

# **INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND LABOR FLEXIBILITY: AN INTERNATIONAL PERSPECTIVE**

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## **ABSTRACT**

This paper presents a preliminary examination of the relationship of ICT and labor flexibility within 26 countries, using a variety of data sources. It is proposed that the more sophisticated a country is in terms of its ICT the more likely that work arrangements will be designed to enhance numeric flexibility and task flexibility. Specifically, part-time, temporary, subcontracting work, flexitime and telework arrangements are shown to be positively and significantly correlated with high ICT sophistication of a country. Additionally organisations within countries with high sophistication of ICT infrastructure are also significantly more likely to have adopted wider job roles across management, professional, clerical, and manual levels. Implications and limitations of the study are also discussed.

## **INTRODUCTION**

This paper seeks to explore the impact of ICT and globalization on work arrangements that enhance labor flexibility. It is argued that globalization and ICT plays an important role in the increasing competitive forces driving concerns about labor cost and labor value. Thus, we expect to see a relationship between globalization, ICT and work arrangements as organisations seek to deal with efficiency and effectiveness demands within the employment relationship. Our principle focus is on the role of ICT, however, and it is proposed that ICT specifically will increase the use of work arrangements that aid numeric flexibility, at the same time as putting pressure on the use of work arrangements that enhance task flexibility. We utilise data from a number of sources to explore these issues. Data is drawn from an international study of human resource management practices to develop insight about changes in work arrangements within twenty-six countries. These data on changes are then examined in terms of country level data on the degree of ICT sophistication, using a large scale UNESCO report on the degree of ICT capability and usage of countries [1]. Given the importance of globalization within the international environment we also incorporate data on globalization within our analysis [2].

## **METHODOLOGY**

**Labor flexibility measures:** To examine changes in work arrangements we utilise original data from the Cranet surveys, an international study on human resource management, carried out in 1990, 1992, 1995, and 1999. The survey asks respondents about various aspects of human resource management policies and practices, such as staffing practices, employee development, compensation and benefits, and employee relations and communication.

In this study we focused on respondents' answers to a set of questions that reflected on flexible working practices. The specific question asked was "Has there been a change in the use of the following working arrangements over the last three years"? Since we are interested in the impact of ICT on numeric flexibility we have utilised data on three work arrangement variables from the list of work practices considered by respondents. These are part-time work, use of temporary and casual workers, and subcontracting and outsourcing. In addition, we have also focused on responses to the use of flexitime

and telework. To have these organisational level data reflect country level information, we calculated the percentage of respondents in each country who indicated either “increased”, “decreased”, “same”, or “not used”, for each of the examined work practices.

We have also utilised responses to the survey question “Has there been a major change in the specifications of jobs over the last three years”? Respondents were asked to indicate whether a) jobs had been made more specific b) there were no major changes, c) jobs made wider or more flexible, or d) don’t know, for four levels of employees – management, professionals, clerical, and manual employees. As with the data on numeric flexibility we calculated the percentage of respondents in each country in order to have this organisational level data reflect country level information.

Country level ICT sophistication measures: Our data on the level of ICT sophistication in countries comes from an international report called “Monitoring the digital divide and beyond” [1]. The report was designed to quantify and examine the difference between countries in terms of their access to and their capacity to use information and communication technologies for economic and social development. To measure this difference the study developed the concepts of Infodensity, Info-use, and Infostate. Infodensity refers to the overall capital and labor stocks associated with ICT, whereas, Info-use refers to the consumption flows of ICT’s (p.6). These two measures are aggregated to form an index of the overall ICT stocks, referred to the Infostate index.

Globalization measure: Anderson and Herbertsson (2003), have developed their own index of globalization, using the multivariate technique of factor analysis. They have produced globalization rankings based on this index for 23 OECD countries over the period 1979 – 2000. While only 18 countries in our sample correspond with the countries used by Anderson and Hertbertsson (2003) we have used this index as it allows us to examine the globalization status of most of our sample prior to 1999.

## **ANALYSIS**

It has been argued that ICT in combination with globalization creates a highly competitive work environment and that this environment impacts work arrangements. In order to deal with this competitive environment organisations are required to maximise the value associated with labor by increasing the efficiency and productivity of labor while at the same time increase the effectiveness and commitment from its human resources. Thus we expect to see that ICT is likely to be associated with both numeric flexibility and to task flexibility.

The Infostate 1998 index is positively correlated with an increase in each of the part-time work, temporary workers, and the use of subcontracting variables. We also see a negative correlation between Infostate 1998 and the response that these work arrangements are not used. Infostate 1998 index is also positively and significantly associated with the use of flexitime and telework. These results suggest that the more sophisticated the ICT level of the country the more likely that they utilise part-time work, temporary work, and subcontractors.

In addition to the correlations discussed above we also carried out a number of regression analyses with the various work practices associated with numerical flexibility and telework, and with task flexibility as the dependent variable and the globalisation 1998 ranking and ICT sophistication (Infostate 1998) as the independent variables. Both the flexitime and telework regressions are significant while the temporary work and the management, professional, and clerical regressions just falls short of

significance. Thus ICT and globalisation contribute to explain the increased use of flexitime and telework as well as to a smaller extent the increased use of temporary work and widening of the work of management, professionals and clerical employees. These results are consistent with the perspective that these two factors are playing an important role in shaping work arrangements.

## **DISCUSSION**

We have utilised globalization and ICT data as well as data from an international study of human resource management practices to examine the relationship of globalization and ICT sophistication with changes in work arrangements in terms of numeric flexibility and task flexibility as well as telework. Correlational analysis shows that both globalisation and ICT sophistication are important factors associated with both numeric and task flexibility, although ICT sophistication in particular is related to work arrangements that relate to increased labour flexibility. Regression analysis further supports the significance of ICT sophistication in relation to telework and flexitime work practices. The strong support for positive relationship between ICT sophistication and the use of telework practices is consistent with the enabling capacity of ICT and the increase in virtual work structures associated with its use.

In summary, globalization and ICT have created a rapidly changing and competitive work environment that is producing pressure on organisations to respond. However, our results are only broad indicators of a move towards flexible work patterns rather than a definitive support for increasingly uniform effects of these two factors on work arrangements. Given that countries have different labour environments which lead to divergent work arrangements, we would not expect a strongly uniform pattern of work arrangements across countries. Nevertheless, globalization and ICT produces uniformity in terms of the competitive pressures facing organisations and managers have only a limited variety of responses to these pressures. Whether economic imperatives ultimately outweigh local labour market conditions in the long run will require more longitudinal research. Our results do suggest that ICT is likely to play a significant role both in terms of increasing competition in the wider organisational environment and also in terms of responses made by management. At the very least, further research on the effects of ICT on labour flexibility is warranted.

There are a number of limitations within the data set used as well as with the study presented here. First, data on work practices comes from a single source within survey organisations where these respondents are asked to reflect upon the last three years. Second, surveyed organisations represent only a small number of organisations within each country. Thus at best the data presents a limited perspective on each country's work arrangements. Third, research on ICT sophistication within countries is still being advanced and a reliable and valid measure of globalization, one that is well recognised within the literature, is not yet available.

Nevertheless, this study provides evidence that ICT sophistication in particular is associated with changing patterns of work arrangements being experienced internationally. Future studies on labour flexibility should, therefore, consider the role of ICT in understanding the dynamic forces at work within the wider organisational environment as well as at work within the organisational environment itself.

## **REFERENCES**

- [1] Orbicom (2003) (Ed, G., S.) UNESCO, Quebec, pp. 162.
- [2] Andersen, T. B. and Herbertsson, T. T. (2003).