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Smart work

Supporting employees' flexibility through ICT, HR practices and office layout

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Abstract

Purpose – This paper explores smart work (SW), a work practice characterized by spatial and temporal flexibility, supported by technological tools, and that provides all employees of an organization with the best working conditions to accomplish their tasks. Specifically, the purpose of this paper is to identify whether firms adopt different SW models, explore complementarities between the factors that can lead to choose a SW model, and figure out whether contingent variables matters in the implementation of a particular SW model.

Design/methodology/approach – This study is based on: a survey delivered in 2013 to 100 Human Resources directors of medium and large Italian organizations to collect preliminary evidence on SW; and four embedded case studies based on 49 semi-structured interviews to better explain the findings achieved in the quantitative analysis.

Findings – Four SW models can be chosen by companies. They are named inconsistent, analogical, digital and complete SW. They are different according to investments in the enabling digital technologies, in trans-formations of the organizational policies and in workspace settings, according the contingent conditions where firms operate. Results show that there are complementarities between the elements that characterize a SW model and that at least two elements are developed in each SW model. In case all the three elements are developed, companies achieve higher labour productivity.

Originality/value – The paper unpacks the elements that can generate SW environments by deepening the complementarities that can be exploited among information and communication technologies, work place and work practice innovation, and by evaluating their development on employees' performance.

Keywords ICT, Human resource practices, Office layout, Smart work

Paper type Research paper

1. Introduction

The methods and tools through which work practices are accomplished have changed dramatically in the last decade (Hamel, 2012). Successful organizations are increasingly characterized by the ability to abandon now inappropriate working configurations (Birkinshaw *et al.*, 2008) to support new organizational principles, such as emerging collaboration (Vlaar *et al.*, 2008), higher mobility of workers (Neirotti *et al.*, 2013), autonomy in the choices of work settings (Leonardi and Bailey, 2008), spatial and temporal flexibility (Hoeven and Zoonen, 2015), and talent enhancement, responsibility

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and widespread innovation (Gastaldi *et al.*, 2015), taking into account several trade-offs and tensions that are behind the adoption of new work practices characterized by high levels of flexibility (Raguseo *et al.*, 2015).

According to Birkinshaw (2010) if, on the one hand, organizations tend to manifest inertial behaviours in dealing with this paradigm shift, on the other hand, they are consistently looking for elements to balance new business targets with the evolving needs of their employees (Leonardi, 2011). In fact, the generation of value within the business domain is no longer linked only to insightful business models (McGrath, 2013), but also to how employees actually create, perceive, realize, defend and evolve these business models in day-by-day activities (Corso *et al.*, 2013) – especially in highly turbulent competitive environments (Eisenhardt and Brown, 1998).

Actually, most of the innovation potential of employees remain unexpressed due to inappropriate organizational models (Oksanen and Ståhle, 2013), and an increasing number of firms are rethinking these organizational models, referring to the emerging ones with the term "Smart Work (SW)" (Plantronics, 2014). Specifically, a SW corresponds to a work practice that is characterized by spatial and temporal flexibility (Fogarty *et al.*, 2011), supported by technological tools, and that provides all employees of an organization with the best working conditions to accomplish their tasks (Kim and Oh, 2015).

Given that the literature is scant in investigating SW practices, the purpose of this paper is threefold: identifying the different SW configurations adopted by firms; figuring out whether contingent variables matter in the implementation of a SW model; and exploring complementarities between the elements affecting these configurations by understanding their impact on firm performance. In order to achieve these goals, we complement qualitative and quantitative analyses.

The rest of the paper is structured as follows. In Section 2, we discuss the theoretical background. In Section 3, we show the research methodology and the data measures used to collect and analyse empirical facts on SW phenomenon. In Section 4, we discuss the key findings of the quantitative and qualitative analyses. Finally, we conclude the paper with empirical and theoretical implications of the findings and directions for future research that it could be interesting to pursue.

2. Theoretical background

The concept of SW finds its origin in the literature stream studying the application of non-traditional and flexible work practices and locations for carrying out work (e.g. Van der Voordt, 2004; Gorgievski *et al.*, 2010). Authors in this stream assert that modern companies strive to provide flexible work arrangements and more cost efficient and creative office environments in order to support competitiveness and employee productivity without decreasing job satisfaction (Beauregard and Henry, 2009).

Even if there are still mixed results on the impact that these non-conventional practices have on employees' extrinsic career success (Leslie *et al.*, 2012), many firms are increasingly exploring models to fully leverage on their employees (Rockmann and Pratt, 2015), while new entrepreneurial opportunities and business models are emerging – e.g., the co-working office spaces with related services proposed by WeWork (www.wework.com).

Within these extremely dynamic settings, companies (e.g. Plantronics, 2014) start referring to "SW" as a set of organizational interventions aiming to fully release the

innovation potential of their employees, providing them with higher levels of autonomy in the choice of their working spaces, time and tools, and asking in return a strong commitment in achieving corporate goals. According to Mann (2012), the interventions over which practitioners are focusing their attention seam based upon three complementary elements: information and communication technologies (ICT) element, Human Resources (HR) element and layout element.

The first one refers to the improvements of the organizations' digital backbone (ICT element). The development and diffusion of digital technologies (especially those supporting communication, collaboration and social network creation), along with the increasingly pervasive dissemination of powerful and easy-to-use mobile devices (Ahuja *et al.*, 2007), support working groups in easily sharing files, information and ideas (Chudoba *et al.*, 2005). In such a way, all employees of an organization can efficiently and effectively interact in real time – even if scattered into disperse settings (Kim and Oh, 2015) or tele working from home (Sewell and Taskin, 2015).

The second element (HR element) refers to the HR practices made available to employees in order to actually exercise their flexibility (Coenen and Kok, 2014). Specifically, training programmes for the middle and top management, training for the end users, new communication plans, new management by objectives processes systems, and projects of cultural change tend to affect the behaviours of the employees and their attitude towards risk taking and innovation (Cameron and Green, 2015).

The third element refers to the changes accomplished in the physical workplace (layout element). Recent works emphasize the importance of promotion strategies in spatial reconfiguration of the office layout (Elsbach and Bechky, 2007) to increase employees' productivity and better manage their work-life balance (Ahuja *et al.*, 2007). Therefore, particular office reconfigurations may lead to innovative ways of collaborating (Smith, 2013).

Literature provides a great deal of evidence regarding the importance of each one of these elements (e.g. Reyt and Wiesenfeld, 2015 for digital element; Birkinshaw *et al.*, 2008 for HR element; Elsbach and Pratt, 2007 for physical element). However, most of contributions tend to focus only on one element per time, narrowing down the focus in order to have manageable empirical settings. Very few contributions (e.g. Leonardi, 2011) consider two elements simultaneously, while – to our best knowledge – no contribution analysed the SW phenomenon in a comprehensive fashion, and considering all the three elements upon which practitioners focus their attention.

Based on these considerations, this paper's aims start to fill this gap by analyzing the three SW elements together. In order to achieve this goal, we refer to the notion of "complementarities" (e.g. Milgrom *et al.*, 1991), which implies that "doing more of one thing increases the returns to doing (more of) the others" (Milgrom and Roberts, 1995, p. 181). Understanding the complementarities among SW elements is important because "a successful change has to involve many relevant elements of a system by involving them in a specific way" (Laursen and Foss, 2003). We will look inside this "black box" of SW, by unpacking the elements that can generate complementarities between the adoption of digital tools, HR models and physical layouts.

3. Methodology

This study is based on a continuative research initiative promoted since 2012 by the School of Management of Politecnico di Milano, i.e. the Smart Working Observatory, which is focussed not only on analyzing the SW phenomenon as well as its impacts on organizations' performance, but also on supporting organizations in the progressive

implementation of SW models. We can refer to Gastaldi and Corso (2013) for an overall description of the logic behind the Observatory.

In order to achieve the goals of this paper, we have triangulated quantitative and qualitative analyses (Jick, 1979). The former is based on a survey run among 100 Italian companies and AIDA Bureau van Dijk database, which contains financial data of Italian firms. The latter has been developed through multiple, embedded case studies oriented in better explaining the findings achieved in the quantitative analysis. In what follows, we will describe the methodological choices that have shaped the research process.

3.1 Quantitative analysis

The quantitative analysis occurred in three steps. First, descriptive statistics and a cluster analysis were computed to examine the diffusion patterns of the three elements taken into exam and to delineate the main configurations used by firms in terms of SW. In the second step, ANOVA analysis and Kruskall-Wallis non-parametric tests were used to understand the contingent conditions under which SW configurations are chosen by firms. In the third step, we evaluated the existence of complementarities between the three elements taken into account by running three regression models. Specifically, we evaluated whether the complementary development by companies of the ICT, HR and layout elements has a positive impact on their performance measured by the labour productivity growth of firms.

For data gathering, a survey was sent to companies. It has been delivered through an electronic platform to a convenient sample of 100 HR directors of medium and large Italian firms. On data gathered, a cluster analysis was conducted in order to investigate the complementarities between the three elements that can characterize a SW strategy. We complemented the data gathered through the questionnaires with data contained in the AIDA Bureau van Dijk database, which includes financial data of Italian firms, for evaluating through ANOVA analyses the contingent conditions and the organizational performance that characterize firms that choose a particular SW practice.

Table I provides the definition, variable construction, and sources for all of the three elements used in this research. As can be observed, they were operationalized using survey responses.

We assisted the data collection effort with the AIDA Bureau van Dijk database. We use this database in order to figure out contingent variables that may influence the decision of adopting a particular SW model. Their operationalization is shown in Table II.

For evaluating the complementary effect on the performance of firms, we run three regression models where we included as dependent variable the labour productivity of companies measured as the growth rate of the productivity between 2008 and 2012. As control variables, we included the firm age, computed as the logarithmic form of the difference between the year of data gathering and the year of foundation; the level of human capital; the productivity level of the company in the 2007; and the dummy variables that refer to the industry affiliation of every company.

3.2 Qualitative analysis

In order to complement results found by employing the quantitative analyses, we performed four case studies on the Italian branches of international organization, which were similar in terms of C-level's willingness to invest in SW, but adopted different implementation strategies.

Elements	Variable construction/definition	Measure	Reference	Data source
Layout element	Adoption of initiatives of redesigning of the physical workspace for creating environments more flexible and oriented to the workers collaboration	From 0 (none initiatives) to 2 (multiple initiatives)	Elsbach and Bechky (2007)	Survey
ICT element	Extent to which employees telework	From 0 (none employee) to 2 (all employees)	Martínez-Sánchez *et al.* (2007)	Survey
	Extent to which employees use IT personal devices (pc, tablet, etc.)	From 0 (none employee) to 2 (all employees)	Martínez-Sánchez *et al.* (2007)	Survey
	Extent to which employees use external IT services (Skype, Twitter, LinkedIn, etc.) at anytime from anyplace	From 0 (none employee) to 2 (all employees)	Martínez-Sánchez *et al.* (2007)	Survey
HR element	Extent to which employees can manage in a flexible way their working hours	From 0 (none employee) to 2 (all employees)	Coenen and Kok (2014)	Survey
	Percentage of employees for which the company uses a MBO (management by objectives) system for evaluating their KPI (key performance indicators)	From 0 (none employee) to 6 (all employees)	Coenen and Kok (2014)	Survey
	Change management actions for managing the organizational models chosen: training for the middle and top management, training for the end users, communication plans, new MBO systems, projects of cultural change, and processes' reorganization	From 0 (adoption of any change management action) to 6 (adoption of all the change management actions)	Coenen and Kok (2014)	Survey

Table I.
Measure of the three elements

Variable	Operationalization	Data source
Industry types	Firms are classified into public administration, retail industry, bank sector, engineering industry, food industry, ICT sector, other industries	Survey
Size	Number of employees	AIDA
Capital intensity	Ratio between the property plants and equipment and the number of employees	AIDA
Human capital	Ratio between the total labour cost and the number of employees	AIDA
Year of foundation	Year of foundation	AIDA
VA/employees	Ratio between the value added and the number of employees	AIDA

Table II.
Variables operationalization

As suggested by Eisenhardt (1989), we relied on several data sources: face-to-face interviews, phone conversations, follow-up e-mails, and archival data such as internal documents, press releases, websites, and news articles. In order to maximize the benefits from these sources of evidence and better deal with reliability issues, two of the three principles suggested by (Yin, 2003) have been followed: the triangulation of data sources and their organization in an electronic and navigable case study database.

The primary data source was 49 semi-structured interviews conducted over seven months (form April 2013 to Octobers 2013) with the HR director of the firms, at least one of the C-levels (mainly chief executive officers, chief information officers and chief financial officers), and other knowledgeable informants involved in SW implementation process (e.g. the facility managers, responsible for the training programme associated with SW or some power users involved in the very first phases of the SW implementation). Among the various potential interviewees, we have chosen those who were universally recognized within the firms as power adopters of the SW model – i.e., people who managed the request of a SW model and who pioneered its development. These actors have been selected through a social inquiry based on a snowball technique (Patton, 2005). Within each firm, authors continued recruiting informants until additional interviews failed to dispute existing, or reveal new, categories or relationships that is, until theoretical saturation (Strauss and Corbin, 1990) was achieved. Table III proposes the organizations involved in the case studies as well as the interviews accomplished.

Potential informant bias has been addressed in several ways. First, the interviews collected both real-time and retrospective longitudinal data in several waves over seven months. According to Ozcan and Eisenhardt (2009), these kinds of data collection are ideal because retrospective data enable efficient collection of more observations (thus enabling better grounding), while real-time data mitigate retrospective bias (Leonard-Barton, 1990). Second, anonymity has been promised to companies and informants. According to Eisenhardt (1989), this decision encourages candour. Third, the interviews have been complemented with wide-ranging archival and observational data, as suggested by Bingham and Eisenhardt (2011). Fourth, open-ended questioning has been used to give the informants wide scope to relate the concept as they chose. According to Koriat *et al.* (2000), this helps in addressing potential informant bias. Fifth, informants not only from multiple levels of hierarchy, but also with different perspectives have been considered during the interviews (Ozcan and Eisenhardt, 2009). Finally, interview techniques like courtroom questioning, event tracking, and nondirective questioning (Martin and Eisenhardt, 2010) have been used to yield accurate information.

Following recommendations regarding multiple cases theory building (Eisenhardt and Graebner, 2007), within and cross-case analyses have been performed with no a priori hypotheses. The authors cycled among the emergent theory, case data and literature to further refine abstraction levels, construct measures, and theoretical relationships (Eisenhardt, 1989). To converge on a parsimonious set of constructs, authors focussed (and will present) only on the most robust findings (Andriopoulos and Lewis, 2009).

			Interviews[b]			
Org.[a]	Industry	Employees	HR manager	C-levels	Others	Total
A	Public administration	3,407	2	2	5	9
B	Food and beverage	3,764	5	8	2	15
C	Brewing	961	4	2	6	12
D	Food packaging and processing	824	6	2	5	13

Notes: [a]Pseudonyms are used to protect the anonymity of the organizational and their members; [b]each interview lasted approximately 1.5 hours

Table III. Organizational involved in the qualitative analysis

4. Findings

4.1 Configurations of SW practices: the cluster analysis

Descriptive statistics (Table IV) highlighted that firms invest more in ICT solutions (59 per cent of companies surveyed) with regard to the reconfiguration of the workplace and of the office layout (39 per cent of companies surveyed). However, the majority of the organizations surveyed (67 per cent) make innovations in the human resource practices and in the organizational model followed.

The three binary variables[1] operationalizing the three elements that may determine a company to adopt SW practices were subject to a hierarchical cluster analysis using Ward's method, which produced a dendrogram[2]. The dendrogram showed that within the sample there were four distinct approaches to SW, which are shown in Table V. The existence of distinct approaches provided empirical evidence on the existence of complementarities between the elements investigated.

A first approach (cluster 1) consists of 28 per cent of companies surveyed. We called these firms "inconsistent SW" as they do not invest significantly in any of the three elements investigated. This cluster is composed mainly by organizations that operate in the public administration and in the retail industry. These organizations have not high-level human capital and are capital intensive. Furthermore, the majority of them are older than the others and are characterized by low levels of productivity.

The second group (cluster 2) in terms of frequency in the sample consists of 13 per cent of surveyed companies whose features are based on attributing importance to investments in innovations in the HR practices and in the organizational model followed, and in the reconfiguration of the workplace and of the office layout. Since ICT element is not significantly used by this cluster, we labelled it as "analogical SW". This cluster is mainly composed of organizations operating in banking and with medium-qualified employees. These organizations are older than others, have more employees, are labour intensive, and have relatively low productivity levels.

Variable	Mean	Median	SD	Min.	Max.
Element					
Layout	0.39	0	0.49	0	1
ICT	0.59	1	0.49	0	1
HR	0.67	1	0.47	0	1
Industry					
PA	0.14	0	0.35	0	1
Bank	0.13	0	0.34	0	1
Engineering	0.08	0	0.27	0	1
Food	0.06	0	0.24	0	1
Retail	0.06	0	0.24	0	1
ICT	0.06	0	0.24	0	1
Other	0.47	0	0.50	0	1
Contingent var					
Human capital (k€)	54.76	57.00	16.84	10.00	88.00
Capital intensity (k€)	762	128	2,980	1.00	21,319
Size	4,197	566	18,387	57	140,435
Year of foundation	1984	1996	29	1865	2010
VA/employees (k€)	80.15	77.00	34.28	15.00	165.00

Table IV.
Descriptive statistics

SW typology	(1) Inconsistent SW	(2) Analogical SW	(3) Digital SW	(4) Complete SW	Total
Element					
Layout	Low	High	Low	High	39%
ICT	Low	Low	High	High	59%
HR	Low	High	High	High	67%
Industry (%)					
PA	21.4	15.4	12.1	7.7	14
Bank	3.6	38.5	15.1	7.7	13
Engineering	7.1	0	12.1	7.7	8
Food	3.6	7	9.1	3.8	6
Retail	10.7	7.7	3.0	3.8	6
ICT	0	7.7	0	19.2	6
Contingent var.					
Human capital (k€)	44.76	55.83	57.80	60.16	54.76
Capital intensity (k€)	2.079	192	443	166	762
Size	566	1,579	274	606	566
Year of foundation	1978	1974	1993	1981	1984
VA/employees (k€)	66.76	70.80	89.40	85.11	80.15
Percentage of firms	28	13	33	26	100

Note: "Low" means that the value of the element is under the mean of the sample, "high" otherwise

Table V.
ANOVA results

The bigger group (cluster 3) consists of 33 per cent of organizations whose distinguishing trait is the limited importance for the reconfiguration of the workplace and of the office layout. For this reason, we labelled this group "digital SW". This cluster is composed mainly of organizations of the engineering and in the food industry. These organizations have medium-qualified human capital and are labour intensive. The majority of them is younger than others firms, have a medium size and are characterized by high levels of productivity.

Finally, a fourth approach to SW (cluster 4) consists of 26 per cent of organizations that have invested in all the three elements investigated. Given the typology of investments made by these organizations, we labelled this group "complete SW". This cluster is composed mainly of organizations of the ICT industry that have hired qualified employees (high human capital levels). These companies are labour intensive, are characterized by medium dimensions, and have high productivity levels.

4.2 Estimation of the complementarities

The estimations of the complementarities between the ICT, HR and layout elements are shown in Table VI. It can be seen from this table that the individual effects of the three elements (estimated in Model 1) do not impact significantly on the outcome of the model, the labour productivity growth, with the exception of the layout element whose contribution is positive and significant with a p-value of less than 5 per cent.

From Model 2, we verify that there are not any significant complementary effects on the outcome variable in case two elements are developed. Specifically, the three coefficients of the two-way interaction effects do not impact significantly on the outcome variable.

Instead, for gauging the complementarities between the three elements, we looked in Model 3 at whether the three-way interaction effect was significant on the outcome

Dependent variable Independent variables Model	Labour productivity M1	 M2	 M3
Direct effect			
ICT element	−0.222	−0.010	−0.039
HR element	−0.092	−0.081	−0.137
Layout element	0.096*	0.104**	0.085*
Two-way interaction effects			
ICT element × Layout element	–	−0.067	−0.093
HR element × Layout element	–	−0.046	−0.033
ICT element × HR element	–	0.062	0.012
Three-way interaction effect			
ICT element × HR element × Layout element	–	–	0.189*
Control variables			
Firm age	−0.045	−0.037	−0.025
Human capital	0.011**	0.010**	0.010**
VA/employees	−0.217*	−0.226*	−0.220*
Fit indexes			
F	4.02**	3.92***	6.32***
R^2	36.32%	39.08%	42.22%

Notes: Industry dummy variables included in the models. ***$p < 0.1$ per cent; **$p < 1$ per cent; *$p <$ 5 per cent

Table VI.
Regression models for evaluating complementarities on labour productivity

variable. Results of this model demonstrate the importance of complementarities of the three elements with respect to determining labour productivity. Indeed, we found that the contribution of the variable measured as the interaction between the three elements, on the outcome variable, is positive and significant at the 5 per cent level.

4.3 Results of qualitative analysis

We have structured the results of the case studies according to the main reasons that led the different organizations to invest in SW (Table VII), and the specific configurations of the three elements characterizing each SW model (Table VIII). The rest of the section will briefly describe the cases deepening the statements reported in the tables. A final sub-section will report the considerations rose during the cross-case analysis.

Organization[a] SW typology Impacts	A Inconsistent SW	B Analogical SW	C Digital SW	D Complete SW
Organizational efficiency	*Cost reduction*	*Rationalization*	*Productivity*	Flexibility
Organizational effectiveness	Response rate	Quality improvement	*Collaboration*	Innovation
Employees engagement	Empowerment	Creativity	Sense of community	Work-life balance

Note: [a]For each organization we have italicized the main reasons explaining the investments in SW

Table VII.
Main reasons for investing in SW

Organization SW typology	A Inconsistent SW	B Analogical SW	C Digital SW	D Complete SW
Layout element	No significant intervention made Building constraints to be faced (old facilities not easily reconfigurable)	Development of a new building focussed on fully exploiting a SW model Concentration rooms, collaboration rooms and relax rooms	No significant intervention made Building constraints to be faced (necessity of changing building in order to fully benefit from SW models)	Intelligent, modular building, which adapt to organizational needs Building automation (light and temperature) Acoustic isolation
ICT element	No significant intervention made Unified collaboration and communication as enabling investment	No significant intervention made Unified collaboration and communication as enabling investment	Mobile workspace for all employees Unified collaboration and communication Cloud solutions Social network within the firm	Full digitalization of archives and documents Unified collaboration and communication Mobile workspace and app for employees
HR element	No significant intervention made Assessment of the effectiveness of current model in balancing employees' needs with firms performance goals	Extension to all senior managers Training SW leadership programme (engagement) Clear definition of the SW priorities on which focusing	Preliminary pilots in ICT and marketing divisions Quantification of the SW benefits Extension to all other employees Training	Extension to all employees (blue collars) Full autonomy in choosing working times, places and tools Self-certification of working hours

Table VIII.
Usage of the three elements in the cases

4.3.1 Organization A: inconsistent SW. Organization A is a public administration managing a big Italian region. With 3,407 employees and different facilities spread throughout a large geographical territory, the C-levels of organization A started thinking about SW principles with the main aims of reducing the commuting costs of their employees while increasing their functional integration and, thus, their effectiveness in answering citizen requests. The underlying objectives were not only to switch from silos based to cohesive service delivery, but also – using the words of the chief information officer – "to progressively empower all employees toward the usage of ICT as a lever through which disrupting the service processes".

Organization A started to invest in a unified communication and collaboration suite (instant messaging, presence and collaboration) as an enabling ICT-based investment to achieve these potential benefits. However, the lack of a solid budget associated with strong financial constraints not only forced to focus on a (suboptimal) general-purpose suite, but also to ignore other complementary SW elements. In particular, as stated by

the HR manager, "the lack of training programmes explaining how to take advantage of the digital solution limited its extension from the convenient pilot units in which it has been tested across the whole organization". Recognizing this initial mistake, organization A is now focussed on assessing the effectiveness that the current organizational model has in balancing employees' needs with firms' performance goals and comparing it to models used in other public administrations and firms. The results of this exercise will be used to define the next priorities to move organization A along the continuum towards SW models.

4.3.2 Organization B: analogical SW. Organization B is the Italian branch of a multinational food and beverage company that, in the last months of 2013, has moved all its employees into a new building structured into functional areas (concentration rooms, collaboration rooms, relax rooms, etc.). This change provided an opportunity to rethink the whole working model, with the aims of rationalizing the cost of facilities (as well as their management), improving the quality of the internal decision-making processes and stimulate creativity in individuals.

During the construction of the new building, the organization has extensively invested in training all senior managers regarding the levers and benefits related to SW. According to the chief executive officer: "this phase is an essential basis on which constructing any further SW initiative". Once a clear idea of SW levers and benefits was disseminated, organization B developed a leadership programme to engage senior managers in the development of SW model and mature the capabilities necessary to efficiently and effectively accomplishing this task. A clear definition of specific SW priorities completed the programme of HR development and allowed to fully exploit the new building once ready. One of the results of the prioritization of all SW efforts has been the choice of not making particular interventions in ICT domain. Two are the main reasons explaining this choice: the organization already had a supportive and mature digital infrastructure; and managing also this element could compromise the effectiveness of the whole process of SW development. These reasons are confirmed by the chief financial officer, who added that "too many variables to be taken into account risk of defocusing and, thus, producing no benefits to be shown to the board in order to continue benefiting from their commitment". Within these settings, only unified collaboration and communication solutions have been considered as an indispensable and enabling investment that cannot be neglected.

4.3.3 Organization C: digital SW. Organization C is the Italian branch of a multinational brewing company that in July 2013 started developing a SW model with the objectives of increasing the productivity and the level of collaboration of its employees, instilling a sense of community in them. Starting from the consideration that it was impossible to work on layout element, since current building structure impedes the rearrange of office layout allowing to fully benefits from SW principles, the C-levels of organization C decided to start a SW initiative involving its HR and the ICT divisions. This initiative has been structured according to three phases: evaluation of current organizational and individual needs; piloting of a SW model into controlled, supportive settings; and quantification of SW benefits and extension of SW model to the whole organization through a set of training sessions.

During this process, organization C invested in the development of a digital environment complementing the HR strategy of letting people work whenever and wherever they wanted. Thus, in addition to some investments in unified

communication and collaboration tools, a mobile workspace (constituted by a laptop, a smartphone and an internet connection) has been made available to all employees. Moreover, a set of cloud-based solutions has been developed to improve the performance, the reliability and the scalability of the applications used in day-by-day tasks. Finally, a corporate social network significantly increased the intra-organizational knowledge exchange. The chief information officer confirmed this aspect by highlighting: "the core importance of progressively investing in an enabling digital infrastructure – able to bring flexibility in the process through which the intricate flows of information within the company are manage and leveraged".

The combination of HR and ICT elements allowed the achievement of significant results in compressed timeframes. This is for instance confirmed by what has been stated by the chief financial officer: "In just three months of experimentation, we have registered a productivity growth of 20% only in our ICT department. The improvement reached the peak of 30% in the HR division". With these numbers, the promoters of SW initiative convinced the board of organization C to significantly invest into the development of a SW model.

4.3.4 Organization D: complete SW. Organization D is the Italian branch of a multinational food packaging and processing company. Organization D started thinking about SW in 2006 in order to increase the innovativeness of its employees and the flexibility in managing them. As stressed by the managing director of the organization: "Underlying these objectives there was the necessity of retaining key human resources in a geographical territory full of other strong employer brands". Within these settings and recognizing the centrality of HR in producing the competitive advantage of the firm, organization D focussed on increasing work-life balance.

One peculiarity of organization D is that its HR director is also the ICT leader as well as the facility manager of the firm. This organizational configuration ensured high levels of interrelations and complementarities among the three SW elements. An intelligent and modular building has been developed to adapt to organizational need. Thus, if employees necessitate of a big conference room, open spaces are autonomously created by moving transparent walls and dynamically rearranging office layout. The light and the temperature within the building are centrally controlled in order to provide employees with the most conformable conditions to accomplish their tasks.

All archives and documents have been digitalized or moved to a separated warehouse. An internal logistic service brings the documents that employees need where and when they need it. In this way: "the working place is highly simplified, and human resource can focus on one task at a time and boost both their efficiency and effectiveness" (HR director). The organization has developed a set of apps allowing booking a meeting room on the run, releasing it, checking the queue at the canteen, etc. More generally, organization D has created a mobile workspace allowing employees to work whenever and wherever they want.

These and many other benefits (corporate kindergarten, wellness areas, centralized commuting services, etc.) have been made to all employees – blue collars included. These last ones have not only full autonomy in choosing their working times, places and devices, but also self-certificate their working hours and spontaneously coordinate in the different R&D projects within the firm. The end result is "a reduction of the HR, ICT and layout yearly costs by an order of 10%, and a significant increase in the innovativeness of the organization" (HR director) who recently won the best-place-to-work award.

5. Discussion and conclusions

We began by asserting that successful organizations are increasingly characterized by the ability to abandon now inappropriate working configurations (Birkinshaw *et al.*, 2008) to support new organizational principles. This happens because the extremely dynamic settings that companies have to manage nowadays lead them to restructuring the old forms of work in order to make possible the implementation of new forms of work, as those that they start labelling "SW". In order to investigate this issue, we rooted our reflections in the theoretical stream of flexible work practices (e.g. Leslie *et al.*, 2012) and we recalled the notion of complementarities (e.g. Milgrom *et al.*, 1991) to look inside the black box of SW, by unpacking the elements that can generate complementarities between the adoption of ICT, workplace and work practice innovation, and by evaluating their impact on outcome variables.

Specifically, this study allows highlighting the elements characterizing SW models and the contingent conditions where they are implemented. The main reasons for which an organization invests in SW tend to shape and being shaped by both the investments accomplished in SW elements. Inconsistent SW organizations tend to see SW only as a paradigm to reduce cost. Analogical SW organizations tend to combine resources rationalization with employee creativity. Digital SW organization focus on establishing collaboration and a sense of community among their employees. Complete SW organizations tend to focus on work-life balance and see the innovativeness of its assets as a by-product of a satisfied employee, who has to be retained as a key resource.

Overall we demonstrate that there are complementarities between the elements that can characterize a SW model. At least two elements are developed in each SW configuration found. Quantitative and qualitative analyses show the centrality of the HR element in the development of SW models. In particular, the cross-analysis of the four different implementation strategies of SW suggests that the development of pilots in controlled organizational niches, the quantification of the benefits associated with SW, the engagement of senior managers and employees in training programmes are central in the development of SW. Indeed, SW requires the concurrent presence of at least two elements, where the HR element is always developed.

We also demonstrated in this paper that the complementary investments in the three elements positively affect the labour productivity of firms, highlighting that SW means higher returns for companies. This implies that firms should focus their attention and their investments on all three elements that characterize a SW setting in a comprehensive and holistic fashion. In this way, we found empirical support for the importance of complementarities between the three elements by supporting the discussion of Milgrom *et al.* (1991).

Regarding the layout element, it is important to note that most of current organizational facilities have different constraints that impede full benefits from the potential of SW. Recognizing that the organizational layout tends to shape working practices in a significant way, many organizations are deciding to start from green field and "use" the development of new facilities as an opportunity to rethink organizational models in order to combine efficiency (e.g. less space used due to the usage of shared desks) with effectiveness (e.g. exploitation of room favouring collaboration among employees). In the quantitative analysis, we found that younger firms do not make any particular investments in the layout element. This maybe due to the fact that such companies adopt already flexible solutions that allow them to be "smart" and do not need do reconfigure their facilities.

With reference to the ICT element, the cases suggest that the unified communication and collaboration solutions seem to be a necessary but insufficient investment to

develop a SW model. In order to concretise the SW potential, most advanced cases complement these investments with (at least) the development of a mobile workplace allowing: employees to work also outside the firm's facilities; and firms to progressively develop flexible models of ICT governance opening up further SW opportunities. What is clear is that there are different stages of ICT maturity towards a SW model, and that banks invest to a lower extent in ICT solutions probably because of security problems that can arise in an extensive usage of them.

To sum up, we believe that this study provides an important approach to how we conceptualize and operationalize the SW concept, and to how complementarities between the three elements characterize SW practice matters.

6. Implications and future research

Our results suggest that managers should devote more effort in thinking about restructuring their old work practices in order to implement new forms of work characterized by higher levels of flexibility, which can bring higher returns for the company. Managers should think about implementing SW practices, not only for achieving better returns at company level, but also for bringing benefits at an individual level.

SW is also related to a cultural change and, therefore, policymakers should consider education redesign as a priority in order to prepare managers but also individuals for the new demands and opportunities brought about by SW. Therefore, policymakers should think about several questions that concern the characteristics that firms should have for succeeding in a SW environment; the requirements for educational and training for firms and individuals, and how they need to be delivered and accessed; what the role of managers is in ensuring that a dispersed team is able to respect its tasks; and what the right technologies are for providing the support and the connection to make SW implementation an effective endeavour.

Future research should focus on four main aspects. First, there is the necessity to further investigate the development dynamics of SW configurations in order to understand the adoption timing of the three elements. Second, future studies should focus on studying SW adoption at a functional level in order to measure the relative performance. Third, future empirical research should be devoted to investigating whether the complementary development of the three elements leads to other performance improvements at firm level, but also at employee level. Finally, future studies should also analyse in more detail the sectorial effects, if any, of the implementation of SW practices.

Notes

1. Values in the scale higher to the median value were converted into a 1 and the others to 0.
2. For further details please contact the authors.

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