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Smart cities and digital workplace culture in the global European context: Amsterdam, London and Paris

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ABSTRACT

Until recently, knowledge-intensive work activities have predominantly taken place in office buildings as a specialized form of economic infrastructure. New digital technologies together with an economic and organizational transition from closed firms to open platforms has changed the pattern of work within the modern metropolis. The office building is no longer the sole workplace typology and work activity has intensified in other urban locations. The questions then are: "How might smart cities reinterpret workplace culture at the urban scale outside the framework of office buildings typology?" and "Which tools and methodologies can be used to make digital workplace culture visible at the urban scale?" In order to answer these questions, workplaces are observed not as private architectural spaces but as compositions of "subjective urban experiences". A Twitter data analysis provides evidence of workplace spatial culture within the innovative global cities of Amsterdam, London and Paris, interpreted as behavior settings. This analysis shows that office pattern locations are generally distributed independently to knowledge intensive business services and workplace demand, as expressed through social media analyses. In addition to office buildings, transit hubs, urban amenities and new digital services play a key role in reframing workplace location. Moving beyond generic visions for digital work in outer spaces, big data therefore provides specific insights and incentives for considering workplace design at the urban scale.

1. Introduction: office typology, urban space and collaborative technologies

Understanding the implication of digital technologies within the workplace[1] – taken here as the combination of behavioural and physical factors – requires a perspective that goes beyond an architectural approach to consider the role of urban design. Despite its prevalent, modernist definition, “office” historically referred an urban space rather than a private room or building. During the renaissance, Florence's *Uffizi* (“Offices,” today a museum), designed by G. Vasari, became Europe's first office-based service centre. The building, a void corridor carved into the pre-existing medieval fabric of its site, is defined by its horizontality and a design that is flexible in the use and configuration. It was a major urban development and centralized the administration of emerging capitalist companies in a public space, situating them in the city's politics.

Thanks to mass productivity (see Taylor, 1911; Rullani, 2004), office activities eventually moved from factory counting houses to skyscrapers (Saval, 2014), increasing their density and complexity within cities. Especially in North America, business districts have been fundamental in localizing large volumes of offices in central locations. Following L. Sullivan's definition of modernism in architecture, according to which “form ever follows function” (Sullivan, 1896), the office typology figures as the main field of modernist experimentation, and anchors metropolitan developments. Starting from the interior design and layout of single office cells, Sullivan's urban ideal is based on a vertical multiplication of this primary organization, generating entire cities of skyscrapers, which he compared to “hives”. In this vision, the original ideal of the office as a “public space” is replaced by an urban idea based on private, enclosed environments.

The office-tower form that dominates the skyline of 20th century downtowns in US cities like New York and Chicago has been more recently integrated into global city centres such as Hong Kong and London. However, in many European cases, the existence of already saturated inner historical areas means that this typology has mostly characterized a second-stage peripheral expansion, as shown by Firley and Gimbal (2011). While mostly concerned with housing issues, European modernism only turned its attention to management centres at a late stage (1930–1950), critically reinterpreting North American skyscraper developments. Unrealized proposals, such as Le Corbusier's *Plan*

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[1] In this case, the process of “knowledge-work” (Drucker, 1957, p. 122) digitalization will be accounted for in opposition to manufacturing, therefore excluding implications such as robotics in factories.

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Voisin, *Ville Radieuse*, or *La Cité des Affaires* project for the *Plan Obus* have shaped the language of later-realized European global service centres.

After World War II, digital technologies migrated from their main military applications to office workplaces, which became their biggest commercial pool. Personal computers and later the Internet caused an intensive shift in productivity, forming a new "informational society" (Castells, 1996). From the beginning, the process of workplace digitalization has inspired many architectural and urban visions that prefigure the "death of the office" (see Vegesack, 1998). In 1980, the futurologist A. Toffler theorized the image of the "electronic cottage" to describe rural and domestic work locations could be rediscovered through remote-work, giving birth to a new "home-centred and rural society" (Toffler, 1980) outside of congested business districts. More concretely, new telecommunications, together with infrastructural developments, have influenced numerous dislocative investments and strategies, such as "edge cities" (Garreau, 1991) or "edgeless cities" (Lang, Sanchez, & Oner, 2009), or those defined by R. Fishman (1987) as "technoburbs", between 1980 and 2000.

As described by Castells, "informational society" fundamentally involves new types of labour and their relationship with inner cities. In contrast with earlier conceptions, which foresaw office developments' ubiquity and their relocation to peripheral and rural areas, the new global economy or "global cities" phenomenon (Sassen, 2005) concentrated knowledge intensive business services in city centres in order to coordinate information flows of increasing complexity.

As largely discussed in the literature, what emerges as the current and future challenge for urban design is not rural relocation but urban densification. Moreover, what becomes evident is that, in contrast with early visions, central offices are still intensively built and are three times more expensive other urban real estate sectors (Hutchings, 2015, p. 21). Office typologies – especially high-rise office towers – are the most expensive large scale architectural projects in terms of energy consumption and construction costs (Snow, 2014, p. 20), raising additional questions of urban design sustainability. Finally, even if it is still not clear how vacancy rates may be directly dependent on workplace digitalization, a strong decrease of surface per employee ratio has been observed since 2008 (Miller, 2014).

Even if workplace digitalization isn't a novel issue, the recent combination of several radical transformations affecting not only work-related activities but the overall urban productive chain put this topic into a new perspective:

1) **Mobile and collaborative media pervasiveness:** since 2008, increasing freelance and entrepreneurial activities has allowed for the unprecedented spread of personalized and mobile collaborative media. This has enabled workers to combine interactivity with work-related communication tools at a global scale that exceeds the single firm and "office" environment. An individual can now easily collaborate with the rest of the world in real time.
2) **Firms are turning into platforms:** where previously service organizations – identifiable in their office buildings – were able to shape society and urban conditions, today the behavioural complexity of urban ecosystems is itself the main resource for productivity and innovation. This justifies the recent and increasing relocation of knowledge intensive companies to downtowns as they look for a return to centrality (Katz & Wagner, 2014).
3) **Smart cities:** digital technologies don't only impact individuals: they are progressively integrated within administrative organizations for urban policies and design. That means civics demands are increasingly supplied by digital solutions and tools, making the urban public sphere "digitally augmented" (Picon, 2015, p. 95).

In this context, a paradox emerges: if work distribution is increasingly controlled by digital technologies, this is not producing place annihilation but rather local intensification. On one side, office typologies and their large urban agglomerations still appear to be unsustainable (Duffy, 2008); on the other, the city is definitively not a place to escape from for knowledge industries and knowledge-work practices, even in their mobile condition. For this reason, understanding the role of digital media requires understanding workplace as "behaviour settings" instead of only as a location in space (Barker, 1990): in the condition of digital work, as B. Jordan points out (2005, p. 3), workplaces can be understood as "workscapes": subjective experiences or "histories" related to diverse environments which exceed the office space. The methodological contribution of this paper deals with how and why to make digital "workplace culture" visible, [2] building knowledge for a data-driven urban design strategy within the European context. I do this by comparing georeferenced Twitter data analysis with GIS spatial data for three European global cities: Amsterdam, London, and Paris.

The use of social media location-based services, more than giving objective evidence of work-related practices in space, provides insights into how "collective projections" or desires map over space. This is coherent with the purpose of understanding a workplace not only as a mere space but as a behaviour setting at the urban scale, showing work as a cultural practice. If space has lost its capacity to control the production chain, which is currently absorbed by digital media, then the demand for a centralization of work activities depends on relational and cultural needs. The informal nature of mobile work reveals a strong demand for the city not sufficiently met in terms of a structural rethinking of urban spaces.

2. Approaches to urban form, digitalization and innovation districts

Research literature has approached workplace digitalization from several perspectives: the largest contributions in this field are from ethnography, sociology, and management theories that consider workplace as a set of human relations and media. [3] As this paper is concerned with design issues, it will refer to those recent contributions in which workplace is intended as a complex agglomeration of human organizations, behaviours, media, and material spaces. While recent architectural discourse about collaborative or home-office spaces has addressed these factors, to my knowledge, urban design implications have not been raised. This contribution becomes crucial as "communication at work constructs our working spaces and our working environment" (Roth-Ebner, 2015, p. 1), and communication space exceeds the limits of enclosed, private architectures. Meanwhile, aspects such as innovation, information communication technologies (ICT), and knowledge districts have been widely related to the notion of urban form.

2.1. Information technologies and urban form

One of the first major studies which relates communication theory to urban organization is R. Meier's *A Communication Theory of Urban Growth* (1962), which describes how knowledge, communications, and interactions promote agglomeration processes. According to M. Webber's (1964) previsions, this implies not only physical changes such as movement but also effects on "patterns of mind". Webber observed the need to shift the urban design discussion from the conception of "place" to "connectivity", seeing the city as a web of interactions and witnessing a progressive intersection between planning and social sciences. His work has been crucial for more recent literature focusing on

[2] This term "workplace culture" counterposes the idea of a "workplace" as a mere space with a "workplace" as a set of meanings.

[3] This concept of workplace has been widely studied by Jordan (2008) and more specifically for the European case by Gareis, Lilischkis, and Mentrup (2006). From a theoretical perspective "mediatized work" (Roth-Ebner, 2015, pp. 1–2) has also been defined by Wimmer and Hartmann (2015).

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