of organisations. For the CFA models normality is assumed (as opposed to confirmed) that is, data may not follow a normal distribution and so, model-fit statistics as per the Maximum Likelihood method may be less precise estimates of the fit of data to theory. Furthermore, this study is the first of its kind and so, additional studies of replicable nature may strengthen or provide a healthy evaluation of the findings and conclusions that were drawn as per this study.

### **7.4.1 Example: Impact on family / home life**

The models together cover all aspects of teleworking be it in terms of simplification and/or aggregation. As stated, there were three CFA models each representative of a layer of the maturity model. The CFA models may exclude impacts on family or home life and certainly from a qualitative perspective in terms of interviews, excludes the details of such an impact for example, how the dynamics or time spent with families change to accommodate homeworking.

However, aggregation and simplification is an approach taken in this research study to include all aspects of teleworking (indirectly) and so, taking the family / home life example, the Likert statements of the resource model can be a mechanism by which issues pertaining to home or family life are raised (indirectly). For example, role overload and job satisfaction (factor structure D of resource)

indirectly voice the impacts on family and home life and thus, these indicators can be addressed by management to find out why perceptions here are significantly negative and thus impacts on family and home life may be potentially identifiable.

In terms of the policy model, a rewards system may improve the commitment to working for an organisation (at a distance from the organisation) and improve the motivations of home workers to implement rules governing work-life balance within their home environment. In other words, rewards is a form of incentives which may establish an environment and setting that will accommodate productivity; a benefit to the employer and employee. Furthermore, systems that do work and allow managers to monitor tasks (as opposed to the employee) may improve home working.

#### **7.4.2 Limitations as per socio-technical factors of teleworking**

The technical factors in terms of dimensions and attributes were out of scope in this research study. Thus, the research study was limited to a foci of socio-factors in terms of maturity as opposed to a wider comprehension that is, socio-technical factors in terms of maturity.

#### **7.4.3 Limitations as per taxonomy of teleworking**

As mentioned earlier, the three theoretical models namely socio-factors, technical factors and the maturity model of teleworking, were brought together into a single coherent model that is the taxonomy of teleworking. A limitation to this research was empirical validation (Garrett and Danziger, 2007, p.29) of each of the **seven major socio-factors** in terms of factor structures. In contrast, and in terms of simplification, the taxonomy was empirically validated in terms confirmatory factor analysis for each of the three layers of the maturity model namely resource, policy and connectivity and as opposed to each of the seven major socio-factors within the three aforementioned maturity layers. Hence, future work may potentially further substantiate (empirically validate) the socio-taxonomy in terms of the seven major socio-factors.

### **7.5 Key future work**

#### **7.5.1 Future work as per technical factors of teleworking**

Technical factors of teleworking were identified in this research study in terms of dimensions and attributes. Although data was collected for each of the dimensions and attributes, the technical section in terms of analyses of that data, was out of scope in this research study. Hence, future work may consist of analyses of the technical factors of teleworking.

The potential of this work is as follows: types of teleworking practices may be identifiable (as per technical factors of teleworking; dimensions and attributes) formally that is, type-A and type-B working practices and which can be named accordingly with greater precision over and above the informal-

type and rather ambiguous conceptualisations considered earlier in this thesis such as mobile workers. Following on from this work, and in terms of vision, types of teleworking practices may be potentially mapped to job roles or job types and thus, a type of teleworking practice may be recommendable per job type and job role.

### **7.5.2 Future work as per socio-technical factors of teleworking**

Following empirically validated models of technical factors of teleworking as stated above, an additional complexity would be to validate the mapping of the socio-factors to technical factors (and vice versa), that is to empirically validate models consistent with the taxonomy and so produce a comprehensive validation of the models of teleworking.

### **7.5.3 Future work as per standardisation of taxonomy of teleworking**

As mentioned earlier, further identification of factors of teleworking (alternatively an identification of potential measures), socio and technical of teleworking is future work in this field. Consistency across researchers with regards to factors of teleworking as per the taxonomy may serve to standardise a taxonomy of teleworking. In other words, factors may be empirically validated and thus further substantiate the taxonomical model. Furthermore, additional factors may be identifiable as per future work and which add to the taxonomy. In turn, the comprehension of teleworking would be enhanced further. Standardisation of the factors of teleworking may also improve the standards of measurement of teleworking and thus also improve research quality and data extrapolation potential.



## Appendices

**Electronic cottage [Additional example 1]**

The term *cottage* infers that a stationary location is definitive to work in this regard. However, the location of workers can vary. For example, Axtell et al. (2008) studied workers that utilise technology on train journeys. There is a difference between a) employees working at fixed locations, b) employees who work at a fixed location on-site and those that work at a fixed location offsite, and c) employees who work on-the-move for example on train journeys. Key differences between these groups of workers are as follows:

- 1) Environment - a worker may have a high level of contextual constraints working on a train journey that is, shared public spaces can limit an employee's capacity to communicate information such as that which is ethically-bound or confidential for example. This type of working is in contrast to employees working on-site, where organisational security and ethical practice is established and accommodated for all workers.
- 2) Technology – a worker may not have the technology in terms of hardware or software to carry out tasks off-site compared to the facilities that would be available on-site for those very tasks. For example, tablet PCs have a relatively smaller screen size than the average desktop monitor and so, screen space can impact on worker output; the extent to a worker is able to multitask windows is reduced.
- 3) An off-site stationary location that is, not owned by the organisation such as the home or internet café may not be adequately conceptualised as a form of cottage.

To conclude, there would be a) over-emphasis to a stationary aspect and b) the naming convention that is, the stationary aspect as discussed above is inconsistent to other conceptualisations, such that *electronic cottage* is clearly not a defining conceptualisation for and of, all types of working practices that utilise information communications technology.

### **Telecommuting [Additional example 2]**

*Telecommuting* is a concept that suggests travel is always involved (opposite, albeit no less in terms of significance, to the discussion above with regards to the stationary aspect for the concept *electronic cottage*). Hence, as there is an absence of a *stationary* inclusion to the definition, the result of this term as a stand-alone concept (overarching all conceptualisations) is that it leans significantly to a mobility or transient aspect concurrently, disregarding some stationary forms of teleworking practices.

However it can be argued that, working from an off-site stationary location has equivalence to non-commuting that is, absence of work-related travel and thus, virtual. This understanding is the way in which the term *telecommuting* is perhaps intended. However, the term *telecommuting* is perhaps closer to the term *teleportation* rather than to *telework*. Hence, *telecommuter* aligns to non-existing, non-real aspects as per discussion with regard to *virtual work* as above.

*Tele* has indirect meaning and linkage to, the term *commuting*; the term *tele* is associated with communications technology and thus, provides an additional context to the latter term *commuting* namely, that information travel via cables and wireless is the commuting that is done, as opposed to the worker that commutes. Commute of information is somewhat seamless and is inclusive by meanings of technology to the term *tele*. Again, the term *commuting* becomes redundant.

The research study may also take the view that an absence of commuting should perhaps not be described by using the term *commuting*. At least in terms of the fact that meanings do change over time and perhaps concepts could be defined by what does exist as a precedent over what does not or what is absent or forgone such as commuting.

Furthermore, technology has advanced to the extent that employees have the capability not only to work at a fixed, stationary location and foregoing commuting but also, to work during travel for example working on a train thus, commuting is not foregone by comparison.

In addition, the concept *telecommuting* does not make work itself inclusive to the conceptual definition rather the concept is inclusive of technology at a distance (*tele*) and commuting is saved. Telecommuters thus infers an arrangement whereby employees use technology to avoid travel and job responsibilities and contribution of workers is excluded from the immediate inference of the concept.

To conclude, the term *telecommuting* is limited in capacity to define types or forms of teleworking practices co-existing today.

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## Questionnaire

### Exploratory study of working practices

#### [Initial questionnaire design]

Organisation: \_\_\_\_\_

Location: \_\_\_\_\_

Date of survey: \_\_\_\_\_

Times: \_\_\_\_\_

#### **Introduction:**

Hi, my name is Khawaja Haq. I am a research student of the School of Computing and Engineering at the University of Huddersfield. The aim of my academic study is to understand the complexity of factors associated with working practices at the Council. This questionnaire is an [initial questionnaire design] of this project.

Your participation in this [initial questionnaire design] will help us to review and improve the questionnaire to the point where we can then post the finalised version in the form of a web-based survey to the larger work group (for completion on PCs).

The questionnaire should take less than 40 minutes to complete. We advise you spend approximately 10 seconds per question. If you would like to contact me regarding any of the points within my questionnaire, please email [khawaja.haq@hud.ac.uk](mailto:khawaja.haq@hud.ac.uk)

Your input to this part of the research process is with full anonymity and data gathered will be stored securely.

Thank you for taking part in this survey.

Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
1	To a very great extent I feel connected to my immediate supervisor.	1	2	3	4	5	6	7
2	There is a need to reduce some parts of my role.	1	2	3	4	5	6	7
3	To a very great extent I trust my immediate supervisor.	1	2	3	4	5	6	7
4	To a very great extent I am free to disagree with my immediate supervisor.	1	2	3	4	5	6	7
5	I work under incompatible policies and guidelines.	1	2	3	4	5	6	7
6	My job doesn't affect whether I enjoy my free time outside of work.	1	2	3	4	5	6	7
7	The Council has almost completely achieved its objective in terms of performance.	1	2	3	4	5	6	7
8	Specific performance goals are established for most jobs.	1	2	3	4	5	6	7
9	I proudly wear my organisation's logo.	1	2	3	4	5	6	7
10	If I improve the level of service, I will be rewarded.	1	2	3	4	5	6	7
11	I can say that the organisation's problems are also my own problems.	1	2	3	4	5	6	7
12	I have been given too much responsibility.	1	2	3	4	5	6	7
13	Problems relating to technology are quickly identified.	1	2	3	4	5	6	7
14	I feel certain about how much authority I have.	1	2	3	4	5	6	7
15	I feel overburdened in my role.	1	2	3	4	5	6	7
16	This organisation has a great deal of personal meaning for me.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
17	Data confidentiality always prevents me from sharing information with other departments/teams.	1	2	3	4	5	6	7
18	I am planning to search for a new job during the next 12 months.	1	2	3	4	5	6	7
19	I am relatively well awarded financially for my work.	1	2	3	4	5	6	7
20	I think I could easily become as attached to another organisation as I am to this one.	1	2	3	4	5	6	7
21	I am empowered to solve problems.	1	2	3	4	5	6	7
22	I am proud to be employed in this organisation.	1	2	3	4	5	6	7
23	To a very great extent top management listens to employees' concerns.	1	2	3	4	5	6	7
24	There are measurable standards for outcomes which are monitored.	1	2	3	4	5	6	7
25	Standards are monitored on a regular basis.	1	2	3	4	5	6	7
26	To a very great extent top management keeps its commitments to employees.	1	2	3	4	5	6	7
27	I have high morale working within the team.	1	2	3	4	5	6	7
28	I am in the loop' with what's going on within my department.	1	2	3	4	5	6	7
29	To a very great extent I trust top management.	1	2	3	4	5	6	7
30	There is effective communication within the team.	1	2	3	4	5	6	7
31	The rewards I receive are based on evaluations of service.	1	2	3	4	5	6	7
32	It is very important for me to do good at work.	1	2	3	4	5	6	7
33	Information technologies and systems (intranet, internet, etc.) are available and always used to give the employee access to the information required.	1	2	3	4	5	6	7
34	The work environment within my department supports balance between work and personal life.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
35	The team keeps wastage to a minimum.	1	2	3	4	5	6	7
36	The work environment at the Council supports a balance between work and personal life.	1	2	3	4	5	6	7
37	Employees of this Council are rewarded for dealing effectively with problems.	1	2	3	4	5	6	7
38	Problem solving is seen as an opportunity for learning and growth.	1	2	3	4	5	6	7
39	Tolerance is valued to a very great extent in my organisation.	1	2	3	4	5	6	7
40	I do not feel a strong sense of belonging to my organisation.	1	2	3	4	5	6	7
41	Because I am often tired after work, I don't see friends as much as I would like.	1	2	3	4	5	6	7
42	I feel angry when someone talks badly about my organisation.	1	2	3	4	5	6	7
43	If subordinates' performance goals are not met, they are required to explain their performance.	1	2	3	4	5	6	7
44	I have a sense of belonging to my department.	1	2	3	4	5	6	7
45	The Council has almost completely achieved its objective in terms of adaptation.	1	2	3	4	5	6	7
46	To a very great extent my immediate supervisor listens to me.	1	2	3	4	5	6	7
47	I share values of the organisation.	1	2	3	4	5	6	7
48	The practice of homeworking / teleworking can help me stay connected.	1	2	3	4	5	6	7
49	I have to work under vague directives or orders.	1	2	3	4	5	6	7
50	To a very great extent my immediate supervisor follows through with what he/she says.	1	2	3	4	5	6	7
51	I do not feel inhibited by organisation resources available to me to do my job.	1	2	3	4	5	6	7
52	I know what my responsibilities are.	1	2	3	4	5	6	7



Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
53	The Council has almost completely achieved its objective in terms of funds available to the organisation.	1	2	3	4	5	6	7
54	I am highly motivated at work.	1	2	3	4	5	6	7
55	If I have my own way, I will be working for this organisation years from now.	1	2	3	4	5	6	7
56	Managers give feedback to their subordinates concerning the extent to which they achieve their performance goals.	1	2	3	4	5	6	7
57	I receive lots of information about how I am being evaluated.	1	2	3	4	5	6	7
58	I have confidence that I can complete my work because I can prioritise tasks to use my time effectively.	1	2	3	4	5	6	7
59	I have confidence that I can complete my work because I can access information needed to perform my job.	1	2	3	4	5	6	7
60	Being socially responsible is valued to a very great extent in my organisation.	1	2	3	4	5	6	7
61	The tasks that I do at work are themselves representing a driving power in my job.	1	2	3	4	5	6	7
62	I am an effective employee.	1	2	3	4	5	6	7
63	The quality of my work output is outstanding.	1	2	3	4	5	6	7
64	All things considered, I have a desire and intent to remain with this organisation.	1	2	3	4	5	6	7
65	I work very efficiently.	1	2	3	4	5	6	7
66	I know exactly what is expected of me.	1	2	3	4	5	6	7
67	My job is so interesting that it is a motivation in itself.	1	2	3	4	5	6	7
68	Inter-departmental projects are carried out and always used in the firm.	1	2	3	4	5	6	7
69	My job is meaningful.	1	2	3	4	5	6	7
70	I receive an assignment without the resources to complete it.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
71	I am a highly productive employee.	1	2	3	4	5	6	7
72	Employees are encouraged to offer input into the development of new rules and procedures.	1	2	3	4	5	6	7
73	The quality of my work is top notch.	1	2	3	4	5	6	7
74	I am allowed to do almost anything to solve problems.	1	2	3	4	5	6	7
75	The Council has almost completely achieved its objective in terms of survival.	1	2	3	4	5	6	7
76	Relationship between management and employees is very good.	1	2	3	4	5	6	7
77	The team is highly valued by other parts of the organisation.	1	2	3	4	5	6	7
78	To a very great extent my immediate supervisor is concerned about my personal well being.	1	2	3	4	5	6	7
79	The practice of homeworking / teleworking can help me interact with people.	1	2	3	4	5	6	7
80	Once technological problems are identified the team is quick to address the problem.	1	2	3	4	5	6	7
81	There is a positive atmosphere within my department.	1	2	3	4	5	6	7
82	I am rewarded for satisfying complaining customers.	1	2	3	4	5	6	7
83	Having children or other dependents at home is / would be a factor in whether or not I would do homeworking.	1	2	3	4	5	6	7
84	I often expend extra effort in carrying out my job.	1	2	3	4	5	6	7
85	I believe the Council systems respect my privacy.	1	2	3	4	5	6	7
86	To a very great extent my immediate supervisor is sincere in his/her efforts to communicate with team members.	1	2	3	4	5	6	7
87	Employees in this Council are rewarded for good standards of service.	1	2	3	4	5	6	7
88	I have confidence that I can complete my work because I can set objectives that align with the organisation's goals.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
89	I feel the organisation I work for is a part of me.	1	2	3	4	5	6	7
90	To a very great extent my immediate supervisor speaks positively about subordinates in front of others.	1	2	3	4	5	6	7
91	I often perform better than what can be expected.	1	2	3	4	5	6	7
92	Members of the team feel that they are fully utilised.	1	2	3	4	5	6	7
93	All individuals perform to the best of their ability within the team.	1	2	3	4	5	6	7
94	I do not feel "emotionally attached" to this organisation.	1	2	3	4	5	6	7
95	I feel that my efforts and contributions are valued by the organisation.	1	2	3	4	5	6	7
96	I do not feel like "part of the family" at my organisation.	1	2	3	4	5	6	7
97	I feel lucky being paid for a job I like this much.	1	2	3	4	5	6	7
98	Instruments such as inter-functional teams, quality circles, improvement groups, etc. are always used by the Council to encourage knowledge transfer.	1	2	3	4	5	6	7
99	The Council has almost completely achieved its objective in terms of creativity.	1	2	3	4	5	6	7
100	The Council has almost completely achieved its objective in terms of customer/ client satisfaction.	1	2	3	4	5	6	7
101	Managers monitor the extent to which subordinates attain their performance goals.	1	2	3	4	5	6	7
102	To a very great extent my immediate supervisor avoids gossip.	1	2	3	4	5	6	7
103	I have control over how I solve problems.	1	2	3	4	5	6	7
104	Feedback on the monitoring of standards is given to the team on a regular basis.	1	2	3	4	5	6	7
105	Resources are identified and made available for staff training.	1	2	3	4	5	6	7
106	I almost always perform better than what can be characterised as acceptable performance.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
107	I am satisfied with the recognition I get for good work.	1	2	3	4	5	6	7
108	Employee pay increases are based upon how employees' performance compares with established goals.	1	2	3	4	5	6	7
109	I am encouraged to handle problems by myself.	1	2	3	4	5	6	7
110	The organisation is interested in my personal development.	1	2	3	4	5	6	7
111	My manager rates the efficiency of my work highly.	1	2	3	4	5	6	7
112	The job is like a hobby to me.	1	2	3	4	5	6	7
113	Job requires to work very hard.	1	2	3	4	5	6	7
114	I receive lots of information about my job duties.	1	2	3	4	5	6	7
115	There is a formal system in place to identify staff development and training needs.	1	2	3	4	5	6	7
116	There is a positive atmosphere within the organisation.	1	2	3	4	5	6	7
117	My job makes it difficult for me to enjoy my free time outside of work.	1	2	3	4	5	6	7
118	I am satisfied with the way I am managed.	1	2	3	4	5	6	7
119	I have to do things that should be done differently.	1	2	3	4	5	6	7
120	How well I am doing in my job.	1	2	3	4	5	6	7
121	The Council has almost completely achieved its objective in terms of quality.	1	2	3	4	5	6	7
122	Pressures to get job done on time.	1	2	3	4	5	6	7
123	I have confidence that I can complete my work because I can access appropriate support staff readily.	1	2	3	4	5	6	7
124	The Council has almost completely achieved its objective in terms of goal achievement.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
125	I can easily identify with the organisation for which I work.	1	2	3	4	5	6	7
126	I know what the critical factor is in getting promoted.	1	2	3	4	5	6	7
127	I have a sense of purpose at my organisation.	1	2	3	4	5	6	7
128	The team is involved from the outset in new developments relating to their services or products.	1	2	3	4	5	6	7
129	There is effective and appropriate leadership within the team.	1	2	3	4	5	6	7
130	To a very great extent I can tell my immediate supervisor when things are going wrong.	1	2	3	4	5	6	7
131	The organisation's image presents me in a good light.	1	2	3	4	5	6	7
132	To a very great extent those in top management keep their word to employees.	1	2	3	4	5	6	7
133	I am satisfied with my current work schedule.	1	2	3	4	5	6	7
134	I am satisfied with the amount of responsibility I am given.	1	2	3	4	5	6	7
135	Fairness is valued to a very great extent in my organisation.	1	2	3	4	5	6	7
136	I receive lots of information about how organisational decisions are made that affect my job.	1	2	3	4	5	6	7
137	I am satisfied with my immediate line manager.	1	2	3	4	5	6	7
138	My workload is too heavy.	1	2	3	4	5	6	7
139	I feel isolated as a worker.	1	2	3	4	5	6	7
140	The tasks that I do at work are enjoyable.	1	2	3	4	5	6	7
141	The amount of time I spend working interferes with how much free time I have.	1	2	3	4	5	6	7
142	There are clearly defined standards for working practices within the team.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
143	I am able to say what I mean regardless of the situation I'm in.	1	2	3	4	5	6	7
144	I like to tell everyone that this is my organisation.	1	2	3	4	5	6	7
145	The firm has a system that is always used to codify its explicit knowledge.	1	2	3	4	5	6	7
146	To a very great extent my values are similar to the values of my immediate supervisor.	1	2	3	4	5	6	7
147	I do not have to get management's approval before I handle problems.	1	2	3	4	5	6	7
148	Homeworking / teleworking is a trend.	1	2	3	4	5	6	7
149	To a very great extent top management is concerned about employees' well being.	1	2	3	4	5	6	7
150	The amount of work I have to do interferes with the quality I want to maintain.	1	2	3	4	5	6	7
151	My immediate manager encourages my personal development.	1	2	3	4	5	6	7
152	I have discretion in work.	1	2	3	4	5	6	7
153	We ensure that all the necessary systems for monitoring and controlling the use of physical resources are in place.	1	2	3	4	5	6	7
154	Worrying about my job makes it hard for me to enjoy myself outside of work.	1	2	3	4	5	6	7
155	To a very great extent my immediate supervisor keeps confidences.	1	2	3	4	5	6	7
156	In my working conditions, I am good at making myself visible with influential people in my organisation.	1	2	3	4	5	6	7
157	Innovation is rewarded in the team.	1	2	3	4	5	6	7
158	I believe my colleagues are sincere.	1	2	3	4	5	6	7
159	I believe my colleagues are trustworthy.	1	2	3	4	5	6	7
160	To a very great extent my immediate supervisor behaves in a consistent manner from day to day.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
161	I have control over pace of work.	1	2	3	4	5	6	7
162	I feel that the organisation's future is also my own.	1	2	3	4	5	6	7
163	Among my work group, I would rate my performance in the top quarter.	1	2	3	4	5	6	7
164	To a very great extent top management is sincere in their efforts to communicate with employees.	1	2	3	4	5	6	7
165	We ensure that we make the maximum practical use of our buildings and equipment.	1	2	3	4	5	6	7
166	I am more independent than most people.	1	2	3	4	5	6	7
167	It is wise to homework / telework.	1	2	3	4	5	6	7
168	I am satisfied with the amount of pay I receive for the job I do.	1	2	3	4	5	6	7
169	I really feel as if this organisation's problems are my own.	1	2	3	4	5	6	7
170	The membership of the team can be readily identified.	1	2	3	4	5	6	7
171	To a very great extent my immediate supervisor keeps his/her commitments to team members.	1	2	3	4	5	6	7
172	I receive lots of information about how my job relates to the total operation of my organisation.	1	2	3	4	5	6	7
173	If I believe that something is wrong I speak out, regardless of who I'm talking to.	1	2	3	4	5	6	7
174	Respect for the rights of the individual is valued to a very great extent in my organisation.	1	2	3	4	5	6	7
175	I have to work very fast.	1	2	3	4	5	6	7
176	I would be very happy to spend the rest of my career with this organisation.	1	2	3	4	5	6	7
177	Mechanisms are in place and always used to encourage the members of an organisation to share information.	1	2	3	4	5	6	7
178	I have to buck (bend) a rule or policy in order to carry out an assignment.	1	2	3	4	5	6	7

Seven-point scale (1 = strongly disagree, 7 = strongly agree)

#	Statement	Response (please circle)						
		1	2	3	4	5	6	7
179	I frequently think of quitting my job.	1	2	3	4	5	6	7
180	I am satisfied with the attention paid to the suggestions I make.	1	2	3	4	5	6	7
181	The organisation's values are very similar to my own values.	1	2	3	4	5	6	7
182	I believe my colleagues are dependable.	1	2	3	4	5	6	7
183	I know how I should handle my free time on the job.	1	2	3	4	5	6	7
184	I receive lots of information about promotion and advancement opportunities.	1	2	3	4	5	6	7
185	I know that I have divided my time properly.	1	2	3	4	5	6	7
186	I receive incompatible requests from two or more people.	1	2	3	4	5	6	7
187	Homeworking / teleworking is a good idea.	1	2	3	4	5	6	7
188	The Council has almost completely achieved its objective in terms of productivity.	1	2	3	4	5	6	7



Interview questions

- 1) Please state your job title: \_\_\_\_\_
- 2) What is your pay category/grade? \_\_\_\_\_
- 3) How many hours per week are you contracted to work? \_\_\_\_\_
- 4) How long have you been in your job? \_\_\_\_\_ years \_\_\_\_\_ months
- 5) How many hours per week are you contracted to do homeworking? \_\_\_\_\_
- 6) How long have you been a homeworker? \_\_\_\_\_ years \_\_\_\_\_ months or  Not applicable
- 7) What are the primary objectives for the implementation of homeworking in your organisation? (*You may tick all that are applicable*)
  - Cost reduction  Sales growth
  - Service quality improvement  Don't know
  - Others, please specify: \_\_\_\_\_
- 8) The organisation's key policies, processes and procedures are clearly documented.
  - Yes  No
- 9) I know where to access policies, processes and procedures.
  - Agree  Disagree
- 10) Please indicate your agreement to the following statement: employees led to expect job security.
  - Agree  Don't know  Disagree
- 11) Do employees get bonuses?
  - Yes  No
- 12) Do employees get individual or group performance schemes?
  - Yes  No
- 13) Are most non-managerial staff receiving performance related pay?
  - Yes  No

14) Is there guaranteed job security for certain groups of employees?

- Yes       No

15) Please cite the cause for going to work not at your peak level (*You may tick all that are applicable*):

- Not that sick.       Fear of losing job.       Did not want to use sick leave.  
 Sense of duty.       Other, please specify: \_\_\_\_\_

16) How many days per month do you miss work? \_\_\_\_\_

17) Please state your reasons for missing work from the list below (*You may tick all that are applicable*):

- Actually sick.       Childcare.       Vehicle repair.  
 Going to doctor's appointments.       Home repair.  
 Other, please specify: \_\_\_\_\_

18) Are you:       Female       Male

19) What is your age group?

- 18-24       35-44       55-64  
 25-34       45-54       65 and over

20) Please state your home post code (the place from which you travel to work): \_\_\_\_\_

21) To which group do you most closely identify:

- African ancestry       European ancestry       Native American ancestry       None of these  
 Arabic ancestry       Hispanic ancestry       Pacific Islander ancestry  
 Asian ancestry       Indian ancestry       Pakistani ancestry

22) Are there any questions or subject matter(s) you feel are relevant but were not covered by this questionnaire?

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23) Are there any questions that were not easily understood?

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24) Please feel free to leave comments with regard to any other aspects of the questionnaire that you feel could be improved (readability, design, layout).

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Thank you for your time.

---- End of [initial questionnaire design] ----

## Citations and references

### Likert statements [citations]

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
1	'To a very great extent I feel connected to my immediate supervisor.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
2	'There is a need to reduce some parts of my role.'	Zhao and Rashid (2010, p.40)	No
3	'To a very great extent I trust my immediate supervisor.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
4	'To a very great extent I am free to disagree with my immediate supervisor.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
5	'I work under incompatible policies and guidelines.'	Zhao and Rashid (2010, p.40)	No
6	'My job doesn't affect whether I enjoy my free time outside of work.'	Zhao and Rashid (2010, p.39)	No
7	'The Council has almost completely achieved its objective in terms of performance.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
8	'Specific performance goals are established for most jobs.'	Huang and Cullen (2001, p.35)	No
9	'I proudly wear my organisation's logo.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
10	'If I improve the level of service, I will be rewarded.'	Babakus et al. (2003, p.283)	Yes
11	'I can say that the organisation's problems are also my own problems.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
12	'I have been given too much responsibility.'	Zhao and Rashid (2010, p.40)	No
13	'Problems relating to technology are quickly identified.'	Bateman et al (2002, p.225)	Yes
14	'I feel certain about how much authority I have.'	Zhao and Rashid (2010, p.39)	No
15	'I feel overburdened in my role.'	Zhao and Rashid (2010, p.40)	No
16	'This organisation has a great deal of personal meaning for me.'	Heponiemi et al. (2011, p.1554)	No
17	'Data confidentiality always prevents me from sharing information with other departments/teams.'	Curry and Moore (2003, p.108)	Yes

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
18	'I am planning to search for a new job during the next 12 months.'	Zhao and Rashid (2010, p.39)	No
19	'I am relatively well awarded financially for my work.'	Babakus et al. (2003, p.283)	No
20	'I think I could easily become as attached to another organisation as I am to this one.'	Meyer and Allan (1997. Cited In: Kuvaas, 2007, Table AI, p.397)	No
21	'I am empowered to solve problems.'	Babakus et al. (2003, p.283)	Yes
22	'I am proud to be employed in this organisation.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
23	'To a very great extent top management listens to employees' concerns.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
24	'There are measurable standards for outcomes which are monitored.'	Bateman et al (2002, p.226)	No
25	'Standards are monitored on a regular basis.'	Bateman et al (2002, p.226)	No
26	'To a very great extent top management keeps its commitments to employees.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
27	'I have high morale working within the team.'	Bateman et al (2002, p.224)	Yes
28	'I am in the loop' with what's going on within my department.'	Morganson et al., (2010, p.584)	Yes
29	'To a very great extent I trust top management.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
30	'There is effective communication within the team.'	Bateman et al (2002, p.224)	No
31	'The rewards I receive are based on evaluations of service.'	Babakus et al. (2003, p.283)	Yes
32	'It is very important for me to do good at work.'	Kuvaas (2007, Table AI, p.397)	No
33	'Information technologies and systems (intranet, internet, etc.) are available and always used to give the employee access to the information required.'	Palacios-Marques et al. (2011, p.109)	Yes
34	'The work environment within my department supports balance between work and personal life.'	Morganson et al., (2010, p.584)	No
35	'The team keeps wastage to a minimum.'	Bateman et al (2002, p.225)	No

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
36	'The work environment at the Council supports a balance between work and personal life.'	Morganson et al., (2010, p.584)	Yes
37	'Employees of this Council are rewarded for dealing effectively with problems.'	Babakus et al. (2003, p.283)	Yes
38	'Problem solving is seen as an opportunity for learning and growth.'	Bateman et al (2002, p.225)	No
39	'Tolerance is valued to a very great extent in my organisation.'	Baird and Wang (2010, p.598)	Yes
40	'I do not feel a strong sense of belonging to my organisation.'	Meyer and Allan (1997. Cited In: Kuvaas, 2007, Table A1, p.397)	No
41	'Because I am often tired after work, I don't see friends as much as I would like.'	Zhao and Rashid (2010, p.39)	No
42	'I feel angry when someone talks badly about my organisation.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
43	'If subordinates' performance goals are not met, they are required to explain their performance.'	Huang and Cullen (2001, p.35)	No
44	'I have a sense of belonging to my department.'	Morganson et al., (2010, p.584)	Yes
45	'The Council has almost completely achieved its objective in terms of adaptation.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
46	'To a very great extent my immediate supervisor listens to me.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
47	'I share values of the organisation.'	Konzelmann et al. (2006, p.566)	Yes
48	'The practice of homeworking / teleworking can help me stay connected.'	Shu and Chuang (2011, p.32)	Yes
49	'I have to work under vague directives or orders.'	Zhao and Rashid (2010, p.40)	No
50	'To a very great extent my immediate supervisor follows through with what he/she says.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
51	'I do not feel inhibited by organisation resources available to me to do my job.'	Bateman et al (2002, p.225)	Yes
52	'I know what my responsibilities are.'	Zhao and Rashid (2010, p.39)	No
53	'The Council has almost completely achieved its objective in terms of funds available to the organisation.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
54	'I am highly motivated at work.'	Curry and Moore (2003, p.107)	No
55	'If I have my own way, I will be working for this organisation years from now.'	Zhao and Rashid (2010, p.39)	No
56	'Managers give feedback to their subordinates concerning the extent to which they achieve their performance goals.'	Huang and Cullen (2001, p.35)	No
57	'I receive lots of information about how I am being evaluated.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
58	'I have confidence that I can complete my work because I can prioritise tasks to use my time effectively.'	Wang (2011, p.330)	Yes
59	'I have confidence that I can complete my work because I can access information needed to perform my job.'	Wang (2011, p.330)	Yes
60	'Being socially responsible is valued to a very great extent in my organisation.'	Baird and Wang (2010, p.598)	Yes
61	'The tasks that I do at work are themselves representing a driving power in my job.'	Kuvaas (2007, Table AI, p.396)	No
62	'I am an effective employee.'	Wang (2011, p.331)	No
63	'The quality of my work output is outstanding.'	Wang (2011, p.331)	No
64	'All things considered, I have a desire and intent to remain with this organisation.'	Zhao and Rashid (2010, p.39)	No
65	'I work very efficiently.'	Wang (2011, p.331)	No
66	'I know exactly what is expected of me.'	Zhao and Rashid (2010, p.39)	No
67	'My job is so interesting that it is a motivation in itself.'	Kuvaas (2007, Table AI, p.396)	No
68	'Inter-departmental projects are carried out and always used in the firm.'	Palacios-Marques et al. (2011, p.109)	No
69	'My job is meaningful.'	Kuvaas (2007, Table AI, p.396)	No
70	'I receive an assignment without the resources to complete it.'	Zhao and Rashid (2010, p.40)	No
71	'I am a highly productive employee.'	Wang (2011, p.331)	No

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
72	'Employees are encouraged to offer input into the development of new rules and procedures.'	Huang and Cullen (2001, p.35)	No
73	'The quality of my work is top notch.'	Kuvaas (2007, Table AI, p.396)	No
74	'I am allowed to do almost anything to solve problems.'	Babakus et al. (2003, p.283)	Yes
75	'The Council has almost completely achieved its objective in terms of survival.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
76	'Relationship between management and employees is very good.'	Konzelmann et al. (2006, p.566)	Yes
77	'The team is highly valued by other parts of the organisation.'	Bateman et al (2002, p.224)	No
78	'To a very great extent my immediate supervisor is concerned about my personal well being.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
79	'The practice of homeworking / teleworking can help me interact with people.'	Shu and Chuang (2011, p.32)	Yes
80	'Once technological problems are identified the team is quick to address the problem.'	Bateman et al (2002, p.225)	Yes
81	'There is a positive atmosphere within my department.'	Curry and Moore (2003, p.107)	No
82	'I am rewarded for satisfying complaining customers.'	Babakus et al. (2003, p.283)	No
83	'Having children or other dependents at home is / would be a factor in whether or not I would do homeworking.'	Morganson et al., (2010, p.584)	Yes
84	'I often expend extra effort in carrying out my job.'	Kuvaas (2007, Table AI, p.396)	No
85	'I believe the Council systems respect my privacy.'	Shu and Chuang (2011, p.33)	Yes
86	'To a very great extent my immediate supervisor is sincere in his/her efforts to communicate with team members.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
87	'Employees in this Council are rewarded for good standards of service.'	Babakus et al. (2003, p.283)	Yes
88	'I have confidence that I can complete my work because I can set objectives that align with the organisation's goals.'	Wang (2011, p.330)	Yes
89	'I feel the organisation I work for is a part of me.'	Podnar et al., (2011, Figure 2, p.1406)	Yes



#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
90	'To a very great extent my immediate supervisor speaks positively about subordinates in front of others.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
91	'I often perform better than what can be expected.'	Kuvaas (2007, Table AI, p.396)	No
92	'Members of the team feel that they are fully utilised.'	Bateman et al (2002, p.225)	No
93	'All individuals perform to the best of their ability within the team.'	Bateman et al (2002, p.224)	No
94	'I do not feel "emotionally attached" to this organisation.'	Meyer and Allan (1997. Cited In: Kuvaas, 2007, Table AI, p.397)	No
95	'I feel that my efforts and contributions are valued by the organisation.'	Curry and Moore (2003, p.107)	No
96	'I do not feel like "part of the family" at my organisation.'	Meyer and Allan (1997. Cited In: Kuvaas, 2007, Table AI, p.397)	No
97	'I feel lucky being paid for a job I like this much.'	Kuvaas (2007, Table AI, p.396)	No
98	'Instruments such as inter-functional teams, quality circles, improvement groups, etc. are always used by the Council to encourage knowledge transfer.'	Palacios-Marques et al. (2011, p.109)	Yes
99	'The Council has almost completely achieved its objective in terms of creativity.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
100	'The Council has almost completely achieved its objective in terms of customer/ client satisfaction.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
101	'Managers monitor the extent to which subordinates attain their performance goals.'	Huang and Cullen (2001, p.35)	No
102	'To a very great extent my immediate supervisor avoids gossip.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
103	'I have control over how I solve problems.'	Babakus et al. (2003, p.283)	Yes
104	'Feedback on the monitoring of standards is given to the team on a regular basis.'	Bateman et al (2002, p.226)	No
105	'Resources are identified and made available for staff training.'	Bateman et al (2002, p.224)	No
106	'I almost always perform better than what can be characterised as acceptable performance.'	Kuvaas (2007, Table AI, p.396)	No

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
107	'I am satisfied with the recognition I get for good work.'	Wang (2011, p.331)	No
108	'Employee pay increases are based upon how employees' performance compares with established goals.'	Huang and Cullen (2001, p.35)	No
109	'I am encouraged to handle problems by myself.'	Babakus et al. (2003, p.283)	Yes
110	'The organisation is interested in my personal development.'	Curry and Moore (2003, p.107)	No
111	'My manager rates the efficiency of my work highly.'	Wang (2011, p.331)	No
112	'The job is like a hobby to me.'	Kuvaas (2007, Table AI, p.396)	No
113	'Job requires to work very hard.'	Konzelmann et al. (2006, p.566)	No
114	'I receive lots of information about my job duties.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
115	'There is a formal system in place to identify staff development and training needs.'	Bateman et al (2002, p.224)	No
116	'There is a positive atmosphere within the organisation.'	Curry and Moore (2003, p.107)	No
117	'My job makes it difficult for me to enjoy my free time outside of work.'	Zhao and Rashid (2010, p.39)	No
118	'I am satisfied with the way I am managed.'	Wang (2011, p.331)	No
119	'I have to do things that should be done differently.'	Zhao and Rashid (2010, p.40)	No
120	'How well I am doing in my job.'	Ellis and Shockley-Zalabak (2001, p.390)	No
121	'The Council has almost completely achieved its objective in terms of quality.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
122	'Pressures to get job done on time.'	Konzelmann et al. (2006, p.566)	No
123	'I have confidence that I can complete my work because I can access appropriate support staff readily.'	Wang (2011, p.330)	Yes
124	'The Council has almost completely achieved its objective in terms of goal achievement.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
125	'I can easily identify with the organisation for which I work.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
126	'I know what the critical factor is in getting promoted.'	Zhao and Rashid (2010, p.39)	No
127	'I have a sense of purpose at my organisation.'	Bateman et al (2002, p.223)	Yes
128	'The team is involved from the outset in new developments relating to their services or products.'	Bateman et al (2002, p.225)	No
129	'There is effective and appropriate leadership within the team.'	Bateman et al (2002, p.224)	No
130	'To a very great extent I can tell my immediate supervisor when things are going wrong.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
131	'The organisation's image presents me in a good light.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
132	'To a very great extent those in top management keep their word to employees.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
133	'I am satisfied with my current work schedule.'	Morganson et al., (2010, p.584)	No
134	'I am satisfied with the amount of responsibility I am given.'	Wang (2011, p.331)	No
135	'Fairness is valued to a very great extent in my organisation.'	Baird and Wang (2010, p.598)	Yes
136	'I receive lots of information about how organisational decisions are made that affect my job.'	Ellis and Shockley-Zalabak (2001, p.390)	No
137	'I am satisfied with my immediate line manager.'	Wang (2011, p.331)	Yes
138	'My workload is too heavy.'	Zhao and Rashid (2010, p.40)	No
139	'I feel isolated as a worker.'	Şeker (2011, Question 18, p.258)	Yes
140	'The tasks that I do at work are enjoyable.'	Kuvaas (2007, Table AI, p.396)	No
141	'The amount of time I spend working interferes with how much free time I have.'	Zhao and Rashid (2010, p.39)	No
142	'There are clearly defined standards for working practices within the team.'	Bateman et al (2002, p.226)	No

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
143	'I am able to say what I mean regardless of the situation I'm in.'	Kuvaas (2007, Table AI, p.397)	No
144	'I like to tell everyone that this is my organisation.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
145	'The firm has a system that is always used to codify its explicit knowledge.'	Palacios-Marques et al. (2011, p.109)	Yes
146	'To a very great extent my values are similar to the values of my immediate supervisor.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
147	'I do not have to get management's approval before I handle problems.'	Babakus et al. (2003, p.283)	Yes
148	'Homeworking / teleworking is a trend.'	Shu and Chuang (2011, p.33)	Yes
149	'To a very great extent top management is concerned about employees' well being.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
150	'The amount of work I have to do interferes with the quality I want to maintain.'	Zhao and Rashid (2010, p.40)	No
151	'My immediate manager encourages my personal development.'	Curry and Moore (2003, p.107)	No
152	'I have discretion in work.'	Konzelmann et al. (2006, p.565)	Yes
153	'We ensure that all the necessary systems for monitoring and controlling the use of physical resources are in place.'	Bateman et al (2002, p.225)	Yes
154	'Worrying about my job makes it hard for me to enjoy myself outside of work.'	Zhao and Rashid (2010, p.39)	No
155	'To a very great extent my immediate supervisor keeps confidences.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
156	'In my working conditions, I am good at making myself visible with influential people in my organisation.'	Wang (2011, p.330)	Yes
157	'Innovation is rewarded in the team.'	Bateman et al (2002, p.225)	No
158	'I believe my colleagues are sincere.'	Shu and Chuang (2011, p.33)	Yes
159	'I believe my colleagues are trustworthy.'	Shu and Chuang (2011, p.33)	Yes
160	'To a very great extent my immediate supervisor behaves in a consistent manner from day to day.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
161	'I have control over pace of work.'	Konzelmann et al. (2006, p.565)	Yes
162	'I feel that the organisation's future is also my own.'	Podnar et al., (2011, Figure 2, p.1406)	No
163	'Among my work group, I would rate my performance in the top quarter.'	Wang (2011, p.331)	No
164	'To a very great extent top management is sincere in their efforts to communicate with employees.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
165	'We ensure that we make the maximum practical use of our buildings and equipment.'	Bateman et al (2002, p.225)	No
166	'I am more independent than most people.'	Kuvaas (2007, Table AI, p.397)	No
167	'It is wise to homework / telework.'	Shu and Chuang (2011, p.33)	Yes
168	'I am satisfied with the amount of pay I receive for the job I do.'	Babakus et al. (2003, p.283)	No
169	'I really feel as if this organisation's problems are my own.'	Meyer and Allan (1997. Cited In: Kuvaas, 2007, Table AI, p.397)	No
170	'The membership of the team can be readily identified.'	Bateman et al (2002, p.223)	No
171	'To a very great extent my immediate supervisor keeps his/her commitments to team members.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	Yes
172	'I receive lots of information about how my job relates to the total operation of my organisation.'	Ellis and Shockley-Zalabak (2001, p.390)	No
173	'If I believe that something is wrong I speak out, regardless of who I'm talking to.'	Kuvaas (2007, Table AI, p.397)	No
174	'Respect for the rights of the individual is valued to a very great extent in my organisation.'	Baird and Wang (2010, p.598)	Yes
175	'I have to work very fast.'	Kroon et al., (2009, p.515)	No
176	'I would be very happy to spend the rest of my career with this organisation.'	Heponiemi et al. (2011, p.1554)	No
177	'Mechanisms are in place and always used to encourage the members of an organisation to share information.'	Palacios-Marques et al. (2011, p.109)	No
178	'I have to buck (bend) a rule or policy in order to carry out an assignment.'	Zhao and Rashid (2010, p.40)	No

#	Likert statement:	Citation regarding Likert statement (opposite):	Adapted:
179	'I frequently think of quitting my job.'	Zhao and Rashid (2010, p.39)	No
180	'I am satisfied with the attention paid to the suggestions I make.'	Wang (2011, p.331)	No
181	'The organisation's values are very similar to my own values.'	Podnar et al., (2011, Figure 2, p.1406)	Yes
182	'I believe my colleagues are dependable.'	Shu and Chuang (2011, p.33)	Yes
183	'I know how I should handle my free time on the job.'	Zhao and Rashid (2010, p.39)	No
184	'I receive lots of information about promotion and advancement opportunities.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes
185	'I know that I have divided my time properly.'	Zhao and Rashid (2010, p.39)	No
186	'I receive incompatible requests from two or more people.'	Zhao and Rashid (2010, p.40)	No
187	'Homeworking / teleworking is a good idea.'	Shu and Chuang (2011, p.33)	Yes
188	'The Council has almost completely achieved its objective in terms of productivity.'	Ellis and Shockley-Zalabak (2001, p.390)	Yes

## Questions [citations]

Question:	Citation regarding question (opposite):	Adapted:
1) 'Please state your job title.'	Griesser (1993, p.26)	Yes
2) 'What is your pay category/grade?'	Kim and Wiggins (2011, Table 2, p.732)	No
3) 'How many hours per week are you contracted to work?'	Beham et al. (2011, p.115)	Yes
4) 'How long have you been in your job?'	Maruyama and Tietze (2012, p.454)	Yes
5) 'How many hours per week are you contracted to do homeworking?'	Beham et al. (2011, p.115)	Yes
6) 'How long have you been a homeworker?'	Maruyama and Tietze (2012, p.454)	Yes
7) 'What are the primary objectives for the implementation of homeworking in your organisation? ( <i>You may tick all that are applicable</i> )'	Law and Ngai (2007, p.429)	Yes
8) 'The organisation's key policies, processes and procedures are clearly documented.'	Curry and Moore (2003, p.107)	Yes
9) 'I know where to access policies, processes and procedures.'	Curry and Moore (2003, p.107)	Yes
10) 'Please indicate your agreement to the following statement: employees led to expect job security.'	Konzelmann et al. (2006, p.564)	No
11) 'Do employees get bonuses?'	Konzelmann et al. (2006, p.564)	Yes
12) 'Do employees get individual or group performance schemes?'	Konzelmann et al. (2006, p.564)	Yes
13) 'Are most non-managerial staff receiving performance related pay?'	Konzelmann et al. (2006, p.564)	Yes
14) 'Is there guaranteed job security for certain groups of employees?'	Konzelmann et al. (2006, p.564)	Yes
15) 'Please cite the cause for going to work not at your peak level ( <i>You may tick all that are applicable</i> ).'	Prater and Smith (2011, p.8)	No
16) 'How many days per month do you miss work?'	Prater and Smith (2011, p.8)	No
17) 'Please state your reasons for missing work from the list below ( <i>You may tick all that are applicable</i> ).'	Prater and Smith (2011, p.8)	No
18) 'Are you: <input type="checkbox"/> Female <input type="checkbox"/> Male'	Kim and Wiggins (2011, Table 2, p.732)	No

<b>Question:</b>	<b>Citation regarding question (opposite):</b>	<b>Adapted:</b>
19) 'What is your age group?'	Morganson et al., (2010, p.584)	No
20) 'Please state your home post code (the place from which you travel to work):'	Alexander et al. (2010, table 1, p.510)	Yes
21) 'To which group do you most closely identify?'	Stark and Poppler (2009, p.327)	No
22) 'Are there any questions or subject matter(s) you feel are relevant but were not covered by this questionnaire?'	-	Not applicable
23) 'Are there any questions that were not easily understood?'	-	Not applicable
24) 'Please feel free to leave comments with regard to any other aspects of the questionnaire that you feel could be improved (readability, design, layout).'	-	Not applicable



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Appendix C: 90 Likert statements of Q-sort study

The term 'additional' as highlighted in orange in the table below is indicative of a Likert statement that was not in the initial survey design instrument, yet added pre-Q-sort study to increase the number of Likert statements for that layer to 30.

**Layer 1 Resource: variables and Likert statements**

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
1	Autonomy orientation	'I am able to say what I mean regardless of the situation I'm in.' (Kuvaas, 2007, table AI, p.397)	No	13	1
		'I am more independent than most people.' (Kuvaas, 2007, table AI, p.397)	No	18	2
2	Empowerment	'I am allowed to do almost anything to solve problems.' (Babakus et al., 2003, p.283)	Yes	43	3
		'I do not have to get management's approval before I handle problems.' (Babakus et al., 2003, p.283)	Yes	38	4
3	Information Receiving: Job related issues	'I receive lots of information about how I am being evaluated.' (Ellis and Shockley-Zalabak, 2001, p.390)	Yes	52	5
		'I receive lots of information on how well I am doing in my job.' (Ellis and Shockley-Zalabak, 2001, p.390)	Yes	77	6
4	Intrinsic motivation	'I feel lucky being paid for a job I like this much.' (Kuvaas, 2007, table AI, p.396)	No	84	7
		'My job is meaningful.' (Kuvaas, 2007, table AI, p.396)	No	37	8
		'My job is so interesting that it is a motivation in itself.' (Kuvaas, 2007, table AI, p.396)	No	20	9
		'The tasks that I do at work are themselves representing a driving power in my job.' (Kuvaas, 2007, table AI, p.396)	No	30	10

Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
5	Job satisfaction	'I am satisfied with the amount of pay I receive for the job I do.' (Babakus et al., 2003, p.283)	No	31	11
		'I am satisfied with my current work schedule.' (Morganson et al., 2010, p.584)	No	1	12
		'I am satisfied with the amount of responsibility I am given.' (Wang, 2011, p.331)	No	17	13
		'I am satisfied with the way I am managed.' (Wang, 2011, p.331)	No	51	14
		'I am satisfied with the recognition I get for good work.' (Wang, 2011, p.331)	No	39	15
6	Retention likelihood: Intention to quit	'I do not frequently think of quitting my job.' (Zhao and Rashid, 2010, p.39)	Yes	22	16
		'If I have my own way, I will be working for this organisation years from now.' (Zhao and Rashid, 2010, p.39)	No	2	17
7	Retention likelihood: Work-leisure conflict	'My job does affect whether I enjoy my free time outside of work.' (Zhao and Rashid, 2010, p.39)	No	26	18
		'The amount of time I spend working interferes with how much free time I have.' (Zhao and Rashid, 2010, p.39)	No	14	19
8	Skills	'Resources are identified and made available for staff training.' (Bateman et al., 2002, p.224)	No	64	20
		'There is a formal system in place to identify staff development and training needs.' (Bateman et al., 2002, p.224)	No	21	21
9	Stress: Role Overload	'My workload is too heavy.' (Zhao and Rashid, 2010, p.40)	No	90	22
		'There is a need to reduce some parts of my role.' (Zhao and Rashid, 2010, p.40)	No	63	23

Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
10	Work pressure	'Job requires to work very hard.' (Konzelmann et al., 2006, p.566)	No	33	24
		'Pressures to get job done on time.' (Konzelmann et al., 2006, p.566)	No	45	25
11	Work-life support	'The work environment within my department supports balance between work and personal life.' (Morganson et al., 2010, p.584)	No	35	26
		'The work environment at the Council supports a balance between work and personal life.' (Morganson et al., 2010, p.584)	Yes	23	27
12 (Additional)	Stress: Role ambiguity	'I don't know exactly what is expected of me.' (Zhao and Rashid, 2010, p.39)	Yes	82	28 (Additional)
		'I don't know that I have divided my time properly.' (Zhao and Rashid, 2010, p.39)	Yes	16	29 (Additional)
		'I don't know what my responsibilities are.' (Zhao and Rashid, 2010, p.39)	Yes	58	30 (Additional)

**Layer 2 Policy: variables and Likert statements**

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
1	Business Unit Culture: Teamwork	'Fairness is valued to a very great extent in my organisation.' (Baird and Wang, 2010, p.598)	Yes	73	1
		'Tolerance is valued to a very great extent in my organisation.' (Baird and Wang, 2010, p.598)	Yes	24	2
2	Cognitive and affective commute strain	'I often fear for my personal safety during my commute due to bad weather.' (Kluger, 1998, p.155)	No	9	3
		'I often fear for my personal safety during my commute due to seeing accidents.' (Kluger, 1998, p.155)	No	42	4
3	Commute enjoyment	'My commute affects my productivity on the job in the following way: It gives me energy and wakes me up.' (Kluger, 1998, p.155)	No	85	5
		'My commute affects my productivity on the job in the following way: It reduces my stress level.' (Kluger, 1998, p.155)	No	10	6
4	Goal-oriented appraisal	'Managers give feedback to their subordinates concerning the extent to which they achieve their performance goals.' (Huang and Cullen, 2001, p.35)	No	59	7
		'Managers monitor the extent to which subordinates attain their performance goals.' (Huang and Cullen, 2001, p.35)	No	83	8
		'Specific performance goals are established for most jobs.' (Huang and Cullen, 2001, p.35)	No	81	9
		'Employee pay increases are based upon how employees' performance compares with established goals.' (Huang and Cullen, 2001, p.35)	No	62	10



Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
5	Information systems	'I always know where to access policies, processes and procedures for information systems.' (Curry and Moore, 2003, p.107)	Yes	3	11
		'The organisation's key policies, processes and procedures for information systems are clearly documented.' (Curry and Moore, 2003, p.107)	No	56	12
6	Quality	'There are clearly defined standards for working practices within the team.' (Bateman et al., 2002, p.226)	No	71	13
		'There are measurable standards for outcomes which are monitored.' (Bateman et al., 2002, p.226)	No	86	14
		'Feedback on the monitoring of standards is given to the team on a regular basis.' (Bateman et al., 2002, p.226)	No	41	15
7	Remote Working Self-Efficacy, Reflective	'I have confidence that I can complete my work because I can access appropriate support staff readily.' (Wang, 2011, p.330)	Yes	5	16
		'I have confidence that I can complete my work because I can access information needed to perform my job.' (Wang, 2011, p.330)	Yes	78	17
8	Rewards	'Employees in this Council are rewarded for good standards of service.' (Babakus et al., 2003, p.283)	Yes	53	18
		'Employees of this Council are rewarded for dealing effectively with problems.' (Babakus et al., 2003, p.283)	Yes	57	19
		'If I improve the level of service, I will be rewarded.' (Babakus et al., 2003, p.283)	Yes	80	20
		'I am rewarded for satisfying complaining customers.' (Babakus et al., 2003, p.283)	Yes	29	21

Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
9	Scenarios on Telecommuting Ethics	'The following scenario is ethical: a company allows workers to telecommute if they provide their own computers, software, and communications equipment to support their job from home.' (Guthrie, 1997, Exhibit 1)	Yes	25	22
		'The following scenario is ethical: Fred is the manager of several telecommuting workers. Because he is concerned with how to evaluate their performance, he keeps an on going log of their connect time.' (Guthrie, 1997, Exhibit 1)	Yes	49	23
10	Stress: Role conflict	'I have to do things that should be done differently.' (Zhao and Rashid, 2010, p.40)	No	8	24
		'I work under incompatible policies and guidelines.' (Zhao and Rashid, 2010, p.40)	No	69	25
11 (Additional)	Disadvantages of the teleworking implementation	'Teleworking / homeworking never hinders the security of internal data.' (Illegems et al., 2001, table 3, p.288)	Yes	89	26 (Additional)
		'Teleworking / homeworking never hinders the fulfilment of health regulations.' (Illegems et al., 2001, table 3, p.288)	Yes	6	27 (Additional)
		'Labour legislation with regards to teleworking is always clear.' (Illegems et al., 2001, table 3, p.288)	Yes	55	28 (Additional)
12 (Additional)	Perceived disadvantages to individuals	'Accountability for repairs/maintenance of employer's equipment placed with employees' is a problem (for example mobile phone, laptop etc).' (Teo et al., 1999, table 1, p.41)	Yes	44	29 (Additional)
		'System access in terms of security is a problem.' Teo et al. (1999, table 1, p.41)	Yes	72	30 (Additional)

**Layer 3 Connectivity: variables and Likert statements**

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
1	Affective organisational commitment	'I do feel like "part of the family" at my organisation.' (Meyer and Allan, 1997. <i>Cited In</i> : Kuvaas, 2007, table A1, p.397)	Yes	54	1
		'I do not think I could easily become as attached to another organisation as I am to this one.' (Meyer and Allan, 1997. <i>Cited In</i> : Kuvaas, 2007, table A1, p.397)	Yes	7	2
2	Use of resources	'We ensure that all the necessary systems for monitoring and controlling the use of physical resources are in place.' (Bateman et al., 2002, p.225)	Yes	61	3
		'I do not feel inhibited by organisation resources available to me to do my job.' (Bateman et al., 2002, p.225)	Yes	88	4
		'Members of the team feel that they are fully utilised.' (Bateman et al., 2002, p.225)	Yes	46	5
		'We ensure that we make the maximum practical use of our buildings and equipment.' (Bateman et al., 2002, p.225)	Yes	19	6
3	Environment	'The organisation is interested in my personal development.' (Curry and Moore, 2003, p.107)	No	70	7
		'There is a positive atmosphere within the organisation.' (Curry and Moore, 2003, p.107)	No	74	8
4	Perceived Organisational effectiveness	'The Council has almost completely achieved its objective in terms of customer/ client satisfaction.' (Ellis and Shockley-Zalabak, 2001, p.390)	No	12	9
		'The Council has almost completely achieved its objective in terms of funds available to the organisation.' (Ellis and Shockley-Zalabak, 2001, p.390)	Yes	4	10

Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
5	Performance	'The quality of my work is top notch.' (Kuvaas, 2007, table AI, p.396)	No	75	11
		'I am a highly productive employee.' (Wang, 2011, p.331)	No	47	12
		'I work very efficiently.' (Wang, 2011, p.331)	No	79	13
6	Team synergy	'The team is highly valued by other parts of the organisation.' (Bateman et al., 2002, p.224)	No	76	14
		'There is effective communication within the team.' (Bateman et al., 2002, p.224)	No	66	15
		'There is effective and appropriate leadership within the team.' (Bateman et al., 2002, p.224)	No	11	16
		'I have a sense of purpose at my organisation.' (Bateman et al., 2002, p.223)	No	67	17
7	Trust in other members	'I believe my colleagues are sincere.' (Shu and Chuang, 2011, p.33)	Yes	60	18
		'I believe my colleagues are trustworthy.' (Shu and Chuang, 2011, p.33)	Yes	48	19
8	Trust in top management	'To a very great extent I trust top management.' (Ellis and Shockley-Zalabak, 2001, Table 2, p.389)	Yes	40	20
		'To a very great extent those in top management keep their word to employees.' (Ellis and Shockley-Zalabak, 2001, Table 2, p.389)	Yes	27	21

Appendix C: 90 Likert statements of Q-sort study

Number of variables	Variable name	Likert statement	Adapted from Journal paper:	ID (Haq, 2012c; and 2012d)	Number of Likert statements
9	Workplace inclusion	'I am in the loop' with what's going on within my department.' (Morganson et al., 2010, p.584)	Yes	36	22
		'I do not feel isolated as a worker in my department.' (Şeker, 2011, Question 18, p.258)	Yes	28	23
10	Attitudes	'Homeworking / teleworking is a trend.' (Shu and Chuang, 2011, p.33)	No	65	24
		'Homeworking / teleworking is a good idea.' (Shu and Chuang, 2011, p.33)	No	50	25
		'It is wise to homework / telework.' (Shu and Chuang, 2011, p.33)	No	15	26
11	Maintaining relationships	'The practice of homeworking / teleworking can help me stay connected.' (Shu and Chuang, 2011, p.32)	No	87	27
		'The practice of homeworking / teleworking can help me interact with people.' (Shu and Chuang, 2011, p.32)	No	68	28
12	Innovation	'Problems relating to technology are quickly identified.' (Bateman et al., 2002, p.225)	No	34	29
		'Once technological problems are identified the team is quick to address the problem.' (Bateman et al., 2002, p.225)	No	32	30

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Appendix C: 90 Likert statements of Q-sort study

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## Appendix D: Logical options 2 and 3 of Q-sort study

The Q-sort can follow three logical paths regarding the two tasks stated in section 3.6: 1) allocation of Likert statements and 2) ranking of Likert statements. The paths are alternatively, logical options of the Q-sort. Logical option 1 was chosen and documented in section 3.6.1. The additional identifiable options, 2 and 3 are documented as per this appendix. The two logical options are summarised in the figures below: logical option 2 in figure D1, logical option 3 in figure D2.

Logical options 2 and 3 are detailed in terms of the steps that would be taken for the 7 participants regarding allocation and 6 participants.

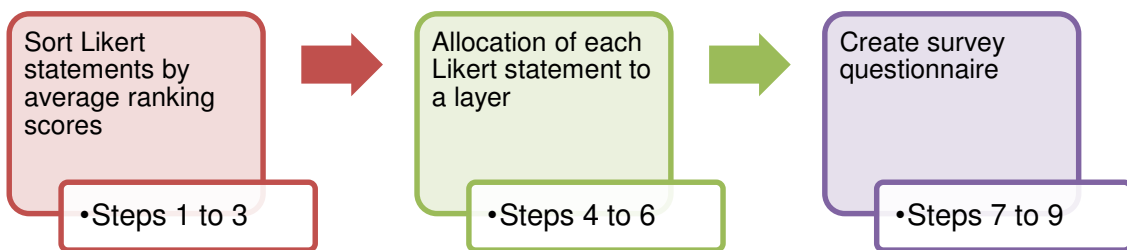


Figure D1: Summary of logical option 2

Detailed steps for logical option 2 are as shown in figure D3 on page 328.

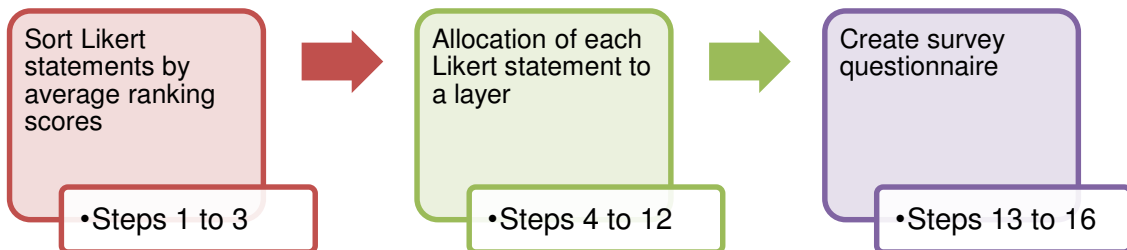


Figure D2: Summary of logical option 3

Detailed steps for logical option 3 are as shown in figure D4a and figure D4b on pages 329-330.



**Logical option 2**

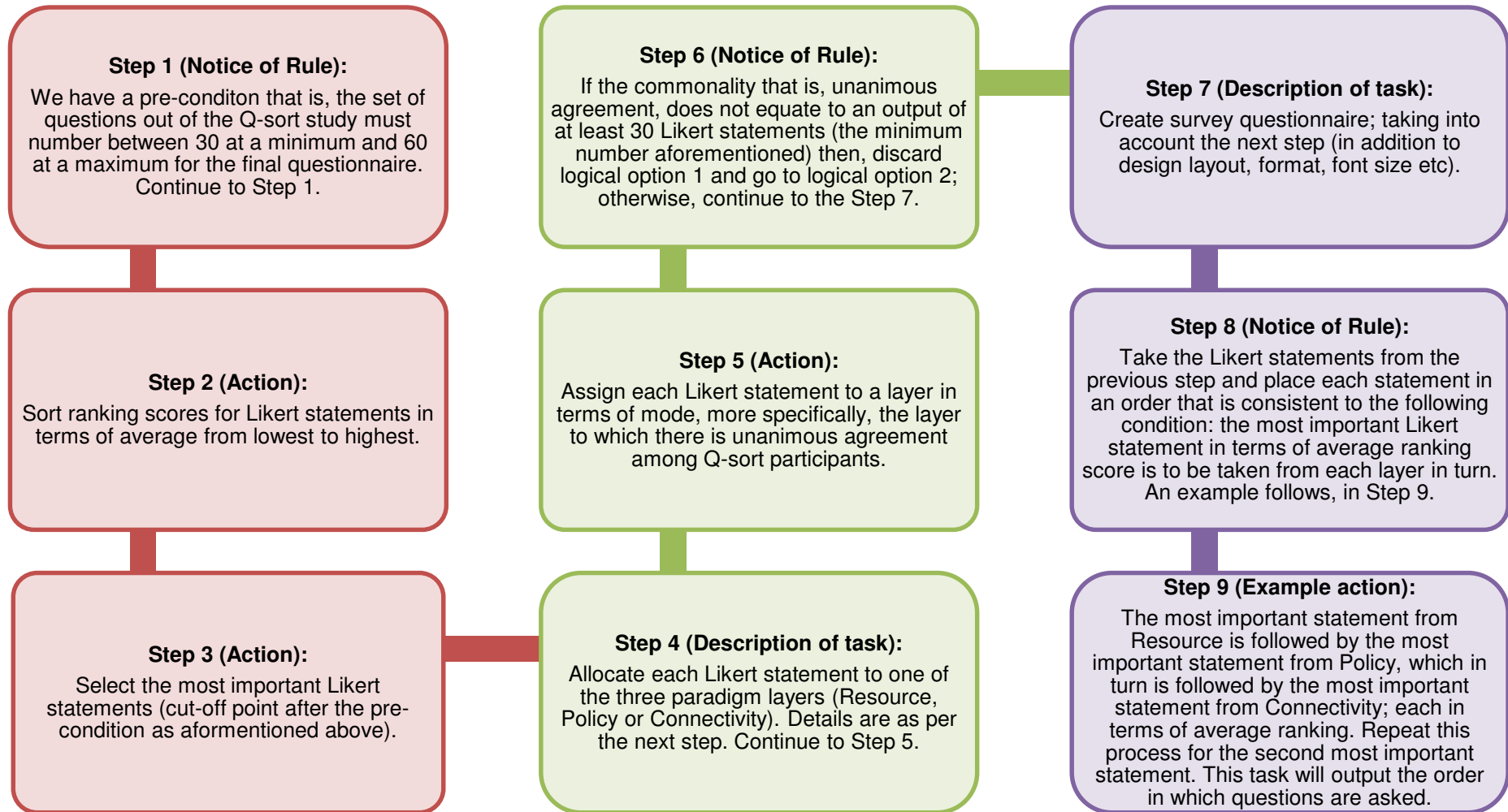


Figure D3: Logical option 2 [Steps 1 to 9 of 9]

**Logical option 3**

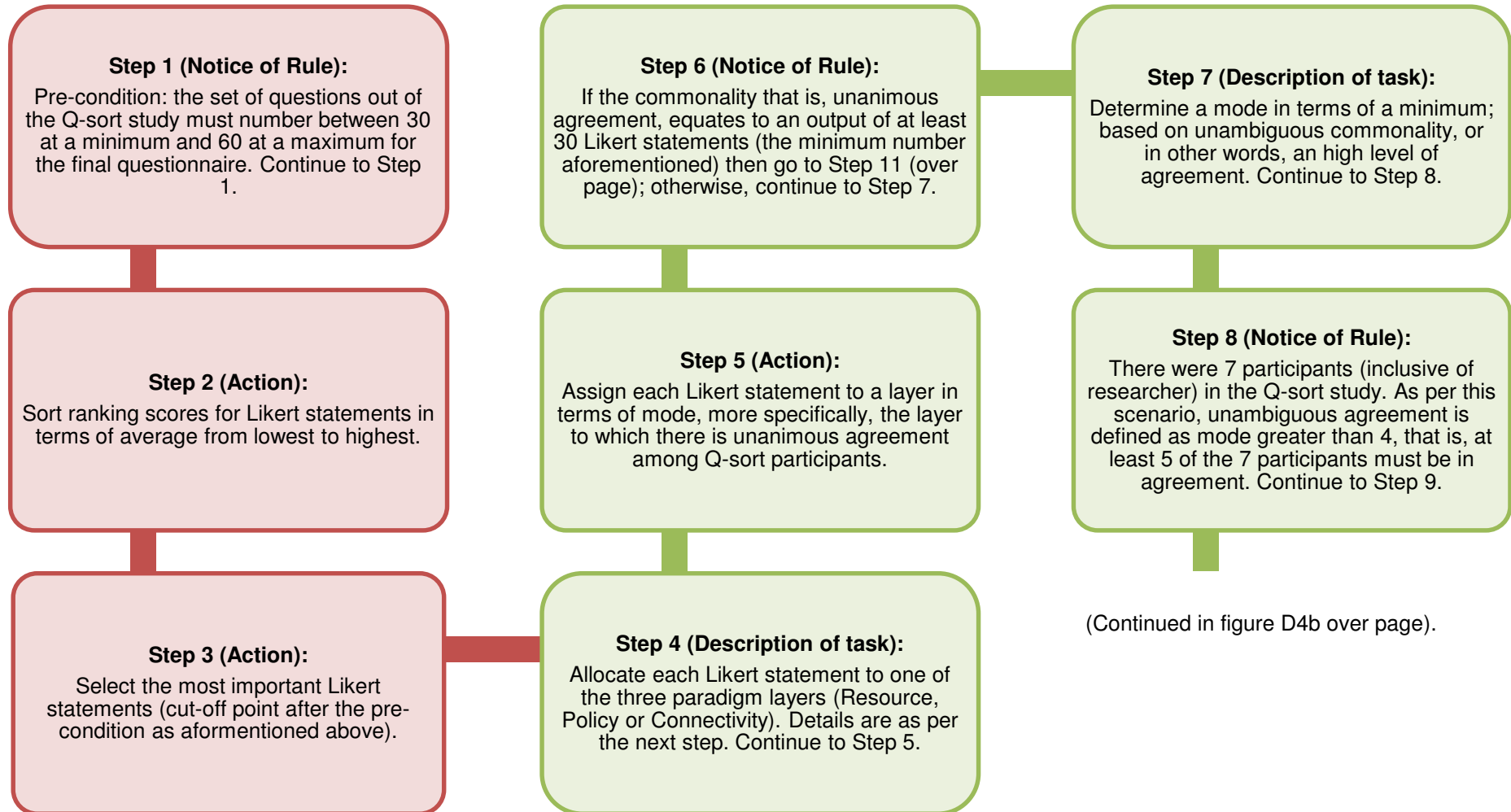


Figure D4a: Logical option 3 [Steps 1 to 8 of 16]

(Continued from figure D4a on preceding page.)

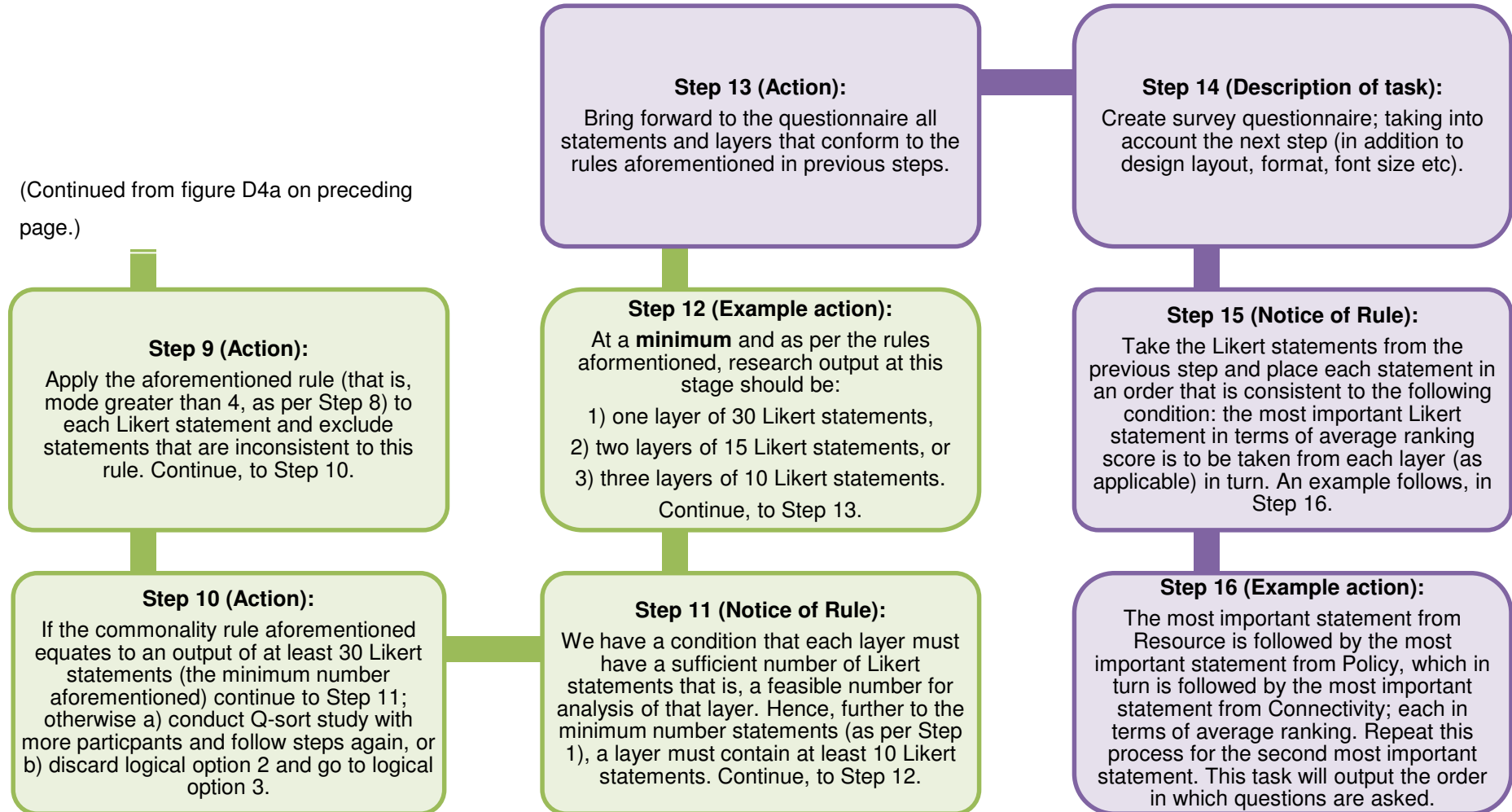


Figure D4b: Logical option 3 [Steps 9 to 16 of 16]

Appendix E: Revised Questionnaire Instrument [web-based]

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## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Welcome

#### INTRODUCTION

The research study we have undertaken is to understand the complexity of factors associated with teleworking practices. Teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer. This survey will enable us to, not only analyse data but also feedback to participating Councils in terms of teleworking development and maturity.

#### THE SURVEY

The questions of this survey should take less than 1 hour to complete and is aimed at both non-teleworkers and teleworkers. For those of you that do not telework we have stated in parentheses a variation of words for some questions to give you the option to respond in terms of your viewpoint. Data will not be used to identify any individuals. For details of our **data protection**, please visit the **link that follows below**.

[http://helios.hud.ac.uk/u9804110/survey\\_data\\_protection.html](http://helios.hud.ac.uk/u9804110/survey_data_protection.html)

If you have more than one job then please select **only one of your job roles**. To help, this decision could be based on the job that is: 1) most important to you AND/OR, 2) has the most work hours AND/OR, 3) is inclusive of teleworking practice. Please ensure the job you choose is **consistent to all your responses** of the survey.

The survey consists of two sections as follows. Section One consists of demographic questions. Section Two consists of 50 Likert statements in two parts, A and B. We advise you spend on average **1 minute** per question. All questions are **mandatory**.

(Continued over page)

**Note that if you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.** Please ensure you have a one hour block free and attempt this survey **once** only. Note that once you have clicked on the **CONTINUE** button at the bottom of each web page: 1) **responses for that web page are saved** to the survey database and 2) **you cannot return to amend that web page.**

Whilst we advise you not to spend too much time for each question, it is of **greatest importance** that you allow yourself the time to read all information provided and that you do think carefully before responding. This method should significantly reduce the need you may have, to re-check or review your responses before you proceed to each subsequent web page.

Once you click on the 'Continue' button below you will be directed to the start of the survey questions namely, Section One. While taking the survey that is, **Sections One and Two:** a) **please do not use the Back button** on your browser, as this can cause errors and b) key points aforementioned above can be found listed at the top of each web page in terms of **reminders.**

If you have any problems reading the survey pages or regarding anything else, please do not hesitate to ask. Thank you in advance for your time. You may now begin the survey.

Yours sincerely,

Khawaja Al-Musavar-Ul Haq

University of Huddersfield

Email: khawaja.haq@hud.ac.uk or u9804110@hud.ac.uk

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End of web page 1

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section One: Demographics

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

(Continued over page)



## GENDER

1. I am:

Male  Female

## AGE GROUP

2. Please state your age from the following:

16-25  26-35  36-45  46-55  56-65  66 and over

## JOB

3. Please state the department to which you belong:

4. Please answer questions 4(i) and 4(ii) in terms of your average weekly **working** hours for your job as per any paid/voluntary agreement(s) with the Council.

There are six work locations (a - f) in the table below. Please answer for each work location. Please note that the second question, 4(ii) is dependent on your answer to the first question, 4(i).

(Continued over page)

Revised Questionnaire Instrument: web page 2 (continued) of 7

	Question 4(i): as per your agreement(s) with the Council, how many hours per week do you work at each of these locations (if your hours vary per week, please state on average)?	Question 4(ii): approximately what percentage of the time you specified in your answer to question 4(i) do you spend using technology that can communicate across a network (for example, the use of a computer, telephone or mobile device)?
a. Mobile (for example, between any two or more of the locations listed below, working from a car, train, plane, internet café or hotel)	Select an answer ▼	Select an answer ▼
b. Main Council building(s)	Select an answer ▼	Select an answer ▼
c. Other Council building(s) (namely, buildings designated officially to remote technological use only such as, a Call Centre)	Select an answer ▼	Select an answer ▼
d. Non-business client or customer site (for example, visiting families at their home)	Select an answer ▼	Select an answer ▼
e. Business client or customer site	Select an answer ▼	Select an answer ▼
f. Your home	Select an answer ▼	Select an answer ▼

(Continued over page)

Revised Questionnaire Instrument: web page 2 (continued) of 7

5. Please answer questions 5(i) and question 5(ii) in terms of your **length of service** at the Council. Please note that the second question, 5(ii) is dependent on your answer to the first question, 5(i).

	Question 5(i): how long have you been in your current job?	Question 5(ii): approximately what percentage of the time you specified in your answer to question 5(i) have you been teleworking*? (*See definition at the bottom of the page for more information.)
a. Your length of service:	Select an answer ▾	Select an answer ▾

**There now follows three sets of questions in tabular form before a few further questions on the penultimate page.**

---

\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer.

**Continue >**

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Two: PART A [Statements 1-15 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

6. Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

(Continued over page)

Revised Questionnaire Instrument: web page 3 (continued) of 7

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
a. I am satisfied with my current work schedule.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I do not feel isolated in the department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I am satisfied with the amount of responsibility I am given.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. There are clearly defined standards for working practices within the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. There is a common sense of purpose for this team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I do not feel inhibited by Council's technical resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Specific performance goals are established for most jobs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. There is effective communication within the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

Revised Questionnaire Instrument: web page 3 (continued) of 7

<b>i.</b> I am satisfied with the amount of pay I receive for the job I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>j.</b> I do not have to get management's approval before I handle problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> I believe my colleagues are sincere.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> Resources are identified and made available for staff training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> The Council's key policies, processes and procedures for information systems are clearly documented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> There is no need to reduce some parts of my role.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> Employees of this Council are rewarded for dealing effectively with problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Two: PART A [Statements 16-30 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

**7.** Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

(Continued over page)

Revised Questionnaire Instrument: web page 4 (continued) of 7

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
a. I do feel like "part of the family" at my Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. My workload is not too heavy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. The Council supports you through its health policies. Teleworking* can (or could) hinder the fulfilment of the Council's health policies. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. I am able to say what I mean regardless of the situation I'm in.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. The tasks that I do at work are themselves representing a driving power in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I do not work under incompatible policies and guidelines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Networking whilst teleworking* can (or could) help me interact with people. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. I have confidence that I can complete my work because I can access information needed to perform my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)



Revised Questionnaire Instrument: web page 4 (continued) of 7

<b>i.</b> I have to do things that should be done differently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>j.</b> I believe my colleagues are trustworthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> Problems relating to technology are quickly identified.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> There are measurable standards for outcomes which are monitored.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> There is a positive atmosphere within the Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> My job does not require me to work very hard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> Teleworking* hinders (or could hinder) the security of internal data. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer.

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Two: PART A [Statements 31-45 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

**8.** Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

(Continued over page)

Revised Questionnaire Instrument: web page 5 (continued) of 7

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
<b>a.</b> Teleworking* can (or could) help me stay connected with colleagues. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b.</b> We ensure that we make the maximum practical use of our buildings and equipment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c.</b> Employment legislation with regards to teleworking* is clear. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d.</b> Managers monitor the extent to which subordinates attain their performance goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e.</b> I do not think I could easily become as attached to another organisation as I am to this Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>f.</b> I do not have pressures to get job done on time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>g.</b> I am more independent than most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>h.</b> Once technological problems are identified the team is quick to address the problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

Revised Questionnaire Instrument: web page 5 (continued) of 7

<b>i.</b> Employees in this Council are rewarded for serving the public well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>j.</b> My job doesn't affect whether I enjoy my free time outside of work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> I know that I have divided my time properly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> The team is highly valued by other parts of the Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> If I improve the level of service, I will be rewarded.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> I am rewarded for satisfying public demand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer.

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End of web page 5

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Two: PART B [Statements 46-50 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

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Please read the following 5 statements, which require a response. Please also note the scale for each of these statements.

(Continued over page)

Revised Questionnaire Instrument: web page 6 (continued) of 7

**9. Statement 1:**

	Seven-point scale (1 = never true, 7 = always true)						
	1	2	3	4	5	6	7
a. I know where to access policies, processes and procedures for information systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**10. Statement 2:**

	Seven-point scale (1 = very little, 7 = very much)						
	1	2	3	4	5	6	7
a. I feel I am in the loop with what's going on within my department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

**11. Statement 3:**

	Seven-point scale (1 = very little, 7 = very great)						
	1	2	3	4	5	6	7
a. I trust top management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**12. Statement 4:**

	Seven-point scale (1 = completely unachieved, 7 = almost completely achieved)						
	1	2	3	4	5	6	7
a. How well do you think the Council has achieved its performance objectives?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

13. Statement 5: The Council should only allow employees to telework\* if they provide their own... (\*See definition at the bottom of the page for more information.)

	Seven-point scale (1 = never acceptable, 7 = always acceptable)						
	1	2	3	4	5	6	7
a. computers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. communications equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer.

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## AN EXPLORATORY STUDY OF WORKING PRACTICES



### End of questionnaire...

#### **Thank you for completing this survey!**

We appreciate the time you have taken to participate in this research. As aforementioned, the research study will help us to understand the complexity of factors associated with teleworking practices and feedback to participating Councils in terms of teleworking development and maturity.

If you would like to contact the author of this survey, email: [khawaja.haq@hud.ac.uk](mailto:khawaja.haq@hud.ac.uk) or [u9804110@hud.ac.uk](mailto:u9804110@hud.ac.uk). You may now close your browser window.

Revised Questionnaire Instrument: data protection

We have a notice of data protection regarding the survey. The notice is available over the duration of the live survey at:

[http://helios.hud.ac.uk/u9804110/survey\\_data\\_protection.html](http://helios.hud.ac.uk/u9804110/survey_data_protection.html)

The above web address is also stated on the Welcome page of the survey (see p.333 of this thesis document). The full notice (as posted live at the above link) is as shown below; starting with the heading that follows and ending with the date as shown on p.357.

## AN EXPLORATORY STUDY OF WORKING PRACTICES

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### Data Protection

- 1) TERMS AND CONDITIONS
  - 1.1 Each term as stated in double quotation marks on this web page refers to word(s) on a) the survey and/or b) this data protection web page.
  - 1.2 The term "survey" refers to the research student's web-based survey with the title name 'an exploratory study of working practices as the header of each web page located at the web address that a) begins 'http://www.survey.bris.ac.uk/hud/...' and b) is subject to the research team's method of distribution as detailed in 1.10-12, below.
  - 1.3 The title name of the survey is also stated at the top this web page to denote that this data protection web page is part of the survey.
  - 1.4 The terms "we", "our" and "us" refer to the research team of Computing and Engineering at the University of Huddersfield.
  - 1.5 The term "research team" refers to the three members of the team: the research student and two staff members in a Supervisory role.
  - 1.6 The research student is also the primary contact for the survey. His contact name and email address can be found a) on the first and last web pages of the survey, b) via the 'Contact Us' link located in the footer section of each survey web page and c) on this web page in Section 4, below.

- 1.7 The term "his" refers to the research student.
- 1.8 The terms "you", "your", "yours", "yourself", "I", "me", "my" and "myself" refer to you, the survey participant or potential survey participant. There is one exception: if 1.13 below is true then the term "you" in 1.13 refers to you, the recipient and all other instances of the terms "you", "your", "yours", "yourself", "I", "me", "my" and "myself" refer to the intended audience only that is, the survey participant(s) or potential survey participant(s) as per 1.10-12 below.
- 1.9 The term "Council staff member(s)" refers to the person(s) of the Council whom have permitted our survey at your work place or department.
- 1.10 The location or web link of the survey is provided by the research student to potential participants. There are two methods of distribution of the survey link as detailed in 1.11, below. The chosen method is as per the research student's Supervision and our discussion and agreement(s) with Council staff member(s).
- 1.11 The location or web link of the survey is provided by the following methods (in terms of the practicalities of distribution): a) indirectly, from the research student to participant(s) that is, via Council staff member(s), or b) directly, from the research student to participant(s) on advice by Council staff member(s). The former of the two methods aforementioned is the primary method.
- 1.12 We do not cold-call employees to request their participation in the survey: we have had discussions regarding our study with Council staff member(s) as aforementioned above, in terms of a) utility of our research to your department or organisation and b) our research output as detailed in Section 2 below. These discussions also create an awareness of our research study among other staff and employees of the department(s) before the survey. Hence, we feel this approach as taken, is more suitable and appropriate for our research.
- 1.13 If you have received the link to the survey or this data protection notice in error that is, contrary to 1.10-12 above, please contact us as per the details in Section 4, below.
- 1.14 We define the term "teleworking" as follows. Teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a remote location to the Organisation's (Council's) main physical building(s) that is, the base of the employer.

- 1.15 Questions in the survey are adopted or adapted from Journal papers only, limited to scholarly publications, including peer-review.
- 1.16 Journal papers aforementioned above are available to us via the Summon University of Huddersfield website.
- 1.17 Every question of the survey is referenced by the research student as per academic protocol in terms of copyright.
- 1.18 References and bibliography of the research student regarding the above teleworking definition and survey questions are stored in an offline document.
- 1.19 References and bibliography regarding the above teleworking definition and/or survey questions are available on request from the research student.
- 1.20 Further information, pertaining to the survey copyright and survey software copyright can be found via the 'Copyright' link located in the footer section of each survey web page.
- 1.21 This notice of data protection will be online and offline when the survey is live and closed, respectively. The date as per the footer section of this web page denotes the version of our data protection notice and this version will be consistent over the duration of the survey for all Council participants. If you would like a copy of this notice you may print or save this web page from your browser window.

## 2) RESEARCH AND ANONYMITY

As per academic protocol, no personal data is asked for or retained, that is, the research student has agreed not to identify any individuals when reporting their results and so, the survey is anonymous. The research student will use his best efforts to ensure that no individuals can be identified by implication that is, 2.1 to 2.2 below have been actioned in the live survey and 2.3 to 2.9 below are to be actioned after responses are saved to the survey database.

- 2.1 We do not use the Internet Protocol address (IP) of your computer in the survey.
- 2.2 We have significantly reduced the number of demographic questions. Details are as follows.

- 2.2.1 We have **excluded** the following demographic questions from our research: **your name, contact email address and phone number, job title, income or salary grade, ethnicity** and a number of **response options regarding type of worker or employment such as Fixed term, Permanent, Agency and Voluntary.**
- 2.2.2 Demographic questions **inclusive** to the survey that is, a utility to our research are with regards to **gender, age** and **your job**. Questions regarding your job are as follows: a) **the department to which you belong**, b) **your average weekly working hours** as per i) your location and ii) technology and c) **your length of service at the Council** as per i) your job and ii) teleworking, These demographics will enable us to a) research at a feasible level, b) compare between different demographic groups in our analyses and c) narrow the focus of our exploratory study.
- 2.3 Only data in terms of an anonymous aggregate will be analysed and supervised. An aggregate as stated would mean that analyses and findings are taken at an overall not individual level.
- 2.4 Data for a demographic type that contains only a few participant responses will be **excluded**: a) that is, we remove the possibility that individuals pertaining to these responses could be identified, b) from analyses, as the sample would not be representative of the larger population and c) from publishing (see 2.7 to 2.9 below for details).
- 2.5 Results are dependent on response rates and so, we may: a) aggregate results for each participating Council or, b) aggregate results for all Councils together. All results (as aforementioned above) will be anonymous.
- 2.6 We pursue a consistency and rigour in our protocol aforementioned above to protect individual-level data.
- 2.7 The results of our research, aggregated and anonymous as aforementioned above: a) will be part of the research student's doctoral thesis and b) may be published in our Journal paper(s). Regarding the latter: in addition to the research team, our Journal paper(s) may include other staff member(s) or person(s) with a contribution to the field of teleworking.
- 2.8 In addition to 2.7 above, results, also aggregated and anonymous as aforementioned above, will be part of a third document type that is, a report to

the Council staff member(s). Results are dependent on response rates (as aforementioned in 2.5 above) and so, the report will contain: a) only aggregate results of the Council to which the document is sent or, b) aggregate results in terms of all Councils together.

- 2.9 For each of the documents aforementioned in 2.7 above, the name of each participating Council will be anonymised that is, a) we will refer to each participating Council in terms of a letter for example, Council A, B, C or, Organisation A, B, C, otherwise, b) we aggregate results for all Councils together (as aforementioned in 2.5 above) and we will refer to this aggregate as one anonymous organisation such as, Organisation Z.

3) COMPUTER SECURITY

- 3.1 We do not use cookies, or personal data stored by your Web browser in the survey.
- 3.2 The research student's survey account is accessible by him via a) his log-in username and password only and b) secure web protocol only that is, https. The password aforementioned is with the research student only.
- 3.3 For additional work place security (particularly with regards to shared PCs) we advise that your Web browser (for example, Internet Explorer, Safari, Firefox and Google Chrome) options are not set up to save form data. This is not data that the research student or team has or would have access to, rather this is to ensure that your data security is not compromised in terms of access that others would normally have to your PC.
- 3.4 We advise that you close the Web browser window post-survey participation and delete the Web browser session.

4) PRIMARY CONTACT

Name: Khawaja Al-Musavar-UI Haq

Capacity: Research student

Institution: University of Huddersfield

Email: khawaja.haq@hud.ac.uk or u9804110@hud.ac.uk

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Dated: 22nd January 2013

### Citations and references

#### Demographics [citations]

Survey Q#	Demographic questions:	Citation regarding question (opposite):	Question adapted:
1	'I am: <input type="checkbox"/> Male <input type="checkbox"/> Female'	Kim and Wiggins (2011, Table 2, p.732)	No
2	'Please state your age from the following: <input type="checkbox"/> 16-25 <input type="checkbox"/> 26-35 <input type="checkbox"/> 36-45 <input type="checkbox"/> 46-55 <input type="checkbox"/> 56-65 <input type="checkbox"/> 66 and over'	Morganson et al., (2010, p.584)	Yes
3	'Please state the department to which you belong:'	Morganson et al., (2010, p.584)	Yes
4(i)	'Question 4(i): as per your agreement(s) with the Council, how many hours per week do you work at each of these locations (if your hours vary per week, please state on average)?'	Alexander et al. (2010, table 1, p.510), Author (2013), Beham et al. (2011, p.115) and Maruyama and Tietze (2012, p.454)	Yes
4(ii)	'Question 4(ii): approximately what percentage of the time you specified in your answer to question 4(i) do you spend using technology that can communicate across a network (for example, the use of a computer, telephone or mobile device)?'		
5(i)	'Question 5(i): how long have you been in your current job?'	Public Sector Commission (2009, p.26) and Griesser (1993, p.26).	Yes
5(ii)	'Question 5(ii): approximately what percentage of the time you specified in your answer to question 5(i) have you been teleworking*? (*See definition at the bottom of the page for more information.)'	Maruyama and Tietze (2012, p.454)	Yes

#### Likert statements [citations]

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
6a	'I am satisfied with my current work schedule.'	Morganson et al., (2010, p.584)	No	No	Yes
6b	'I do not feel isolated in the department.'	Şeker (2011, p.258)	Yes	No	Yes

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
6c	'I am satisfied with the amount of responsibility I am given.'	Wang (2011, p.331)	No	No	No
6d	'There are clearly defined standards for working practices within the team.'	Bateman et al (2002, p.226)	No	No	Yes
6e	'There is a common sense of purpose for this team.'	Bateman et al (2002, p.223)	No	No	Yes
6f	'I do not feel inhibited by Council's technical resources.'	Bateman et al (2002, p.225)	Yes	No	Yes
6g	'Specific performance goals are established for most jobs.'	Huang and Cullen (2001, p.35)	No	No	Yes
6h	'There is effective communication within the team.'	Bateman et al (2002, p.224)	No	No	Yes
6i	'I am satisfied with the amount of pay I receive for the job I do.'	Babakus et al. (2003, p.283)	No	No	Yes
6j	'I do not have to get management's approval before I handle problems.'	Babakus et al. (2003, p.283)	Yes	No	Yes
6k	'I believe my colleagues are sincere.'	Shu and Chuang (2011, p.33)	Yes	No	No
6l	'Resources are identified and made available for staff training.'	Bateman et al (2002, p.224)	No	No	Yes
6m	'The Council's key policies, processes and procedures for information systems are clearly documented.'	Curry and Moore (2003, p.107)	Yes	No	Yes
6n	'There is no need to reduce some parts of my role.'	Zhao and Rashid (2010, p.40)	Yes	No	No
6o	'Employees of this Council are rewarded for dealing effectively with problems.'	Babakus et al. (2003, p.283)	Yes	No	Yes
7a	'I do feel like "part of the family" at my Council.'	Meyer and Allan (1997. <i>Cited In: Kuvaas, 2007, Table A1, p.397</i> )	Yes	No	Yes



## Appendix E: Revised Questionnaire Instrument [web-based]

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
7b	'My workload is not too heavy.'	Zhao and Rashid (2010, p.40)	Yes	No	No
7c	'The Council supports you through its health policies. Teleworking* can (or could) hinder the fulfilment of the Council's health policies. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
7d	'I am able to say what I mean regardless of the situation I'm in.'	Kuvaas (2007, Table AI, p.397)	No	No	Yes
7e	'The tasks that I do at work are themselves representing a driving power in my job.'	Kuvaas (2007, Table AI, p.396)	No	No	Yes
7f	'I do not work under incompatible policies and guidelines.'	Zhao and Rashid (2010, p.40)	Yes	No	No
7g	'Networking whilst teleworking* can (or could) help me interact with people. (*See definition at the bottom of the page for more information.)'	Shu and Chuang (2011, p.32)	Yes	No	No
7h	'I have confidence that I can complete my work because I can access information needed to perform my job.'	Wang (2011, p.330)	Yes	No	No
7i	'I have to do things that should be done differently.'	Zhao and Rashid (2010, p.40)	No	No	No
7j	'I believe my colleagues are trustworthy.'	Shu and Chuang (2011, p.33)	Yes	No	No
7k	'Problems relating to technology are quickly identified.'	Bateman et al (2002, p.225)	Yes	No	Yes
7l	'There are measurable standards for outcomes which are monitored.'	Bateman et al (2002, p.226)	No	No	Yes
7m	'There is a positive atmosphere within the Council.'	Curry and Moore (2003, p.107)	Yes	No	Yes

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
7n	'My job does not require me to work very hard.'	Konzelmann et al. (2006, p.566)	Yes	No	Yes
7o	'Teleworking* hinders (or could hinder) the security of internal data. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
8a	'Teleworking* can (or could) help me stay connected with colleagues. (*See definition at the bottom of the page for more information.)'	Shu and Chuang (2011, p.32)	Yes	No	No
8b	'We ensure that we make the maximum practical use of our buildings and equipment.'	Bateman et al (2002, p.225)	No	No	Yes
8c	'Employment legislation with regards to teleworking* is clear. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
8d	'Managers monitor the extent to which subordinates attain their performance goals.'	Huang and Cullen (2001, p.35)	No	No	Yes
8e	'I do not think I could easily become as attached to another organisation as I am to this Council.'	Meyer and Allan (1997. <i>Cited In:</i> Kuvaas, 2007, Table AI, p.397)	Yes	No	Yes
8f	'I do not have pressures to get job done on time.'	Konzelmann et al. (2006, p.566)	Yes	No	Yes
8g	'I am more independent than most people.'	Kuvaas (2007, Table AI, p.397)	No	No	Yes
8h	'Once technological problems are identified the team is quick to address the problems.'	Bateman et al (2002, p.225)	Yes	No	Yes
8i	'Employees in this Council are rewarded for serving the public well.'	Babakus et al. (2003, p.283)	Yes	No	Yes
8j	'My job doesn't affect whether I enjoy my free time outside of work.'	Zhao and Rashid (2010, p.39)	No	No	No

Appendix E: Revised Questionnaire Instrument [web-based]

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
8k	'I know that I have divided my time properly.'	Zhao and Rashid (2010, p.39)	No	No	No
8l	'Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.'	Teo et al. (1999, table 1, p.41)	Yes	No	Yes
8m	'The team is highly valued by other parts of the Council.'	Bateman et al (2002, p.224)	Yes	No	Yes
8n	'If I improve the level of service, I will be rewarded.'	Babakus et al. (2003, p.283)	Yes	No	Yes
8o	'I am rewarded for satisfying public demand.'	Babakus et al. (2003, p.283)	Yes	No	Yes
9a	'I know where to access policies, processes and procedures for information systems.'	Curry and Moore (2003, p.107)	Yes	No	Yes
10a	'I feel I am in the loop with what's going on within my department.'	Morganson et al., (2010, p.584)	Yes	No	Yes
11a	'I trust top management.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	No	No	Yes
12a	'How well do you think the Council has achieved its performance objectives?'	Ellis and Shockley-Zalabak (2001, p.390)	Yes	No	Yes
13a	'The Council should only allow employees to telework* if they provide their own... (*See definition at the bottom of the page for more information.) a. computers. b. software. c. communications equipment.'	Guthrie (1997, Exhibit 1)	Yes	Yes	Yes

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## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Welcome

#### INTRODUCTION

The research study we have undertaken is to understand the complexity of factors associated with teleworking practices. Teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a location which is remote from the Council's main buildings. This survey will enable us to, not only analyse data but also feedback to participating Councils in terms of teleworking development and maturity.

#### THE SURVEY

The questions of this survey should take less than 1 hour to complete and is aimed at both non-teleworkers and teleworkers. For those of you that do not telework we have stated in parentheses a variation of words for some questions to give you the option to respond in terms of your viewpoint. Data will not be used to identify any individuals. For details of our **data protection**, please visit the **link that follows below**.

[http://helios.hud.ac.uk/u9804110/lc\\_survey\\_data\\_protection.html](http://helios.hud.ac.uk/u9804110/lc_survey_data_protection.html)

If you have more than one job then please select **only one of your job roles**. To help, this decision could be based on the job that is: 1) most important to you AND/OR, 2) has the most work hours AND/OR, 3) is inclusive of teleworking practice. Please ensure the job you choose is **consistent to all your responses** of the survey.

The survey consists of three sections as follows. Section One consists of demographic questions. Section Two consists of technical

(Continued over page)

Council-Z Teleworking Survey page 1 (continued) of 8

questions. Section Three consists of 50 Likert statements in two parts, A and B. We advise you spend on average **1 minute** per question. All questions are **mandatory**.

**Note that if you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.** Please ensure you have a one hour block free and attempt this survey **once** only. Note that once you have clicked on the **CONTINUE** button at the bottom of each web page: 1) **responses for that web page are saved** to the survey database and 2) **you cannot return to amend that web page**.

Whilst we advise you not to spend too much time for each question, it is of **greatest importance** that you allow yourself the time to read all information provided and that you do think carefully before responding. This method should significantly reduce the need you may have, to re-check or review your responses before you proceed to each subsequent web page.

Once you click on the 'Continue' button below you will be directed to the start of the survey questions namely, Section One. While taking the survey that is, **Sections One to Three:** a) **please do not use the Back button** on your browser, as this can cause errors and b) key points aforementioned above can be found listed at the top of each web page in terms of **reminders**.

If you have any problems reading the survey pages or regarding anything else, please do not hesitate to ask. Thank you in advance for your time. You may now begin the survey.

Yours sincerely,

Khawaja Al-Musavar-Ul Haq

University of Huddersfield

Email: khawaja.haq@hud.ac.uk or u9804110@hud.ac.uk

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End of Council-Z Teleworking Survey page 1



## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section One: Demographics

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

(Continued over page)

## GENDER

1. I am:

Male  Female

## AGE GROUP

2. Please state your age from the following:

16-25  26-35  36-45  46-55  56-65  66 and over

## JOB

3. Please state your job title:

4. Please state the council service to which you belong:

(Continued over page)

5. My employment is:

- Full-time
- Part-time
- Other (*please specify*):

6. My average weekly working hours are:

Select an answer

**Continue >**

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Two: Technical questions

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

In the questions that follow we are interested in three different potential roles you may have within the council, namely roles that are *internal* (within the council), *across councils/companies* or *with the public/customers*. If you only undertake one or two of these roles please select **not applicable** for role(s) you do not perform.

(Continued over page)

Council-Z Teleworking Survey page 3 (continued) of 8

7. Please identify whether you use **portable** devices (such as a laptop, tablet PC, mobile phone and smart phone), **non-portable** devices (such as a desktop PC and land-line telephone) or **a mixture** of these devices to fulfil your roles.

	Internal	Across councils/companies	With the public/customers
a. The hardware devices that I use are:	Select an answer ▼	Select an answer ▼	Select an answer ▼

8. Please identify whether you use **local** software (e.g. mobile apps or email applications installed on the device), **network** software (e.g. web-based email, social media or mobile/virtual desktops which can only be accessed on-line) or **a mixture**.

	Internal	Across councils/companies	With the public/customers
a. The software that I access is:	Select an answer ▼	Select an answer ▼	Select an answer ▼

9. How you use ICT may vary from time to time, and therefore you may use ICT **regularly**, **irregularly** or **a mixture**.

	Internal	Across councils/companies	With the public/customers
a. I use ICT:	Select an answer ▼	Select an answer ▼	Select an answer ▼

(Continued over page)

**10.** The location from where you work may vary from time to time, and therefore you may work **on-site**, **off-site** or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. I work:	Select an answer ▼	Select an answer ▼	Select an answer ▼

**11.** The number of log-on screens you need to go through may vary from time to time, and therefore you may view these as being either consistently **too many**, consistently **too few** or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. I feel that the number of log-on screens I need to go through are:	Select an answer ▼	Select an answer ▼	Select an answer ▼

**12.** Please identify whether the content of your work is **electronic** (such as emails, word processed documents, phone-calls and video conferencing), **physical** (such as paper work and physical meetings) or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. The content of my work is:	Select an answer ▼	Select an answer ▼	Select an answer ▼

(Continued over page)

Council-Z Teleworking Survey page 3 (continued) of 8

13. Please identify whether your work is oriented to **tasks** (completion of objectives), **time** (completion of hours) or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. My work is oriented to:	Select an answer ▼	Select an answer ▼	Select an answer ▼

14. There may be a number of contextual constraints which vary from time to time and which limit your ability to work at your given location including issues of confidentiality, privacy etc. The impact of these constraints may be **low**, **high** or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. The impact of contextual constraints at the location(s) where I work are:	Select an answer ▼	Select an answer ▼	Select an answer ▼

15. There may be a number of reasons why you may not be able to respond as soon as you would like based on where or how you are working (for example limited network connection on a train trip). Your responses may therefore vary from time to time and may be **prompt**, **untimely** or a **mixture**.

	Internal	Across councils/companies	With the public/customers
a. My work responses are:	Select an answer ▼	Select an answer ▼	Select an answer ▼

(Continued over page)

Council-Z Teleworking Survey page 3 (continued) of 8

**16.** Similarly there may be a need or benefit in providing a response at a different time to the respondent i.e. **asynchronously** (for example via emailing) or at the same time that the respondent is available i.e. **synchronously** (for example via telephone) or **a mixture**.

	Internal	Across councils/companies	With the public/customers
a. My work responses are:	Select an answer ▼	Select an answer ▼	Select an answer ▼

**17.** Finally for this section there may be a need or benefit in working **on-line** (connecting to appropriate network software/services), **off-line** (using only software/services on your computer) or **a mixture**.

	Internal	Across councils/companies	With the public/customers
a. My work activities require me to be:	Select an answer ▼	Select an answer ▼	Select an answer ▼

There now follows three sets of questions in tabular form before a few further questions on the penultimate page.

[Continue >](#)



## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Three: PART A [Statements 1-15 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

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Council-Z Teleworking Survey page 4 (continued) of 8

**18.** Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
<b>a.</b> I am satisfied with my current work schedule.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b.</b> I do not feel isolated in the department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c.</b> I am satisfied with the amount of responsibility I am given.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d.</b> There are clearly defined standards for working practices within the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e.</b> There is a common sense of purpose for this team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>f.</b> I do not feel inhibited by Council's technical resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>g.</b> Specific performance goals are established for most jobs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>h.</b> There is effective communication within the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>i.</b> I am satisfied with the amount of pay I receive for the job I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

Council-Z Teleworking Survey page 4 (continued) of 8

<b>j.</b> I do not have to get management's approval before I handle problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> I believe my colleagues are sincere.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> Resources are identified and made available for staff training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> The Council's key policies, processes and procedures for information systems are clearly documented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> There is no need to reduce some parts of my role.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> Employees of this Council are rewarded for dealing effectively with problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Three: PART A [Statements 16-30 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

(Continued over page)

**19.** Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
<b>a.</b> I do feel like "part of the family" at my Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b.</b> My workload is not too heavy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c.</b> The Council supports you through its health policies. Teleworking* can (or could) hinder the fulfilment of the Council's health policies. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d.</b> I am able to say what I mean regardless of the situation I'm in.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e.</b> The tasks that I do at work are themselves representing a driving power in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>f.</b> I do not work under incompatible policies and guidelines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>g.</b> Networking whilst teleworking* can (or could) help me interact with people. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

Council-Z Teleworking Survey page 5 (continued) of 8

<b>h.</b> I have confidence that I can complete my work because I can access information needed to perform my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>i.</b> I have to do things that should be done differently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>j.</b> I believe my colleagues are trustworthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> Problems relating to technology are quickly identified.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> There are measurable standards for outcomes which are monitored.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> There is a positive atmosphere within the Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> My job does not require me to work very hard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> Teleworking* hinders (or could hinder) the security of internal data. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a location which is remote from the Council's main buildings.

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Three: PART A [Statements 31-45 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

(Continued over page)

Council-Z Teleworking Survey page 6 (continued) of 8

20. Please read the following statements, which require a response. Indicate your agreement from 1 to 7 where 1 equals strongly disagree and 7 equals strongly agree.

	Seven-point scale (1 = strongly disagree, 7 = strongly agree)						
	1	2	3	4	5	6	7
a. Teleworking* can (or could) help me stay connected with colleagues. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. We ensure that we make the maximum practical use of our buildings and equipment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Employment legislation with regards to teleworking* is clear. (*See definition at the bottom of the page for more information.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Managers monitor the extent to which subordinates attain their performance goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. I do not think I could easily become as attached to another organisation as I am to this Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I do not have pressures to get job done on time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. I am more independent than most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Once technological problems are identified the team is quick to address the problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)



Council-Z Teleworking Survey page 6 (continued) of 8

<b>i.</b> Employees in this Council are rewarded for serving the public well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>j.</b> My job doesn't affect whether I enjoy my free time outside of work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>k.</b> I know that I have divided my time properly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>l.</b> Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>m.</b> The team is highly valued by other parts of the Council.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>n.</b> If I improve the level of service, I will be rewarded.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>o.</b> I am rewarded for satisfying public demand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a location which is remote from the Council's main buildings.

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### Survey Section Three: PART B [Statements 46-50 of 50]

#### REMINDERS:

- 1) If you have more than one job then please select **only one of your job roles**. Please ensure the job you choose is **consistent to all your responses** of the survey.
- 2) **If you leave the survey mid-way through by closing the browser window, you cannot return to the last survey page you visited.**
- 3) Once you have clicked on the **CONTINUE** button at the bottom of each page: a) **responses for that web page are saved** to the survey database and b) **you cannot return to amend that page.**
- 4) **Please do not use the Back button** on your browser, as this can cause errors.

Please read the following 5 statements, which require a response. Please also note the scale for each of these statements.

(Continued over page)

**21. Statement 1:**

	Seven-point scale (1 = never true, 7 = always true)						
	1	2	3	4	5	6	7
a. I know where to access policies, processes and procedures for information systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**22. Statement 2:**

	Seven-point scale (1 = very little, 7 = very much)						
	1	2	3	4	5	6	7
a. I feel I am in the loop with what's going on within my department.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**23. Statement 3:**

	Seven-point scale (1 = very little, 7 = very great)						
	1	2	3	4	5	6	7
a. I trust top management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Continued over page)

Council-Z Teleworking Survey page 7 (continued) of 8

24. Statement 4:

	Seven-point scale (1 = completely unachieved, 7 = almost completely achieved)						
	1	2	3	4	5	6	7
a. How well do you think the Council has achieved its performance objectives?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Statement 5: The Council should only allow employees to telework\* if they provide their own... (\*See definition at the bottom of the page for more information.)

	Seven-point scale (1 = never acceptable, 7 = always acceptable)						
	1	2	3	4	5	6	7
a. computers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. communications equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*Definition: teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a location which is remote from the Council's main buildings.

[Continue >](#)

## AN EXPLORATORY STUDY OF WORKING PRACTICES



### End of questionnaire...

#### **Thank you for completing this survey!**

We appreciate the time you have taken to participate in this research. As aforementioned, the research study will help us to understand the complexity of factors associated with teleworking practices and feedback to participating Councils in terms of teleworking development and maturity.

If you would like to contact the author of this survey, email: [khawaja.haq@hud.ac.uk](mailto:khawaja.haq@hud.ac.uk) or [u9804110@hud.ac.uk](mailto:u9804110@hud.ac.uk). You may now close your browser window.

### Council-Z Teleworking Survey data protection

We have a notice of data protection regarding the survey. The notice is available over the duration of the live survey at:

[http://helios.hud.ac.uk/u9804110/lc\\_survey\\_data\\_protection.html](http://helios.hud.ac.uk/u9804110/lc_survey_data_protection.html)

The above web address is also stated on the Welcome survey page of the survey (see p.366 of this thesis document). The full notice (as posted live at the above link) is as shown below, inclusive of the heading that follows and the date as shown at the end of the notice (p.393):

## AN EXPLORATORY STUDY OF WORKING PRACTICES

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### Data Protection

#### 1) TERMS AND CONDITIONS

- 1.1 Each term as stated in double quotation marks on this web survey page refers to word(s) on a) the survey and/or b) this data protection web survey page.
- 1.2 The term "survey" refers to the research student's web-based survey with the title name 'an exploratory study of working practices' as the header of each web survey page located at the web address that a) begins 'http://www.survey.bris.ac.uk/hud/...' and b) is subject to the research team's method of distribution as detailed in 1.10-12, below.
- 1.3 The title name of the survey is also stated at the top this web survey page to denote that this data protection web survey page is part of the survey.
- 1.4 The terms "we", "our" and "us" refer to the research team of Computing and Engineering at the University of Huddersfield.
- 1.5 The term "research team" refers to the three members of the team: the research student and two staff members in a Supervisory role.
- 1.6 The research student is also the primary contact for the survey. His contact name and email address can be found a) on the first and last web survey pages of the survey, b) via the 'Contact Us' link located in the footer section of each survey web survey page and c) on this web survey page in Section 4, below.
- 1.7 The term "his" refers to the research student.

- 1.8 The terms "you", "your", "yours", "yourself", "I", "me", "my" and "myself" refer to you, the survey participant or potential survey participant. There is one exception: if 1.13 below is true then the term "you" in 1.13 refers to you, the recipient and all other instances of the terms "you", "your", "yours", "yourself", "I", "me", "my" and "myself" refer to the intended audience only that is, the survey participant(s) or potential survey participant(s) as per 1.10-12 below.
- 1.9 The term "Council staff member(s)" refers to the person(s) of the Council whom have permitted our survey at your work place or department.
- 1.10 The location or web link of the survey is provided by the research student to potential participants. There are two methods of distribution of the survey link as detailed in 1.11, below. The chosen method is as per the research student's Supervision and our discussion and agreement(s) with Council staff member(s).
- 1.11 The location or web link of the survey is provided by the following methods (in terms of the practicalities of distribution): a) indirectly, from the research student to participant(s) that is, via Council staff member(s), or b) directly, from the research student to participant(s) on advice by Council staff member(s). The former of the two methods aforementioned is the primary method.
- 1.12 We do not cold-call employees to request their participation in the survey: we have had discussions regarding our study with Council staff member(s) as aforementioned above, in terms of a) utility of our research to your department or organisation and b) our research output as detailed in Section 2 below. These discussions also create an awareness of our research study among other staff and employees of the department(s) before the survey. Hence, we feel this approach as taken, is more suitable and appropriate for our research.
- 1.13 If you have received the link to the survey or this data protection notice in error that is, contrary to 1.10-12 above, please contact us as per the details in Section 4, below.
- 1.14 We define the term "teleworking" as follows. Teleworking, also known as flexible working, homeworking, telecommuting and mobile working, is the utilisation of technology in its varied forms to carry out and complete job responsibilities from a location which is remote from the Council's main buildings.

- 1.15 Questions in the survey are adopted or adapted from Journal papers only, limited to scholarly publications, including peer-review.
- 1.16 Journal papers aforementioned above are available to us via the Summon University of Huddersfield website.
- 1.17 Every question of the survey is referenced by the research student as per academic protocol in terms of copyright.
- 1.18 References and bibliography of the research student regarding the above teleworking definition and survey questions are stored in an offline document.
- 1.19 References and bibliography regarding the above teleworking definition and/or survey questions are available on request from the research student.
- 1.20 Further information, pertaining to the survey copyright and survey software copyright can be found via the 'Copyright' link located in the footer section of each survey web survey page.
- 1.21 This notice of data protection will be online and offline when the survey is live and closed, respectively. The date as per the footer section of this web survey page denotes the version of our data protection notice and this version will be consistent over the duration of the survey for all Council participants. If you would like a copy of this notice you may print or save this web survey page from your browser window.

## 2) RESEARCH AND ANONYMITY

As per academic protocol, no personal data is asked for or retained, that is, the research student has agreed not to identify any individuals when reporting their results and so, the survey is anonymous. The research student will use his best efforts to ensure that no individuals can be identified by implication that is, 2.1 to 2.2 below have been actioned in the live survey and 2.3 to 2.9 below are to be actioned after responses are saved to the survey database.

- 2.1 We do not use the Internet Protocol address (IP) of your computer in the survey.
- 2.2 We have significantly reduced the number of demographic questions. Details are as follows.



- 2.2.1 We have **excluded** the following demographic questions from our research: **your name, contact email address and phone number, income or salary grade, ethnicity** and a number of **response options regarding type of worker or employment such as Fixed term, Permanent, Agency and Voluntary.**
- 2.2.2 Demographic questions **inclusive** to the survey and utility to our research are with regards to **gender, age** and **your job.** Questions regarding your job are as follows: a) **your job title,** b) **the Council service to which you belong,** c) **your employment** with the options full-time, part-time or other (please specify), and d) **your average weekly working hours.** These questions will enable us to a) research at a feasible level, b) compare between different demographic groups in our analyses and c) narrow the focus of our exploratory study.
- 2.3 Only data in terms of an anonymous aggregate will be analysed and supervised. An aggregate as stated would mean that analyses and findings are taken at an overall not individual level.
- 2.4 Data for a demographic type that contains only a few participant responses will be **excluded:** a) that is, we remove the possibility that individuals pertaining to these responses could be identified, b) from analyses, as the sample would not be representative of the larger population and c) from publishing (see 2.7 to 2.9 below for details).
- 2.5 Results are dependent on response rates and so, we may: a) aggregate results for each participating Council or, b) aggregate results for all Councils together. All results (as aforementioned above) will be anonymous.
- 2.6 We pursue a consistency and rigour in our protocol aforementioned above to protect individual-level data.
- 2.7 The results of our research, aggregated and anonymous as aforementioned above: a) will be part of the research student's doctoral thesis and b) may be published in our Journal paper(s). Regarding the latter: in addition to the research team, our Journal paper(s) may include other staff member(s) or person(s) with a contribution to the field of teleworking.
- 2.8 In addition to 2.7 above, results, also aggregated and anonymous as aforementioned above, will be part of a third document type that is, a report to the Council staff member(s). Results are dependent on response rates (as

aforementioned in 2.5 above) and so, the report will contain: a) only aggregate results of the Council to which the document is sent or, b) aggregate results in terms of all Councils together.

- 2.9 For each of the documents aforementioned in 2.7 above, the name of each participating Council will be anonymised that is, a) we will refer to each participating Council in terms of a letter for example, Council A, B, C or, Organisation A, B, C, otherwise, b) we aggregate results for all Councils together (as aforementioned in 2.5 above) and we will refer to this aggregate as one anonymous organisation such as, Organisation Z.

3) COMPUTER SECURITY

- 3.1 We do not use cookies, or personal data stored by your Web browser in the survey.
- 3.2 The research student's survey account is accessible by him via a) his log-in username and password only and b) secure web protocol only that is, https. The password aforementioned is with the research student only.
- 3.3 For additional work place security (particularly with regards to shared PCs) we advise that your Web browser (for example, Internet Explorer, Safari, Firefox and Google Chrome) options are not set up to save form data. This is not data that the research student or team has or would have access to, rather this is to ensure that your data security is not compromised in terms of access that others would normally have to your PC.
- 3.4 We advise that you close the Web browser window post-survey participation and delete the Web browser session.

4) PRIMARY CONTACT

Name: Khawaja Al-Musavar-UI Haq

Capacity: Research student

Institution: University of Huddersfield

Email: khawaja.haq@hud.ac.uk or u9804110@hud.ac.uk

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Dated: 21<sup>st</sup> August 2013

### Citations and references

#### Demographics [citations]

Survey Q#	Demographic questions:	Citation regarding question (opposite):	Question adapted:
1	'I am: <input type="checkbox"/> Male <input type="checkbox"/> Female'	Kim and Wiggins (2011, Table 2, p.732)	No
2	'Please state your age from the following: <input type="checkbox"/> 16-25 <input type="checkbox"/> 26-35 <input type="checkbox"/> 36-45 <input type="checkbox"/> 46-55 <input type="checkbox"/> 56-65 <input type="checkbox"/> 66 and over'	Morganson et al., (2010, p.584)	Yes
3	'Please state your job title:'	Griesser (1993, p.26)	Yes
4	'Please state the council service to which you belong:'	Morganson et al., (2010, p.584)	Yes
5	'My employment is: <input type="checkbox"/> Full time <input type="checkbox"/> Part time <input type="checkbox"/> Other (please specify)'	Beham et al. (2011, p.115)	Yes
6	'My average weekly working hours are:'	Beham et al. (2011, p.115)	No

#### Technical Questions [citations]

Introductory survey statement:

'In the questions that follow we are interested in three different potential roles you may have within the council, namely roles that are internal (within the council), across councils/companies or with the public/customers. If you only undertake one or two of these roles please select not applicable for role(s) you do not perform.'

Survey Q#	Technical question:	Citation regarding question (opposite):	Question adapted:
7.a.	<p>7. Please identify whether you use portable devices (such as a laptop, tablet PC, mobile phone and smart phone), non-portable devices (such as a desktop PC and land-line telephone) or a mixture of these devices to fulfil your roles.</p> <p>a. The hardware devices that I use are:</p> <p><input type="checkbox"/> Portable  <input type="checkbox"/> Non-portable  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	Allsopp, (2010); The Open University (2005, pp.21-25); Zuurmond (2005, p.136); and section 2.1.3.3.4.3.	Yes
8.a.	<p>8. Please identify whether you use local software (e.g. mobile apps or email applications installed on the device), network software (e.g. web-based email, social media or mobile/virtual desktops which can only be accessed on-line) or a mixture.</p> <p>a. The software that I access is:</p> <p><input type="checkbox"/> Local  <input type="checkbox"/> Network  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	The Open University (2005, pp.21-25); Zuurmond (2005, p.136); and section 2.1.3.3.4.4.	Yes
9.a.	<p>9. How you use ICT may vary from time to time, and therefore you may use ICT regularly, irregularly or a mixture.</p> <p>a. I use ICT:</p> <p><input type="checkbox"/> Regularly  <input type="checkbox"/> Irregularly  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	Tremblay (2002. <i>Cited In:</i> Greenhill and Wilson, 2006, p.381); The Open University (2005, pp.21-25); Sener and Bhat (2009, pp.4-6); Alexander et al., 2010, table 1, p.510); and	Yes

Survey Q#	Technical question:	Citation regarding question (opposite):	Question adapted:
		section 2.1.3.3.4.5.	
10.a.	<p>10. The location from where you work may vary from time to time, and therefore you may work on-site, off-site or a mixture.</p> <p>a. I work:</p> <p><input type="checkbox"/> On-site  <input type="checkbox"/> Off-site  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	The Open University (2005, pp.21-25); and section 2.1.3.3.4.6.	Yes
11.a.	<p>11. The number of log-on screens you need to go through may vary from time to time, and therefore you may view these as being either consistently too many, consistently too few or a mixture.</p> <p>a. I feel that the number of log-on screens I need to go through are:</p> <p><input type="checkbox"/> Too many  <input type="checkbox"/> Too few  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	The Open University (2005, pp.21-25); and section 2.1.3.3.4.7.	Yes
12.a.	<p>12. Please identify whether the content of your work is electronic (such as emails, word processed documents, phone-calls and video conferencing), physical (such as paper work and physical meetings) or a mixture.</p> <p>a. The content of my work is:</p> <p><input type="checkbox"/> Electronic  <input type="checkbox"/> Physical  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p>	The Open University (2005, pp.21-25); and section 2.1.3.3.4.1.	Yes

Survey Q#	Technical question:	Citation regarding question (opposite):	Question adapted:
	[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]		
13.a.	<p>13. Please identify whether your work is oriented to tasks (completion of objectives), time (completion of hours) or a mixture.</p> <p>a. My work is oriented to:</p> <p><input type="checkbox"/> Tasks  <input type="checkbox"/> Time  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	Daniels et al. (2001, figure 1, p.1160); Tietze and Musson (2003, pp.439-441); Hislop and Axtell (2009, table 1, p.64); The Open University (2005, pp.21-25); and section 2.1.3.3.4.2.	Yes
14.a.	<p>14. There may be a number of contextual constraints which vary from time to time and which limit your ability to work at your given location including issues of confidentiality, privacy etc. The impact of these constraints may be low, high or a mixture.</p> <p>a. The impact of contextual constraints at the location(s) where I work are:</p> <p><input type="checkbox"/> Low  <input type="checkbox"/> High  <input type="checkbox"/> A mixture  <input type="checkbox"/> Not applicable</p> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	Sherry and Salvador (2002. <i>Cited In:</i> Hislop and Axtell, 2007, p.44); Axtell et al. (2008, p.906); Watad and Paterson (2010); The Open University (2005, pp.21-25); and section 2.1.3.3.4.8.	Yes
15.a.	<p>15. There may be a number of reasons why you may not be able to respond as soon as you would like based on where or how you are working (for example limited network connection on a train trip). Your responses may therefore vary from time to time and may be prompt, untimely or a mixture.</p>	Harpaz (2002, p.74); The Open University (2005, pp.21-25);	Yes

Survey Q#	Technical question:	Citation regarding question (opposite):	Question adapted:
	<p>a. My work responses are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prompt</li> <li><input type="checkbox"/> Untimely</li> <li><input type="checkbox"/> A mixture</li> <li><input type="checkbox"/> Not applicable</li> </ul> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	<p>Tietze and Musson (2005, p.1337. <i>Cited In:</i> Hislop and Axtell, 2007, p.39); and section 2.1.3.3.4.9.</p>	
16.a.	<p>16. Similarly there may be a need or benefit in providing a response at a different time to the respondent i.e. asynchronously (for example via emailing) or at the same time that the respondent is available i.e. synchronously (for example via telephone) or a mixture.</p> <p>a. My work responses are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Asynchronous</li> <li><input type="checkbox"/> Synchronous</li> <li><input type="checkbox"/> A mixture</li> <li><input type="checkbox"/> Not applicable</li> </ul> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	<p>The Open University (2005, pp.21-25; and section 2.1.3.3.4.10.</p>	<p>Yes</p>
17.a.	<p>17. Finally for this section there may be a need or benefit in working on-line (connecting to appropriate network software/services), off-line (using only software/services on your computer) or a mixture.</p> <p>a. My work activities require me to be:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> On-line</li> <li><input type="checkbox"/> Off-line</li> <li><input type="checkbox"/> A mixture</li> <li><input type="checkbox"/> Not applicable</li> </ul> <p>[Only one of the above four options (listed as drop-down options on the survey) is selected for each of the three roles as stated in the introductory statement earlier]</p>	<p>The Open University (2005, pp.21-25; and section 2.1.3.3.4.11.</p>	<p>Yes</p>

**Likert statements [citations]**

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
18.a.	'I am satisfied with my current work schedule.'	Morganson et al., (2010, p.584)	No	No	Yes
18.b.	'I do not feel isolated in the department.'	Şeker (2011, p.258)	Yes	No	Yes
18.c.	'I am satisfied with the amount of responsibility I am given.'	Wang (2011, p.331)	No	No	No
18.d.	'There are clearly defined standards for working practices within the team.'	Bateman et al (2002, p.226)	No	No	Yes
18.e.	'There is a common sense of purpose for this team.'	Bateman et al (2002, p.223)	No	No	Yes
18.f.	'I do not feel inhibited by Council's technical resources.'	Bateman et al (2002, p.225)	Yes	No	Yes
18.g.	'Specific performance goals are established for most jobs.'	Huang and Cullen (2001, p.35)	No	No	Yes
18.h.	'There is effective communication within the team.'	Bateman et al (2002, p.224)	No	No	Yes
18.i.	'I am satisfied with the amount of pay I receive for the job I do.'	Babakus et al. (2003, p.283)	No	No	Yes
18.j.	'I do not have to get management's approval before I handle problems.'	Babakus et al. (2003, p.283)	Yes	No	Yes
18.k.	'I believe my colleagues are sincere.'	Shu and Chuang (2011, p.33)	Yes	No	No
18.l.	'Resources are identified and made available for staff training.'	Bateman et al (2002, p.224)	No	No	Yes
18.m.	'The Council's key policies, processes and procedures for information systems are clearly documented.'	Curry and Moore (2003, p.107)	Yes	No	Yes



Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
18.n.	'There is no need to reduce some parts of my role.'	Zhao and Rashid (2010, p.40)	Yes	No	No
18.o.	'Employees of this Council are rewarded for dealing effectively with problems.'	Babakus et al. (2003, p.283)	Yes	No	Yes
19.a.	'I do feel like "part of the family" at my Council.'	Meyer and Allan (1997. <i>Cited In:</i> Kuvaas, 2007, Table AI, p.397)	Yes	No	Yes
19.b.	'My workload is not too heavy.'	Zhao and Rashid (2010, p.40)	Yes	No	No
19.c.	'The Council supports you through its health policies. Teleworking* can (or could) hinder the fulfilment of the Council's health policies. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
19.d.	'I am able to say what I mean regardless of the situation I'm in.'	Kuvaas (2007, Table AI, p.397)	No	No	Yes
19.e.	'The tasks that I do at work are themselves representing a driving power in my job.'	Kuvaas (2007, Table AI, p.396)	No	No	Yes
19.f.	'I do not work under incompatible policies and guidelines.'	Zhao and Rashid (2010, p.40)	Yes	No	No
19.g.	'Networking whilst teleworking* can (or could) help me interact with people. (*See definition at the bottom of the page for more information.)'	Shu and Chuang (2011, p.32)	Yes	No	No
19.h.	'I have confidence that I can complete my work because I can access information needed to perform my job.'	Wang (2011, p.330)	Yes	No	No
19.i.	'I have to do things that should be done differently.'	Zhao and Rashid (2010, p.40)	No	No	No
19.j.	'I believe my colleagues are trustworthy.'	Shu and Chuang (2011, p.33)	Yes	No	No

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
19.k.	'Problems relating to technology are quickly identified.'	Bateman et al (2002, p.225)	Yes	No	Yes
19.l.	'There are measurable standards for outcomes which are monitored.'	Bateman et al (2002, p.226)	No	No	Yes
19.m.	'There is a positive atmosphere within the Council.'	Curry and Moore (2003, p.107)	Yes	No	Yes
19.n.	'My job does not require me to work very hard.'	Konzelmann et al. (2006, p.566)	Yes	No	Yes
19.o.	'Teleworking* hinders (or could hinder) the security of internal data. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
20.a.	'Teleworking* can (or could) help me stay connected with colleagues. (*See definition at the bottom of the page for more information.)'	Shu and Chuang (2011, p.32)	Yes	No	No
20.b.	'We ensure that we make the maximum practical use of our buildings and equipment.'	Bateman et al (2002, p.225)	No	No	Yes
20.c.	'Employment legislation with regards to teleworking* is clear. (*See definition at the bottom of the page for more information.)'	Illegems et al. (2001, table 3, p.288)	Yes	No	Unknown
20.d.	'Managers monitor the extent to which subordinates attain their performance goals.'	Huang and Cullen (2001, p.35)	No	No	Yes
20.e.	'I do not think I could easily become as attached to another organisation as I am to this Council.'	Meyer and Allan (1997. <i>Cited In: Kuvaas, 2007, Table AI, p.397</i> )	Yes	No	Yes
20.f.	'I do not have pressures to get job done on time.'	Konzelmann et al. (2006, p.566)	Yes	No	Yes
20.g.	'I am more independent than most people.'	Kuvaas (2007, Table AI, p.397)	No	No	Yes
20.h.	'Once technological problems are identified the team is quick to address the problems.'	Bateman et al (2002, p.225)	Yes	No	Yes
20.i.	'Employees in this Council are rewarded for serving the public well.'	Babakus et al. (2003, p.283)	Yes	No	Yes

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
20.j.	'My job doesn't affect whether I enjoy my free time outside of work.'	Zhao and Rashid (2010, p.39)	No	No	No
20.k.	'I know that I have divided my time properly.'	Zhao and Rashid (2010, p.39)	No	No	No
20.l.	'Accountability for repairs/maintenance of employer's equipment placed with employees is (or could be) a problem.'	Teo et al. (1999, table 1, p.41)	Yes	No	Yes
20.m.	'The team is highly valued by other parts of the Council.'	Bateman et al (2002, p.224)	Yes	No	Yes
20.n.	'If I improve the level of service, I will be rewarded.'	Babakus et al. (2003, p.283)	Yes	No	Yes
20.o.	'I am rewarded for satisfying public demand.'	Babakus et al. (2003, p.283)	Yes	No	Yes
21.a.	'I know where to access policies, processes and procedures for information systems.'	Curry and Moore (2003, p.107)	Yes	No	Yes
22.a.	'I feel I am in the loop with what's going on within my department.'	Morganson et al., (2010, p.584)	Yes	No	Yes
23.a.	'I trust top management.'	Ellis and Shockley-Zalabak (2001, Table 2, p.389)	No	No	Yes
24.a.	'How well do you think the Council has achieved its performance objectives?'	Ellis and Shockley-Zalabak (2001, p.390)	Yes	No	Yes
25.a.	'The Council should only allow employees to telework* if they provide their own... (*See definition at the bottom of the page for more information.) a. computers.'	Guthrie (1997, Exhibit 1)	Yes	Yes	Yes

Appendix F: Council-Z Teleworking Survey Instrument [web-based]

Survey Q#	Likert statements:	Citation regarding Likert statement (opposite):	Likert statement adapted:	Likert scale	
				Different type of labels:	Different number of response options:
25.b.	'The Council should only allow employees to telework* if they provide their own... (*See definition at the bottom of the page for more information.) b. software.'	Guthrie (1997, Exhibit 1)	Yes	Yes	Yes
25.c.	'The Council should only allow employees to telework* if they provide their own... (*See definition at the bottom of the page for more information.) c. communications equipment.'	Guthrie (1997, Exhibit 1)	Yes	Yes	Yes

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## Appendix G: PGR - Project Ethical Review Form V2

UNIVERSITY OF HUDDERSFIELD  
SCHOOL OF COMPUTING AND ENGINEERING

V2

**PROJECT ETHICAL REVIEW FORM**

*Applicable for all research, masters and undergraduate projects*

<b>Project Title:</b>	Feasibility of teleworking in a local council environment (working title)
<b>Student:</b>	Khawaja Al-Musavar-UI Haq <span style="margin-left: 50px;">9804110.</span>
<b>Course/Programme:</b>	PhD
<b>Department:</b>	Informatics
<b>Supervisor:</b>	Dr. Rupert Ward
<b>Project Start Date:</b>	1st October 2010

**ETHICAL REVIEW CHECKLIST**

	Yes	No
1) Are there problems with any participant's right to remain anonymous? (see over page)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Could a conflict of interest arise between a collaborating partner or funding source and the potential outcomes of the research, e.g. due to the need for confidentiality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) Will financial inducements be offered?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4) Will deception of participants be necessary during the research?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) Does the research involve experimentation on any of the following?		
(i) animals?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(ii) animal tissues?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iii) human tissues (including blood, fluid, skin, cell lines)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6) Does the research involve participants who may be particularly vulnerable, e.g. children or adults with severe learning disabilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7) Could the research induce psychological stress or anxiety for the participants beyond that encountered in normal life? (see over page)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8) Is it likely that the research will put any of the following at risk:		
(i) living creatures?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(ii) stakeholders (disregarding health and safety, which is covered by Q9)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iii) the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iv) the economy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9) Having completed a health and safety risk assessment form and taken all reasonable practicable steps to minimise risk from the hazards identified, are the residual risks acceptable (Please attach a risk assessment form)	<input type="checkbox"/>	<input type="checkbox"/>
	Not applicable	



#### STATEMENT OF ETHICAL ISSUES AND ACTIONS

If the answer to any of the questions above is yes, or there are any other ethical issues that arise that are not covered by the checklist, then please give a summary of the ethical issues and the action that will be taken to address these in the box below. If you believe there to be no ethical issues, please enter "NONE".

The research we are undertaking is a comprehensive study of teleworking at a local council based on a number of models we have developed namely, 1) a technical model, 2) a perceptions model and 3) a maturity model (which is a context / an interpretation of the former two models aforementioned). We are testing the accuracy of each of the models and aim to produce a road map to teleworking maturity within an organisation. The research method we have used is a questionnaire survey consisting of technical questions pertaining to number 1 above and Likert statements pertaining to number 2 above.

##### **Issue 1: (regarding questions 1 and 7 of page 1)**

The council (and indeed all councils in UK) with respect to the current economic climate and cuts in government spending may induce stress or anxiety for participants who may be unclear as to the implications of our research on their jobs.

##### **Action:**

- 1) The survey questionnaire is anonymous that is, we do not ask for: their name, contact email address and phone number, income or salary grade, or ethnicity.
- 2) Data will be analysed in terms of an aggregate.
- 3) We have had meetings with the local council staff members and have their support for the survey to be done at the local council.
- 4) We do not cold call employees asking for their time to do the survey – the council has issued our email on our behalf to employees.
- 5) The survey is not a requirement on staff members - the email sent to staff members informs them of our survey but does not state that they must to do the survey.

##### **Issue 2 : (regarding questions 1 and 7 of page 1)**

There has been feedback from one staff member regarding the issue as stated above: 'it states that the survey is anonymous but, if you are part of a small team and are required to input your age, service and particularly job role, some individuals may be concerned that this information alone could identify them'.

##### **Action:**

We have responded to participant: 'to clarify, only data in terms of an anonymous aggregate will be analysed and supervised. An aggregate as stated would mean that analyses and findings are taken for all participants by age, service and job role and the latter (job roles) will be categorised. In terms of statistical significance, where there are only a few workers for an age group, service or job role, this data will be aggregated (added to a larger group) or even excluded. (Further information can be found at our data protection link [[http://helios.hud.ac.uk/u9804110/lc\\_survey\\_data\\_protection.html](http://helios.hud.ac.uk/u9804110/lc_survey_data_protection.html)] posted on the survey's Welcome page.)'.

The respondent has replied: 'Many thanks for the below e-mail - it's much appreciated and I can inform other colleagues now if they raise the same issue.'

##### **Issue 3: (query regarding our research subject by staff member)**

A staff member has replied concerning that we are not covering all the issues regarding teleworking.

##### **Action:**

We have replied with an explanation of the research we are undertaking (consistent with the first paragraph of this page) and that we would like to discuss with the staff member, their perceptions against the findings of our research. The staff member has replied that they would be more than happy to participate in any further related

research.

**Additional notes:**

The definition of teleworking on our survey states on the welcome page and footnote section of survey pages, that it is those workers using technology from a location which is remote from the Council's main buildings. We are redefining teleworking to be those that use technology (onsite and remotely).

**Action (regarding the additional notes above):**

We are including the definition of being offsite but expanding it to be comprehensive - inclusive of onsite teleworking and so, improve research output and analysis. The subject 'definitions of teleworking' has been discussed with the local council also and so, there is an awareness of how we look to measure/define teleworking and how teleworking can vary and the difficulties associated with its measurement – the final survey was reviewed by the council which now includes a technical section to determine the definition of a teleworker as opposed to previous definition (also reviewed by the Council) which referred to hours spent at different work locations. Furthermore, we have sections of the thesis which deals with the definition of teleworking.

**STATEMENT BY THE STUDENT**

I believe that the information I have given in this form on ethical issues is correct.

Signature:  Date: 28/10/13

**AFFIRMATION BY THE SUPERVISOR**

I have read this Ethical Review Checklist and I can confirm that, to the best of my understanding, the information presented by the student is correct and appropriate to allow an informed judgement on whether further ethical approval is required.

Signature:  Date: 28/10/13

**SUPERVISOR RECOMMENDATION ON THE PROJECT'S ETHICAL STATUS**

Having satisfied myself of the accuracy of the project ethical statement, I believe that the appropriate action is:

The project proceeds in its present form	
The project proposal needs further assessment by an Ethical Review Panel. The Supervisor will pass the form to the Ethical Review Panel Leader for consideration.	

**RETENTION OF THIS FORM**

- The Supervisor must retain a copy of this form until the project report/dissertation is produced.
- The student must include a copy of the form as an appendix in the report/dissertation.

**OUTCOME OF THE ETHICAL REVIEW PANEL PROCESS, WHERE REQUIRED**

Tick One

- 1. Approved. The ethical issues have been adequately addressed and the project may commence.
- 2. Approved subject to minor amendments. The required amendments are stated in the box below. The project may proceed once the form has been amended in line with the requirements and signed by the Supervisor in the box immediately below to confirm this.

**I confirm, as Supervisor, that the amendments required have been made:**

Signature: \_\_\_\_\_ Date: 8/12/13

- 3. Resubmit. The areas requiring further action are stated in the box below. The project may not proceed until the form has been resubmitted and approved.
- 4. Reject. The reasons why it will not be possible to address the ethical issues adequately are stated in the box below.

For any of the outcomes 2, 3 or 4 above, please provide a statement in the box below.

Please get participants consent that their names may get published.

Participants are anonymised. 02/12/13.

**AFFIRMATION BY THE REVIEW PANEL LEADER**

**I approve the decision reached above by the review panel members:**

Signature: \_\_\_\_\_ Date: 21/12/13

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