Prometheus, Vol. 21, No. 1, 2003

Carfax Publishing
Taylor & Francis Group

Top Manager and Institutional Effects on the Adoption of Innovations: The Case of Teleworking[1]

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ABSTRACT *In spite of the advances in information and communication technologies, the implementation of teleworking is still behind early expectations. The slow adoption of teleworking may be explained by different organizational drivers that influence its implementation. This article reports the empirical findings of a survey conducted among a sample of Spanish companies to identify potential drivers and constraints based on top manager and institutional perspectives. The results indicate that the potential of teleworking is influenced by the manager's perception of teleworking benefits and barriers, the manager's tenure, the company's use of information and communication technologies, the company's degree of innovation, the proportion of salespeople, women and middle-age employees in the workforce, and the company size. Top manager factors seem to have more influence in the decision to adopt teleworking, while institutional factors are more significant in the potential diffusion in the company.*

Keywords: teleworking, top manager, institutional forces, organizational context.

Introduction

The study of innovation adoption has long been concerned with understanding factors that promote an organization's openness to innovation and change. There are two perspectives that have recently attracted much interest among management researchers on whether and when organizations adopt innovations: the top manager perspective and the institutional perspective. The top manager perspective emphasizes the importance of an organization's top managers, particularly the manager's perceptions and personal and experience characteristics.[2] By contrast, the institutional perspective emphasizes the importance of an organization's social context. From an institutional perspective, firms operate within a social framework of norms, values, and assumptions about what constitutes appropriate or acceptable economic behaviour.[3]

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2003 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/0810902032000051018

So far, there has been little systematic study of each perspective's relative contribution to our understanding of whether and when organizations adopt innovations.[4] Several studies suggest an important role for top managers, but leave largely unanswered the question of whether top managers' perception and personal characteristics are more or less important than the social context in which their organizations are embedded. Consequently, senior officials lack guidance as to where they should focus their efforts when attempting to diffuse innovations among organizations. We have addressed this theoretical issue by examining the drivers of teleworking adoption. This article reports the empirical findings of a survey conducted among a sample of Spanish companies to identify drivers and constraints to the implementation of teleworking based on top manager and institutional factors. The following section reviews the literature and develops the research framework. Then the methodology and sample used to test the model are explained, followed by the empirical results and their discussion. Finally, the article's conclusion is established.

Theoretical Background

Teleworking: Definition and Concepts

Teleworking has attracted a great deal of attention from both academics and practitioners because of the potential it seems to offer individuals, organizations and society to work anywhere and anytime.[5] Various terms for teleworking have been used in the literature, such as 'teleworking', 'telecommuting', 'remote working', 'homeworking', each with a slightly different emphasis on how the work is carried out. Organizations have tried to adopt some, but not all, of these concepts to varying degrees, depending on ease of accessibility to the Internet, affordability and connectivity. Collectively, these phrases describe teleworking as a way of flexible working that enables employees to have access to the resources they require for work from different and remote locations by the use of information and communication technologies (ICT).

Three main types of teleworking are evident: home-based teleworking, satellite offices, and mobile-based working. Home-based teleworking refers to employees who work at home on a regular basis, though not necessarily (and, in fact, rarely) every day. In satellite offices, employees work both outside the home and away from the conventional workplace in a location convenient to the employees and/or customers to reduce commuting. Finally, mobile workers are frequently on the move (for example, salespeople), and by using communications technology they are able to work from home, from a car, from a plane, or from a hotel, communicating with the office as necessary from each location.

Teleworking offers several advantages to companies and employees, but it also poses some difficulties and disadvantages.[6] The main benefits for the company of adopting teleworking are the savings in office space and the increase in employee productivity. For the employee, teleworking gives more labour time flexibility and less commuting. The main disadvantages or barriers are access to technology, integration of teleworking with the company's strategy and organizational structure, and keeping teleworkers both motivated and controlled. On the other hand, teleworking has societal benefits, such as reduced pollution and urban congestion, and the provision of employment opportunities in rural areas.

The development of teleworking started in the 1970s but the number of teleworkers was initially very low because of the reluctance of companies to adopt it, and the limits and high costs of telecommunications at that time. In the 1990s, teleworking was rediscovered as an alternative work organization to reduce commuting, and improve the work–family balance. However, even though the number of teleworkers has increased significantly since the early 1990s,[7] the diffusion of teleworking has remained below expectations. This is surprising, as recent developments in ICT have reduced the coordination and control costs associated with the geographic decentralization of workforce location. The low diffusion has been explained by the important changes that teleworking requires in the organization and structure of companies.[8]

In a review of the literature, Shin *et al.* argued that many studies depended on anecdotal and exploratory discussion of telework motivations, factors, advantages, disadvantages, and barriers.[9] However, a lack of theoretical support can be seen in most telework research. Although much effort has been placed on studying teleworker-related factors, the organizational implications of teleworking have received much less attention. This disparity has prevented an effective and balanced accumulation of teleworking knowledge. Also, heavy focus on personal issues appears to create a misconception that teleworkers are at the centre of teleworking research. Teleworking is an organizational phenomenon, and the success of a teleworking programme will be decided by organizational rather than individual factors. But very few studies have used organizational theories to analyse the drivers of teleworking implementation. These scarce studies have nevertheless contributed to the literature by demonstrating which organizational factors are determinants of teleworking adoption.

For example, Ruppel and Harrington employed innovation theory and found that the variables which affected teleworking adoption were the company's degree of centralization, management support, employee education, and company size.[10] On the other hand, Gray's work indicated that the agency theory that models the relationship between an owner and employees in determining optimal contracts provides useful explanations of certain teleworking issues within the organization: task assignment, design of an information system, and compensation.[11] Similarly, Devey and Risman adopted contingency theory to explain labour process reorganization of teleworkers in an organization.[12] They suggested that work reorganization was the consequence of interactions among management goals, organizational constraints, and the power of employees. Finally, Illegems *et al.* used an institutional approach to analyse organizational drivers to teleworking in a sample of Belgium companies and found that a teleworking programme should be based upon team organization, have a high level of electronic communication, and be supported by educated managers and an educated workforce.[13]

Daniels *et al.* have drawn on institutional theory to conceptualize various influences on the adoption of teleworking practices by organizations.[14] They explained the task pressures likely to influence early adopters at the organizational level, industry level and national level. These authors have discussed the mimetic and communicative influences of early adopters on later adopters, and the coercive and normative pressures likely to influence later adopters. The authors did not test empirically any of their propositions, but they show how a theoretical framework based on organizational theories could be used to analyse teleworking adoption. Actually, because teleworking is an organizational innovation, the analysis of drivers

for teleworking adoption could adjust to the kind of frameworks usually employed to study the adoption of innovations.

This paper wants to contribute to the organizational literature about teleworking adoption by addressing two shortcomings of the empirical studies carried out so far. First, most studies have used only a single theoretical perspective, institutional theory being the most frequently used. Our study proposes two organizational perspectives: top manager and institutional perspectives. And secondly, the paper develops a framework taken from the adoption of information technologies to analyse the potential adoption of teleworking. Both shortcomings are addressed in the paper and the theoretical model is tested in a sample of Spanish companies. The next section develops the research framework analysis for the empirical study.

Research Framework

Both top manager and institutional perspectives have emerged as important theoretical frameworks for studying patterns in the adoption of innovations among organizations.[15] Each perspective approaches the issue of adoption very differently. The first is more oriented to the personal characteristics and perceptions of people involved in the adoption of innovations, and the second toward the social characteristics of the adopter's organization. There are several reasons why an institutional analysis is appropriate to explain the adoption of teleworking. Notwithstanding analyses that indicate technological innovations are likely to be imbedded in institutional processes, teleworking is also a human resource management innovation which is then subject to many of the same normative influences as other human resource management practices. Below we discuss the research framework depicted in Figure 1. This framework is adapted from empirical work carried out to study the adoption of information technologies.[16]

Managers. The top manager perspective begins by recognizing that top managers are responsible for adopting the key policies that govern an organization's activities.[17] It focuses on identifying the personal characteristics and perceptions of top managers that influence their relative propensity to innovate. The manager's perception of an innovation may be a powerful driver for the adoption of innovations. According to Rogers, the adoption of innovations is related to the attributes of the innovations as perceived by potential adopters.[18] Thus, the relative advantage of teleworking—greater benefits and lower barriers—must be appreciated by the company's executive managers to increase the likelihood of adoption.

Because it is difficult to measure knowledge and beliefs, the level of empirical work has not matched scholars' level of interest in explaining the strategic decisions of adopting innovations. This discrepancy explains the eagerness of many scholars to utilize the suggestion that individual knowledge and beliefs can be captured by managers' external characteristics (such as age) as proxy measures for individual cognition. Other scholars, however, have criticized this approach.[19] Given the total or partial support that has been empirically found between managers' characteristics and their decisions,[20] we will use managerial demographics in this paper as proxy measures for predictors of teleworking adoption. The model depicted in Figure 1 includes managers' age and tenure as these drivers.

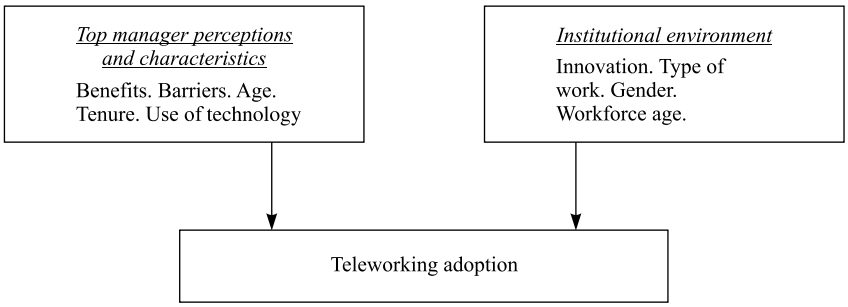

Figure 1. A top manager and institutional based model for teleworking adoption.

With advancing age, managers may become less flexible from a cognitive standpoint in adapting to new ideas and committing themselves to such major organizational undertakings as teleworking.[21] In addition, there is evidence that, with increasing tenure, top managers and technicians are better able to manage the adoption of innovations and to engage in change efforts.[22]

Use of Technology. A manager's previous exposure to an innovation may also be an indicator of his/her propensity to adopt that innovation in the future. In the case of teleworking, when a company studies the introduction of a teleworking programme, managers should be aware of the best technologies available in the marketplace, specifically the information and communication technologies (ICT). Since ICT usage enables many different forms of teleworking, we expect greater adoption of teleworking where there is a greater development of knowledge about ICT.[23] Companies that have a greater use of ICT should be better positioned to adopt teleworking because top managers are more knowledgeable about the use and implementation of these technologies.

Innovation. However, the availability of ICT in an organization is not necessarily a guarantee that ICT will be adapted for teleworking as an organizational goal;[24] these technologies also require organizational changes. The more complex the technological change, the greater top managers' opposition to change, because they may be less familiar with the new technology, and engineers and technicians will take more time and effort to 'sell' the new technology to the top managers. But companies with an innovative orientation may adopt organizational and technological changes more frequently than other companies.[25] Because they are innovative, these companies may use their innovation capabilities and their managers may show less opposition to organizational and technological changes.

Type of Work. The central role of telecommunications raises the issue of communication.[26] It is important to consider the social relations inherent in different teleworking practices. Activities repeatedly performed become institutionalized,[27] so much so that such employees as salespeople may be quite accustomed to working out of the office. Remote working or mobile-based working may be

highly institutionalized for these employees and so they may be quite willing to perform their job by teleworking. Actually, teleworking has been around for salespeople for a long time because they have always worked remotely. Salespeople are prime contenders for teleworking, and monitoring and measuring their performance is easier than with other employees. With experience of teleworking in the sales function, the company may introduce teleworking in other areas. Similarly, other employees may perceive a more positive attitude to teleworking if salespeople are satisfied with their lot.

Gender. Because primary responsibility for homemaking and childcare tasks falls on women,[28] female employees face particularly strong work–family conflicts. Firms employing relatively large numbers of female employees are more dependent upon them than other firms, and more likely to adopt flexible and family-friendly work practices as a result.[29] Some recent studies indicate that such companies are already developing extensive work–life programmes that are impacting positively on productivity.[30] However, other studies show that female employees are uninterested in such options because they perceive work, not home, as the less stressful and more emotionally rich environment.[31] Teleworking is often seen as a key element of this package in that professional and clerical jobs have become more dependent on information technology and less dependent on time and location.

Workforce Age. Finally, employee age may also influence the manager's decision to adopt teleworking. First, older employees may be more institutionalized and have lower experience and knowledge than younger employees in the use of ICT. Thus, they may be more reluctant to change their work organization.[32] But younger employees may have less job experience, which would make managers reluctant to let them work without supervision. As a consequence, both older and younger employees exhibit characteristics that may affect negatively their perceptions and attitudes to teleworking. In order to test this model, and analyse each perspective's contribution to teleworking adoption, we carried out a mail survey among Spanish companies. The next section describes the methodology of the survey.

Methods and Sample

Data for this study were collected through a mail survey carried out in the second half of 2000. Teleworking adoption lags in Spain compared with northern Europe. According to available statistics, the rate of teleworking adoption is around 6% of the Spanish workforce: in such northern European countries as Sweden and the UK, adoption rates are over 12%.[33] These differences can be explained by the smaller degree of Spanish urban agglomeration, weather conditions that do not constrain commuting in winter time, and a greater wish to be social at work. There is also a hierarchical and bureaucratic management culture, and a lack of legislation and government initiatives to encourage employers to set up teleworking schemes. Both are normative factors negatively associated with the adoption of teleworking.[34] The Spanish adoption rate of information and communication technologies and the Internet is also lower, and this variable may play a role in our model of teleworking adoption.

Table 1. Descriptive statistics

Variable	Definition	Mean	SD
ADOPTION (Dependent variable model I)	Adoption of teleworking (dummy variable) 1 = adoption; 0 = not adoption	0.565	–
POTENTIAL (Dependent variable model II)	Percentage of company's tasks that can be performed remotely by teleworking	5.67	9.55
BENEFITS	Manager's perception of teleworking benefits. Construct of seven items (Cronbach's alpha = 0.8876) measured in a four-step scale from 1 (not important) to 4 (very important)	2.85	0.75
BARRIERS	Manager's perception of teleworking barriers. Construct of nine items (Cronbach's alpha = 0.8172) measured in a four-step scale from 1 (not important) to 4 (very important)	2.63	0.56
MANAGER'S AGE	Manager's age	38.09	8.88
TENURE	Manager's tenure	10.49	7.16
TECHNOLOGY	Number of ICT used in the company	6.56	3.55
INNOVATION	Percentage of sales from products with 3 years or less in the market	22.24	37.25
SALESPEOPLE	Percentage of salespeople in the workforce	7.90	13.10
WOMEN	Percentage of female employees in the workforce	27.04	26.71
AGE35.55	Percentage of employees who are between 35 and 55 years old	40.07	22.93
SIZE	Log of total employees	180.94	602.29
n = 157			

The mailing was addressed to the executive and human resources managers of each company with more than 25 employees in Aragon, a region located in the northeast of Spain. Executive and human resources managers were chosen for this study because they are the most concerned in decisions to initiate teleworking.[35] For example, in a US study of teleworking adoption, 66% of senior managers and 30% of human resources managers were involved in the decision to adopt teleworking.[36] We addressed the survey to the human resources manager because we needed his/her perception about the implications of teleworking for the company's employees, and his/her analysis of how teleworking could change the present work organization. However, in the cover letter we asked the human resources manager to consult the company's executive manager about these issues and to tell us about the beliefs and attitudes of the company's top management—not just the human resources manager—about the adoption of teleworking. We tried to avoid the problems inherent in the use of single respondents to gather organizational data, though the single respondent approach has been used elsewhere to measure human resource management practices.[37]

The questionnaire was pre-tested with managers of four companies to obtain feedback concerning the clarity of instructions and to ensure that the questions were appropriate. The survey included quantitative questions about the company (number of employees, use of information and communication technologies, etc.), and qualitative questions about the benefits of, and barriers to, teleworking. These qualitative items were measured with four-step Likert scales, and were based on previous empirical work.[38] Comments and suggestions received during the pre-test were then used to fine-tune the presentation of the final questionnaire. Some 747 questionnaires were distributed, and 157 questionnaires were eventually returned (a response rate of 21%, which is greater than most Spanish mail surveys[39]). The statistical distribution of the sample in terms of company sector and size did not show any significant bias.

Table 1 shows the descriptive statistics of the variables included in the empirical study. The independent variables are developed from the model depicted in Figure 1. Company size was used as a control variable. Some authors suggest that large companies have more resources than small companies for adopting innovations; on the other hand, large companies are more likely to be constrained by the internal bureaucracy that discourages such process and organizational innovations as teleworking.[40]

To limit the managers' subjective opinion about the feasibility of teleworking adoption, we asked which tasks could be performed remotely by teleworking in the company. One of the prime inhibitors of the adoption of teleworking is the suitability of specific tasks for teleworking.[41] Thus, we assumed that only those companies where managers indicated that teleworking would be feasible and that have suitable tasks for teleworking might eventually adopt it. At the same time, we also suggest that managers consider employees' opposition when they evaluate which tasks should be performed remotely by teleworking.

Two multivariate analyses were made. The first was a logistic regression to explain the influence of the drivers depicted in Figure 1 on the decision to adopt teleworking. This multivariate statistical technique was chosen over multiple regression analysis because the dependent variable (ADOPTION) was dichotomous. The significance of the regression coefficients of the independent variables was examined to determine support for each driver. Then, a linear regression by ordinary least squares was performed to explain the percentage of tasks that could be performed remotely by teleworking (POTENTIAL). Similarly, the significance of the regression coefficients of the independent variables was examined to determine support for each driver. This double analysis has also been performed by other authors in order to distinguish between explanatory variables of the decision to initiate teleworking, and the explanatory variables of the potential use of teleworking.[42]

Results

The results that appear in Table 2 for both regression analyses (models I & II) indicate which drivers of teleworking adoption are significant. The variables that explain the decision to adopt teleworking (model I) are the manager's perception of teleworking benefits (BENEFITS), the manager's age (AGE) and tenure (TENURE), the use of information and communication technologies (TECHNOLOGY), and the percentage of women (WOMEN) and middle age employees (AGE35.55) in the workforce. The model is statistically significant ($p = 0.000$). The

Table 2. Determinants of teleworking adoption

	Model I	Model II
BENEFITS	1.099***	−0.092
	(12.082)	(0.832)
BARRIERS	0.160	−0.215*
	(0.160)	(2.123)
MANAGER'S AGE	−0.043**	−0.074
	(3.892)	(0.666)
TENURE	0.076**	0.127
	(4.367)	(1.006)
TECHNOLOGY	0.969**	0.234**
	(4.456)	(2.189)
INNOVATION	0.004	0.307***
	(0.530)	(2.870)
SALESPEOPLE	0.022	0.315***
	(1.667)	(3.034)
WOMEN	0.034*	−0.031
	(3.174)	(0.286)
AGE35.55	0.022**	0.039
	(4.399)	(0.341)
SIZE	0.001	−0.318***
	(0.145)	(2.745)
	−2 Log Likelihood = 160.422	R^2 = 0.295
	Cox & Snell R^2 = 0.249	Adjusted R^2 = 0.201
	Chi-square = 42.572	F = 3.138
	p = 0.000; n = 157	p = 0.002; n = 87

Model I: Logistic regression; Wald statistics between parentheses. Model II: Linear regression; *t*-values between parentheses. Significance: ***$p<0.01$; **$p<0.05$; *$p<0.1$.

most explanatory variable is the manager's perception of teleworking benefits. From the top manager's perspective, all independent variables, except the perceived barriers (BARRIERS), are significant at least at the 95% level. However, from the institutional perspective, there are only two out of four variables which we found significant (WOMEN and AGE35.55), and actually just one of them (AGE35.55) at the same level of significance as the variables from the top manager's perspective. The control variable (SIZE) did not have any influence in the decision to initiate teleworking.

For the potential diffusion of teleworking in the company (model II in Table 2), the explanatory variables are the manager's perception of teleworking barriers (BARRIERS), the use of information and communication technologies (TECHNOLOGY), the company's degree of innovation (INNOVATION), and the percentage of salespeople in the workforce (SALESPEOPLE). The control variable (SIZE) explains negatively the potential diffusion of teleworking, which means that small companies have more adoption of teleworking than large companies. The model is statistically significant ($p=0.002$) and explains the 20% of variance. From

the top manager's perspective, there are only two significant variables. This is also the case from the institutional perspective, but the significant variables (INNOVATION and SALESPEOPLE) have a greater level of significance than the explanatory variables from the top manager's perspective (BARRIERS and TECHNOLOGY).

Discussion

A handful of theoretical and empirical studies has addressed various aspects of the adoption of teleworking—organizational,[43] intra-organizational contact,[44] work–family balance,[45] pattern of use,[46] and so on. This paper has contributed by considering whether the managerial or the institutional perspective has a greater influence on the potential adoption of teleworking.

The nature of organizational motivation for teleworking may hold the key to its success. Teleworking initiated by organizations to meet certain strategic purposes may be easier to maintain than an adoption to satisfy individual needs. Successful teleworking may demand effective marketing to employees. The marketing effort may entail managerial support for the teleworking programme and the provision of carefully crafted organizational policies. The acceptance of teleworking may be contingent on its compatibility with existing organizational norms. Compatibility is a positive indicator for the effective adoption and diffusion of an innovation. A teleworking programme that fits with current organizational cultures, procedures, and value systems may have a higher chance of success.

On the other hand, managerial attitudes may be an important factor in the success of programmes. The role of top management as an effective influence in organizational change has been found in many studies,[47] but the nature of management support for teleworking is still largely unexplored.[48] Top management is the one force that can abolish existing structural inertia and direct organizational resources toward an implementation effort. Studies indicate that top-down initiative is especially effective in encouraging the adoption of administrative innovations.[49] When teleworking is introduced in an *ad hoc* fashion based on employee requests, it may be difficult to sustain as part of the organizational structure without support from top management. For example, lack of publicity and knowledge surrounding successful teleworking adoption, or the belief that teleworking is inefficient or expensive may keep managers from climbing on the teleworking bandwagon.[50]

The relative strength and significance of the regression coefficients in Table 2 are instructive in understanding the underlying differences between companies from both the top manager and the institutional perspectives. One deduction from the results is that managers might improve the chances of teleworking adoption by concentrating on just a few factors. This is not to say that the other factors should be ignored, but rather to note that, in our cross-sectional study, these weaker factors did not powerfully distinguish the potential adopters from the non-adopters companies. The significant variables in model I (Table 2) indicate that the top manager's perspective is a more powerful driver than the institutional perspective in explaining the adoption of teleworking. But once teleworking has been adopted, its diffusion within the company is more related to institutional and organizational factors than to the influence of top managers. This result supports other studies that found top managers to be a more powerful driver to the adoption of innovations than the institutional context in which their organizations are

embedded.[51] It also suggests that managers 'in the know' are those willing to adopt teleworking.

From the top manager's perspective, personal characteristics such as age and tenure are positively related to the potential adoption of teleworking. Younger managers with long tenure in the company are more favourably disposed towards teleworking than older managers with less tenure. Older managers may be more reluctant to adopt teleworking because they are less trained in the use of ICT and/or they find more difficult changing the means by which they organize and control employees. The implementation of teleworking results in a shift of responsibility from the manager to the teleworker.[52] Our results support other studies that found bureaucratic structures and people to have a negative impact on teleworking adoption.[53]

Companies that consider the adoption of teleworking to be feasible also perceive greater benefits from teleworking, such as reduced commuting or increased productivity. This result supports studies which found that the relative advantage of an innovation is one of the major predictors of its introduction.[54] Daniels *et al.* also found that individual employees and middle managers resisted the introduction of teleworking where teleworking was thought to bring more individual costs than benefits; for example, where there are concerns over social isolation or reduced middle management control over employees.[55] Nevertheless, the perceived benefits do not seem to influence the actual diffusion of teleworking within the company. A plausible explanation is that, once teleworking has already been adopted, benefits may be captured whatever the level of use. On the other hand, teleworking barriers seem to explain its potential diffusion, but not the adoption itself. The more perceived difficulties, the lower the potential of teleworking within different functions. A plausible explanation is that implementing teleworking to more company functions, beyond sales or management, would require organizational changes that discourage its implementation. Given that the perceptions of both teleworking benefits and barriers by senior managers are drivers of its potential adoption, the communication of knowledge on the advantages to other companies may facilitate later adoption of teleworking amongst other organizations in the same industry.[56]

The use of information and communication technologies (ICT) is a powerful driver of teleworking. Companies in which electronic communication prevails show a greater potential for teleworking. This result is also found by other researchers.[57] But the relevance of this result to our case is that ICT may help top managers to be in favour of teleworking for other reasons. For example, the ICT may reduce concern of managers about how teleworkers allocate their time outside the traditional office setting. A major challenge of teleworking for managers is their inability physically to observe employee performance. Some managers can just focus on outcome, rather than process, assuming that these outcomes are easy to measure and monitor. State-of-the-art ICT offers an effective mechanism for addressing this concern in ways that include information management and monitoring capability. In particular, the revolution in ICT enables any worker to belong to the virtual network of a company regardless of his/her geographical location. Thus, companies that already use these technologies are in a better position to adopt teleworking successfully because their top management team may be more inclined to implement teleworking.

The company's degree of innovation also explained the potential of teleworking. Once the decision to implement teleworking had been taken by top

managers, companies with a more innovative orientation show greater potential to use teleworking. This result supports other studies that found a positive relationship between in-house innovation and external technology acquisition, or between product innovation and process innovation.[58] On the other hand, the company's product innovation orientation may influence its commercialization efforts. For example, most of the surveyed companies with a strong innovative orientation were developing and adopting software to integrate further their sales force within the company's marketing and production networks.

Thus, we also found that the percentage of salespeople in the workforce was positively related to the potential for teleworking. Salespeople are prime contenders for teleworking because their performance is easy to monitor and measure by outcome. The advantages and benefits of the company's ICT investment in the sales force become a successful starting point for the further adoption of remote working elsewhere in the company. Mobile-based teleworking seems to be a positive experience that influences the manager's attitude towards teleworking in other areas. This result suggests that organizations should initially restrict teleworking to those jobs which will benefit most from teleworking. Many firms today require employees and supervisors who want to participate in teleworking to present a written justification outlining exactly how teleworking will increase the efficiency of a particular job.

We found that the presence of women in the workforce may be another driver to adopt teleworking, although larger proportions of female employees do not explain a greater potential of teleworking. Other studies have found that female employees and managers see teleworking differently from men, perceiving more benefits and lower barriers.[59] Thus, the adoption of teleworking could be proposed as part of a flexible work arrangement in order to, for example, improve the work–family balance. However, other studies suggest that female employees are uninterested in such options.[60] Teleworking may be an option for some women, but not all. In such countries as Spain, home-based teleworking may confirm women in their received domestic identity. Besides, teleworkers may experience difficulties establishing a home environment that is conducive to work. Children, especially, may have a tough time learning not to interrupt a working parent. Indeed, teleworking may reduce employees' productivity if they are expected simultaneously to raise children. It may trap women in the dual roles of caretaker and employee while working at home.

Finally, we found that company size is negatively correlated with the potential for teleworking. This result is consistent with the teleworking and innovation literature. Telework researchers elsewhere have also found that smaller organizations are more likely to assimilate teleworking because they are able to accept change more easily and are less concerned about organizational obstacles.[61] The implementation of teleworking results in a shift of responsibility from the manager to the teleworker. However, managers are often reluctant to change their coordination and control habits, which suggests that organizational barriers to the implementation of teleworking may be greater in large and more institutionalized companies where bureaucracy constraints make more difficult the adoption of innovations. This study suggests that managers in smaller firms perceive an easier implementation of teleworking because they expect to find less opposition to its implementation. Overall, the findings discussed above have implications for the future of teleworking. Because managerial support has a strong effect on the adoption and diffusion of teleworking, top managers must

perceive a clear business benefit before more organizations can climb aboard the teleworking bandwagon.

Conclusion

This article has given insight into the drivers and barriers to the adoption of teleworking based on top manager and institutional factors. The statistical analysis indicates that the most powerful explanatory variables of teleworking adoption and diffusion are the manager's perception of teleworking benefits and barriers, the manager's tenure, the use of information and communication technologies, the company's degree of innovation, the percentage of salespeople, women and middle-age employees in the workforce, and the company size. These results support other studies of the influence of company size, innovation and electronic communication in the adoption of teleworking. But the article also explores new ideas. In particular, the proposition that teleworking diffuses beyond the sales function has never been tested before. It needs more support to be validated. Similarly, the results suggest that top manager factors are more important in the adoption of teleworking while institutional factors have more influence on its diffusion within the company.

The article has several limitations. First, this is a cross-sectional study that does not analyse causal relationships between variables. Second, the results might differ according to the level of teleworking since our study uses managerial perceptions and does not differentiate between organizations with a little bit of teleworking and organizations with a great level and different types of teleworking. Further research on this topic should address these shortcomings by using longitudinal studies and employing real measures of teleworking diffusion instead of managerial perceptions. Another goal for future research is to generate more detailed propositions to test in an organizational framework. The testing of comprehensive organizational models, such as that proposed by Daniels *et al.*, would improve our understanding of the underlying nature and effort of managerial support for teleworking. Research into individual managers' biases and the management skills demanded by teleworking may lead to greater understanding of the assimilation of teleworking.

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