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Anticiper les effets de la digitalisation sur l'emploi dans le secteur du tourisme dans la Région de Bruxelles-Capitale

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AUTHOR'S NOTE

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Introduction

1 Digitalisation has increasingly become a major political, managerial and individual concern [WEF, 2020]. This is also the case in the Brussels-Capital Region (BCR) with a research call issued by Innoviris on this matter in 2018. This paper provides insights into some of the results of a larger prospective research project which contributed to this call. The project – named Cap-SMART – was carried out between 2018 and 2023; it examined how digitalisation was likely to affect tourism employment in the Brussels tourist area (BTA) by 2030[1]. As defined from the perspective of tourism studies, digitalisation refers to the leverage of digital technologies and data in the transformation of businesses, production processes and markets [Dredge *et al.*, 2018]. As such, it is expected to introduce major changes in the business environment and employment within the BTA.

2 The case of the BTA was – and still is – particularly relevant in terms of research on the topic, as there were no data available before Cap-SMART. Yet, the Region has been supporting tourism development due to its employment opportunities (3 % of total employment[2]), in particular those aimed at low-skilled workers. Moreover, BCR and its destination management organisation (DMO) have been committed to developing and promoting a "smart" city/tourist destination endeavour in recent years [Bocquet, 2014; visit.brussels, 2019].

3 Section 1 provides an overview of the literature pertaining to the quantitative and qualitative effects of digitalisation on tourism-related employment. Sections 2 and 3 outline the conceptual framework adopted in the study and the methods used for collecting and analysing data. Section 4 sheds light on the key results of the study. The last section presents a reflection on the results and underlines study limitations and avenues for future research.

1. Literature review

4 Digitalisation is a multifaceted phenomenon. It encompasses the digital innovation of products (e.g. immersive tourist experiences) and processes (e.g. digital communication and data-driven management), as well as automation (e.g. tasks hitherto performed by humans are carried out thanks to software solutions or robots, for instance using self-check-in kiosks) [COE, 2017]. All these phenomena affect employment and work, and it is believed that the effects will increase even more in the near future [COE, 2017]. Yet, extant knowledge on the tourism sector remains scarce and highly fragmented, with only a few studies mainly published after 2018. Effects on employment and work have been addressed more thoroughly in other economic sectors from different disciplinary perspectives (economics, sociology, psychology and ergonomics), both quantitatively and qualitatively.

1.1. Quantitative approaches

5 Quantitative studies either focus on the number of jobs which are at risk of being lost due to automation or on the number of jobs which are created with technological innovation. None of those studies are specific to the tourism industry. This section is based on studies of the first category which can be of interest in the tourism sector. A key study in this approach is the one by Frey and Osborne concerning the USA, which was first published in 2013 [Frey and Osborne, 2017]. Their method was then used in many other reports, including those by Bowles [2014] about Europe, by ING [2015] about Belgium and by Albessart *et al.* [2017] about Wallonia.

6 Frey and Osborne's method consisted in estimating the probability of "computerisation", i.e. automation due to computer-controlled equipment, for more than 700 occupations, whose tasks are detailed in the O*NET job description database (https://www.onetonline.org). Their model drew on the task model of Autor *et al.* [2003], which was revisited to reflect advances in technological development. In short, Frey and Osborne's model postulated that: (a) computers are more substitutable for human labour in routine relative to non-routine tasks; (b) and in a wide range of tasks considered hitherto as non-routine and which are no longer subject to engineering bottlenecks; (c) "a greater intensity of routine inputs increases the marginal

productivity of non-routine inputs" [Frey and Osborne, 2017: 261]. The authors expected that tasks still facing bottlenecks at the time of their study (i.e. tasks requiring complex perception and manipulation, creative intelligence and/or social intelligence) would be simplified and restructured so as to enable their partial computerisation. In the tourism industry, cleaning could be an example of how some of the bottlenecks have been alleviated whilst others remain. A hotel manager cited in Tuomi *et al.* [2020] explained that nowadays, robot cleaners do a perfect job of carrying out half the work humans used to do; humans are still needed for more complex work. This can be done by complex robots, but he felt that the results were not satisfactory enough for his hotel.

7 Based on these premises, Frey and Osborne [2017] estimated that 47 % of all jobs in the US are in the high-risk category, meaning that they were "potentially automatable over some unspecified number of years, perhaps a decade or two" [ibid.: 265]. Some occupations for the tourism industry were listed in this category: "Hotel, motel and resort desk clerks"; "First-line supervisors of housekeeping workers"; "waiters and waitresses". "Housekeeping cleaners" were listed as a medium-risk occupation, and "chefs and head cooks" and managers as low-risk occupations. Using the same method, Albessart *et al.* estimated that 31,3 % of jobs in the hospitality and food and beverage sector and 30,1 % of jobs in the creative and recreative sector were at high risk of automation in Wallonia [Albessart *et al.*, 2017: 47].

8 It is worth noting that Frey and Osborne's [2017] estimation is one of a risk of being automatable and not a risk of being automatised. Estimates of the latter are much lower, i.e. around 10% [Arntz et al., 2016; COE, 2017]. Factors of automation include the way tasks are actually implemented, workplace heterogeneity, restructuring modes of non-automatised tasks [COE, 2017], automation history [Arntz *et al.*, 2016], and the degree and pace at which new technologies are adopted [Valenduc & Vendramin, 2016]. Technological adoption depends on factors pertaining to the technological, organisational and environmental contexts [DePietro, Wiarda and Fleisher, 1990]. With respect to tourism, attention needs to be drawn to SMEs and not growth-oriented businesses. The literature indicates that most SMEs do not adopt technologies like larger companies do [Albessart *et al.*, 2017]. Non-profit organisations and lifestyle entrepreneurs are not documented; it could be surmised that they are less interested in productivity gains associated with automation.

1.2. Qualitative approaches

9 Qualitative studies centre on how digitalisation affects jobs, the tasks attributed to them and the skills they will require. This section focuses on extant knowledge in tourism studies; the research carried out in other domains is significant but the results are sector-specific [COE, 2017]. In tourism studies, only a couple of publications were available at the time of research.

10 Ivanov [2020], Tuomi *et al.* [2020] and NTG [2019b] highlight that labour shortage is a main driver for automation in the tourism industry. The shortage is expected to worsen in developed economies due to low birth rates and the growth of the industry [Ivanov, 2020]. Entry-level positions are most at risk of automation (e.g. receptionists, sales agents, cooks, waiters, room service and food delivery staff, cashiers, accountants, drivers, cleaners, gardeners, etc.) [Ivanov, 2020], but persisting technological

limitations do not allow full automation. Presently, highly automated tourism organisations focus their endeavours on defining automatable processes for optimum human-machine cooperation. Humans must intervene for transactional and procedural tasks for which technologies cannot achieve full performance levels. They are also given interpersonal tasks considered for their potential to create value [Tuomi *et al.*, 2020]. New job opportunities are created with digitalisation; they consist in supervising the work done by technologies (e.g. a fleet of robots), data analysis and technology maintenance and engineering [Tuomi *et al.*, 2020]. Positions with advanced digital skills are mainly expected to be outsourced [Ivanov, 2020; NTG, 2019b].

11 As most occupations will change considerably in nature [COE, 2017; Ivanov, 2020], new skills – and potentially new profiles – will be required. Based on a mixed-method and multi-country study, NTG [2019c] found that only basic digital skills would be required for entry-level positions in hotels, attractions and museums. Basic skills should make it easy for workers to take part in training for the specific technologies in use in the organisations. Higher requirements would concern cross-cutting professional and personal competencies, including both face-to-face and digital communication, commercial, interpersonal and intercultural skills (e.g. languages). Staff would be asked to be flexible, centring on tasks which are not performed by computers or robots. Staff would also be expected to network and work in teams [NTG, 2019a]. Employees in DMOs would have to specialise in knowledge management and innovation, and in relation and/or project management [NTG, 2019b].

12 The extant literature highlights a need for a holistic approach to the evolution of employment and work resulting from digitalisation. Variables are situated at different levels. The high complexity of the phenomenon makes it context-specific, both in terms of industries and societies. Each industry has its own specificities pertaining to the technologies and the tasks to be fulfilled by different occupations. The way tasks can be restructured for computerisation may vary depending on the variety of occupations in a company and its use of technology. The cultural, social and political environment also plays a role as it facilitates, impedes and shapes the development and adoption of technology. Yet until then, such a holistic system approach had remained conceptual [Ivanov and Webster, 2019]; it had never been applied empirically in tourism studies prior to Cap-SMART.

2. Conceptual framework

13 The model by Ma and Hassink [2013] was found to be a relevant conceptual framework to start with. Its system approach is in line with Godet's [2007] reference work in prospective research. It centres on a tourist destination, and its evolutionary perspective highlights the (inter)relationships between the variables at play. The model was adapted as in figure 1: the variables associated with digitalisation were included, and clearer distinctions were made between variables specific to the tourist destination system and the external variable on which it has no or limited control.

14 The framework distinguishes three categories of variables: institutions, structure and production. Production consists in what is generated by the tourism system of the destination, mainly in terms of services, products and the outcomes of consumption (e.g. guided tours and the knowledge and satisfaction they provide to visitors). This category is not the focus of this paper. The "structure" category pertains to the sector,

including tourism-related public and private stakeholders. This category of variables was examined using two levels of analysis: the organisational level concerns what happens in companies or organisations (e.g. types of technologies adopted in a hotel and for which tasks); the structural level relates to system components and patterns (e.g. providers of new tourism technologies entering the tourism system; types of relationships they have with other tourism stakeholders in terms of power or the competition they created between small and large tourism providers). The "institution" category encompasses formal and informal collective representations, i.e. mutual knowledge, beliefs, values, symbols, ideas and expectations of members of a society [Stones, 2007] (e.g. optimistic versus pessimistic social representations towards technological evolutions; regulations which support or hinder the development and adoption of technology). Drawing on Ma and Hassink's [2013] work, micro, macro and co-evolution mechanisms are suspected within the three categories, shaping the evolution of the destination system as a whole.

3. Method

15 The model guided Cap-SMART's data collection and first-stage analysis, whose core results are presented in this paper. A qualitative and exploratory approach was found to be most appropriate considering the state of the art and the current focus of research on mechanisms which drive changes. Moreover, a quantification of jobs at risk was limited by the complexity of both digitalisation and the tourism industry, as well as by the limited granularity of statistics available on BTA tourism employment and the adoption of digital technology (produced by Statbel). Furthermore, it was not an option to apply the figures provided in the literature to certain sub-sectors due to their context dependency [Arntz *et al*., 2016]. Additionally, most recent statistics on tourism employment dated back to 2019, which was a problem for extrapolation considering the significant effects of the Covid-19 crisis on tourism labour [Grefe, 2022].

16 The data used in this paper were collected between June 2019 and September 2022, prior the public launch of ChatGPT. A total of 63 semi-structured interviews were conducted by six interviewers, either face-to-face or via video conferences. Participants included tourism providers (top or first-line managers) and workers, key informants from public or private professional associations, tourism education providers, trade unions and a chatbot developer. Three sub-sectors were included in the research: hospitality, visitor attractions including museums, and professional conference organisations. Interviews were 60 to 90 minutes long. The interviews varied in their content depending on the domain and position of the interviewees: technology adoption, employment, destination management, education and training. All interview guides covered the three levels of analysis: organisational, structural and institutional. Participants were asked about: their experience in the organisation they work for; their perceptions of structural changes in their sub-sector; their beliefs regarding digitalisation; and their perceptions of how BTA-related institutions adapt to digitalisation. Additional data were collected by analysing reports produced by stakeholders and during specifically dedicated workshops organised by Cap-SMART with one representative from each of the different categories of tourism stakeholders (small and large hotel firms, cultural attractions, destination management, education

and training). Data analysis involved a thematic technique based on the conceptual model[3].

17 A number of limitations need to be highlighted. The data reflect the perceptions of participants and what they are willing to share with the researchers. Participants demonstrated a sound level of awareness of digitalisation, but differed in their levels of knowledge and experience regarding digital technologies in tourism. Techno-pessimistic views were less represented in the sample of tourism providers. The data collected from different interest groups was cross-analysed in an attempt to mitigate possible biases. The short format of this paper does not allow the subtleties across sub-sectors and types of organisation to be addressed.

4. Results

18 This section structures data according to key themes pertaining to interactions and co-evolution in the BTA system. The themes shed light on system trajectories likely to shape transformations of BTA tourism employment and work driven by digitalisation in the near future. Interview participants who have been quoted are situated in the BTA system using the codes in Table 1. The quotations were translated from French by the authors.

Table 1. Codes used in quotations

Sector	**Position of the interviewee**
Accommodation: Acc	Manager or director: M
Event management: Ev	Other worker: W
Provision of guided tours: Gt	
Trade union: Tu	

4.1. The effects of institutions and structures on the adoption of digital technologies

19 A close look into the current structure of the tourism system reveals that most BTA tourism stakeholders play by the rules of digital players who occupy a dominant position in the system. This is particularly true for the hospitality sector. Most often, tourism stakeholders feel they do not have options other than digitalisation if they want their company to survive. They also underline the role of the customers, who are often described as expecting and valuing digital services and experiences.

> (...) all customers below 50 are very pleased, and all leisure customers are very pleased. The business customers above 55 who are frequent travellers ask, “Why are you bothering me with your smartphones?”, but all of this will go away as time goes by [Acc1M, Nov. 2019].

20 This must be considered in relation to relocations of power within the tourism system following the advent of digital intermediaries, and more specifically a handful of

market places with sizeable market shares, including online travel agencies (e.g. Booking; Expedia) and customer to customer (C2C) platforms (e.g. Airbnb, Vrbo, etc.). These have exacerbated competition over the last decade. By enabling tourists to easily compare offerings from a vast number of providers, they have not only empowered customers but also made themselves leaders in the distribution of tourism services. C2C platforms have also contributed to a considerable growth of supply as well as disloyal competition as services provided by private individuals are not subject to the same legal requirements and easily operate off-the-radar. In such context, tourism providers and DMOs seek to differentiate themselves from their competitors, mainly by acting on prices, market fit, perceived quality of services, (e-)notoriety and (e-)reputation, etc. All these levers now tend to be perceived as digital dependent by tourism stakeholders.

21 Another extremely powerful player in the system is Google Inc. Its power lies in its omnipresence in the system. Google – just like other social media – is a virtual place in which destinations and tourism supply are promoted and easily compared by tourists. Even though the newly released ChatGPT might compete with the Google metasearch engine, it is very likely that tourists, tourism organisations, destinations and tourism intermediaries remain dependent on Google Inc. given the quantity of digital data it has gathered over the years, its stakes in the tourism industry and its expertise and investment capacity in artificial intelligence (e.g. Gemini). In the face of such dependency on digital players, all BTA stakeholders interviewed regarded digitalisation as their only option.

22 This perception of digitalisation is also found in wider systems. For instance, with its "build (...) a Europe fit for the digital age"[4], the European Commission conveys the idea that digitalisation is an end in itself, a new era which humans have no other option than to adapt to. As reflected in the name of the DG (DG GROW, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs), this perception of digitalisation is rooted in a growth-oriented paradigm centred on economics. Recent European policies and guidance documents pertaining to digitalisation (e.g. RGPD, Digital Services Act, Digital Market Act, Transition pathway for tourism 2022) indicate that the growth and competitiveness of the EU tourism industry represent the foundation of stakeholders' support for digitalisation.

23 Similarly, most tourism providers interviewed associated digitalisation with modernity, experiential and economic value creation, productivity gains and competitiveness. Very often, the BTA was referred to by tourism providers and representatives of the public authorities as being "behind" other destinations they considered as benchmarks, e.g. London or Amsterdam.

> (...) in the BTA, we are far behind in terms of tech. If you go to Amsterdam, many [hotels] are part of this new generation. Here, things are very slow [Acc2M, Nov. 2019].

24 This reference to a "lag" calls to mind the general line taken by technology providers and lobbies which often use the expression when promoting technology adoption and infrastructure development. This line is also often taken by the media and by politicians. As they believe they are behind others, stakeholders feel in the pressure to adopt digitalisation, and to follow the lead of other destinations. In doing so, they might neglect other possibilities.

25 This does not mean that the data did not reflect any tension. On the one hand, some tourism providers felt that the authorities played a facilitating role. They perceived

regulation (e.g. RGPD) as an obstacle to a competitive BTA and European tourism industry compared with other tourism areas in the USA and Asia. On the other hand, one cultural tourism provider noted that the market positioning of Brussels would never be on the cutting edge of digital technologies; it is about conviviality. “If we lose this [conviviality], what’s left?” (Ev1, Oct. 2022). Three other tourism providers – representing all three tourism sub-sectors – shared their thoughts on the energy consumption of digital technologies and the dearth of information on the matter [Acc3M, Ev2M, GT1M, Apr. 2022]. These effects, however, were not highlighted as having a decisive influence on the adoption of technologies, but rather as being issues which should also be taken into account.

26 As highlighted above, the prevailing – not to say dominant – institutional and structural properties exist beyond the BTA at the level of the wider tourism and non-tourism systems. The wider systems interact with BTA stakeholders and influence how they act. The position of the big tech companies in these wider systems has helped spread the idea that digitalisation is a new era which the BTA belongs to, i.e. a long-term trend in the evolution of a destination. This could explain why most research participants regarded digitalisation as highly strategic over the next years, but did not know which technology they would invest in as a priority in three to five years. As competitiveness, productivity and customer experience drive the adoption of technologies, this path will affect tourism work in the near future and will most likely continue to do so.

4.2. Co-evolution of the adoption of technologies and employment

27 Research participants acknowledged the different ways the adoption of digital technologies affects employment and work. These effects are similar to those highlighted in the literature. As regards job numbers, attention needs to be drawn to the evolution of employment ratios in the tourism sector over the last years. Statistics for the hotel industry show a decline in employment ratios since 2010, prior the advent of advanced technologies. The number of employees per 10 000 bed nights fell from 11 in 2010 to 8 in 2018, implying that fewer workers were employed to deliver the service to the same number of guest nights. In 2010, 17 employees worked for every 100 hotel beds; this number was 14 in 2018[5], which suggests that fewer workers were employed for the same bed capacity. Together these ratios show that the evolution of the total number of employees in BTA hotels is not explained by the evolution of guest nights or bed capacity[6]. The interviews indicate that digitalisation is used in organisations to serve this underlying trend. For instance, hotel groups were able to entrust their revenue and/or hotel managers with more establishments. A major motive expressed by interview participants was labour costs, which they found particularly high in Brussels. Recruitment challenges which had worsened with the Covid-19 crisis were also mentioned. As with NTG [2019], digitalisation was perceived as enabling hotels to reduce costs for tasks which are automatable and reduce their exposure to labour shortage.

28 Similar observations were made with regard to the organisation of professional congresses. Although, in this sub-sector, the conjunction of the Covid-19 crisis and digitalisation also introduced a major structural change: the development of online congresses, allowing fully virtual organisers to penetrate the market and inciting

traditional congress organisers to increase their digitalisation, as well as restructure their services in some cases, e.g. by removing hotel booking services.

> Generally speaking, there are fewer employees than before, especially regarding the management of registrations: from 12 employees to 3 employees. [Ev2M, 26 May 2020]

29 In both sub-sectors, a decrease in job numbers is to be expected in the near future, at least in occupations which are at risk of automation. Most workshop participants acknowledged this trend but expected that this decrease would be offset by growth in the industry.

30 With respect to job contents, the adoption of technologies had introduced changes mostly in terms of tasks: employees used technologies but their roles remained more or less similar to what they were before. Changes in terms of types of occupation were limited, and no occupation had been removed completely. In order to be fully understood, this result needs to be considered together with the fact that the technologies under scrutiny in Cap-SMART had not reached their automation potential; they still had to be trained by the staff.

31 One occupation which has been highly exposed to digitalisation for some time is that of receptionist, in all three sub-sectors. The occupation still exists but its nature is changing, and this is reflected in the way the position has been renamed with terms such as “welcomer”, “creative”, “talent”, “host front manager” [Flandrin, 2023]. The aim is to decrease the time spent by receptionists on administrative tasks – which is viewed as unproductive. In the hotel industry, the time spared can therefore be used either in more elaborate commercial and interpersonal tasks – the latter being perceived positively by the receptionists interviewed – or in adding new functions to the job. The latter option seems to prevail in economy and midscale brands as well as in SMEs [Flandrin, 2023].

> The occupation will not disappear because a person is needed. But employment and working hours cost a lot in Belgium, therefore it has to be maximised and people need to become multifunctional [Acc2W, 2022].

32 New roles also require new skills to be acquired by the staff. As seen in the literature, the skills expected by the managers interviewed were not circumscribed to digital technologies. On-the-job training in digital technologies was provided to new staff, which corroborates the idea that entry positions will require basic technological skills [NTG 2019c]. In contrast to the NTG results [2019a], the manager of a small-scale hotel considered that digital technologies meant that receptionists did not need to have advanced knowledge of the destination.

> (...) it would take months to get to know all of the tips about Brussels and so on. Digital tools can help us share our favourite tips with our guests. (...) All I ask is that they have at least some knowledge, but empathy is more important to me, such as how they react to a complaint and so on [Acc2M, 2022].

33 Data-driven management took place in most of the tourism organisations which participated in the study. There was no mention of its use for rationalising work, but there was evidence of its use for assessing the work done and supervising workers: checking “online” status and location of workers (e.g. housekeepers) and monitoring the completion of digital checklists or the time spent to respond to a digital request [Flandrin, 2023]. According to Flandrin [2023], digital tools also enabled remote management and multi-site working, e.g. for receptionists. Remote management is useful in situations when workers need help to solve a problem, but it also entails

psychosocial risks for workers when it leads to feelings of isolation and reduced support and socialisation at work. Multi-site working was perceived by receptionists as not being consistent with their interpersonal role and the personalised experience they are expected to offer to loyal guests.

4.3. Co-evolution of tourism employment and related structures and institutions

34 Changes in skills requirements and working conditions affect tourism employment-related structures and institutions. As these show signs of adaptation, they also face resistance from the structures and institutions in place. The cases of education and trade unions are illustrative examples. The education providers interviewed stressed the need to adapt the material which is taught. However, they also questioned their capacity to do so and had concerns related to two sets of skills: (1) those specific to new and forthcoming digital tools; (2) and cross-cutting skills aimed at supervising the work of digital technologies and enhancing the "human touch" so as to create value for tourism organisations (i.e. cognitive, communication and interpersonal skills).

35 The high number of tools used in tourism organisations and the pace of technological development are a real challenge. A limited amount of reliable information is readily available to those who have to decide which technologies will be taught. Constraints in terms of finances and competence limit access to the most recent technologies. Moreover, participants who had teaching experience with digital tools noted that students have a high level of difficulty when it comes to using digital technologies in professional contexts. Issues are related to cross-cutting skills and logical and mathematical thinking in particular. In addition, education providers stressed that a majority of their students struggle with advanced communication skills (e.g. languages, including their mother tongue) and interpersonal skills (e.g. empathy). These issues raise questions regarding the profiles of students who are currently drawn to a career in tourism and the profiles which will soon be required in tourism organisations. This will not be solved by adapting teaching programmes alone; structural (e.g. salaries, working conditions, work-life balance) and institutional (e.g. beliefs about careers) factors also play a part in attracting students.

36 Structural and institutional barriers also hinder the adaptation of tourism education. Firstly, education is not within the competences of the Region, implying that some convergence must exist between political entities, which might have different priorities and views. Secondly, the multi-layered nature of the education system in BCR has created a sense of competition between schools and a major impediment to collaboration and synergies. Although research participants highlighted a need to share resources (e.g. knowledge, professional network, tools, etc.) between schools, this is hampered by competition and mostly relies on collaboration between teachers.

37 Working conditions are altered with the digitalisation of the tourism industry. Trade unions and employers are involved in negotiations over new norms; these relate to the health and safety of workers, work contracts and people management. Although the managers interviewed gave priority to their guests' experience and productivity over their employees' well-being, they were not totally insensitive to ergonomic issues. However, it can be surmised that technologies which could be highly beneficial for customers and for the business were adopted even though their use was detrimental

for the staff. This raises questions given that most tourism organisations are SMEs with no union representative.

38 New norms are also being negotiated regarding several aspects of work relationships. Trade unions advocate the adaptation of the current collective salary scale in the hospitality sector given the increased level of skills (soon to be) required for some occupations. Data-driven management, teleworking and the development of C2C business models have led to new ways of working and contracting as well as a resurgence of precariousness in some work relationships (Tu1, Sept 2022). The BTA system adapts itself to these wider trends, but data do not allow a full assessment of how this adaptation takes place.

5. Conclusion

39 With an approach inspired by Ma and Hassink's [2013] model of tourism destination evolution, this paper has aimed to develop knowledge on how digitalisation is likely to affect tourism employment and work in the BTA in the near future. The study results highlight that the adoption of technologies reflects changes which have taken place in the wider systems which the BTA system interacts with. This is shown by tourism stakeholders criticising the BTA for being "behind" other tourist destinations or referring to non-tourism specific wider systems in the USA and Asia. The study also pinpointed co-evolution dynamics, notably between the adoption of digital technologies and employment structures (multisite, flexibility) and institutions (skills valued) as well as between those changes and the intentions and undertakings of tourism education providers and trade unions. Co-evolution is a systemic process in which structural and power dynamics between stakeholders play a role. This suggests that changes in BTA tourism employment will be influenced by these tensions in the system, making it harder to anticipate precisely how digitalisation will influence employment and work in the future.

40 The study results also suggest that co-evolution and interaction phenomena only partially occur at the level of the destination. Some of the results indicate sectoral and organisational dynamics. For instance, there was evidence that managerial decisions on how time spared with automation is or will be used depend on the type of occupation, brand positioning, organisation size, and sub-sector. This points to the high level of complexity of the tourism industry, and to a limitation in the holistic approach used in the study. A sectoral or occupational approach which takes the aforementioned variables into account could be more accurate in anticipating future changes.

41 Concerning the future perspectives of tourism employment in the BTA, it can be inferred from the study that in organisations for which competition is based on productivity gains (e.g. 1 to 4-star hotels), tasks will be redistributed between computers and humans. Humans will have to generate more value for money than ever before and to adapt their skills continuously to business imperatives and to what computers can do more efficiently. Like Tuomi et al. [2020], the study shows that organisations are testing new work adjustments, making it hard to anticipate how occupations will change in terms of their content. System structures and institutions which prevail in the BTA will tend not to prevent these changes but to mitigate them, for instance with pressure from trade unions and/or regulation. Together with health and safety, wages are part of ongoing negotiations. Wages – and the willingness of

tourism organisations to pay for the newly required skills and work conditions – are a key issue which was not investigated in the study. This could be another insightful avenue for research.

42 Another key issue concerns the economic-centred paradigm which characterises the mode of reasoning of most stakeholders in the BTA and the wider systems. Digitalisation is essentially portrayed in dominant growth-driven approaches as urgent, inescapable and progressive. This paradigm leads most stakeholders to treat digitalisation and sustainability separately and through the prism of economic objectives. When both are addressed together as in the EU Transition Pathway for Tourism 2022, digitalisation tends to be examined only for its contribution to sustainability. Yet both digital technologies and tourism contribute significantly to greenhouse gas emissions and other planetary challenges. Some study participants requested more knowledge in this area. We therefore also advocate for more research on the digitalisation and sustainability nexus in tourism studies.

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BIBLIOGRAPHY

ALBESSART, Caroline, CALAY, Vincent, GUYOT, Jean-Luc, MARFOUK, Abdeslam and VERSCHUEREN, Frédéric, 2017. *La digitalisation de l'économie wallonne: une lecture prospective et stratégique*, Namur: Iweps.

ARNTZ, Melanie, GREGORY, Terry and ZIERAHN, Ulrik. 2016. *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*, OECD Social, Employment and Migration Working Papers, n°189.

AUTOR, David H., LEVY Frank and MURMANE, Richard J., 2003. The skill content of recent technological change: an empirical exploration, *The Quarterly Journal of Economics*, 188(8), pp. 1279-1333.

BOCQUET, Nicolas, 2021. La Smart city à Bruxelles: Quand « intelligence » rime avec vidéosurveillance. In: *Brussels Studies*, no 159, https://doi.org/10.4000/brussels.5655.

BOWLES, Jeremy, 2014. *The computerization of European Jobs*. Brussels: Bruegel think tank.

CONSEIL D'ORIENTATION POUR L'EMPLOI – COE, 2017. *Automatisation, numérisation et emploi*. 3 tomes, Paris: COE.

CZARNITZKI, Dirk, FERNÁNDEZ, Gastón P. and RAMMER, Christian, 2023. Artificial intelligence and firm-level productivity. In: *Journal of Economic Behavior & Organization*, 211: 188-205.

DEPIETRO, R., WIARDA, E. and FLEISCHER, M., 1990. The context for change: Organization, technology and environment". In: TORNATZKY, L. G. and FLEISCHER, M. (dir.) *The processes of technological innovation*, Lexington Books: Lexington, MA., pp. 151-175.

DG GROW (online). Internal Market, Industry, Entrepreneurship and SMEs. In: *European Commission*. [Retrieved on February 28 2023] from: https://commission.europa.eu/about-

european-commission/departments-and-executive-agencies/internal-market-industry-entrepreneurship-and-smes_en

DREDGE, Diane, PHI, Giang, MAHADEVAN, Renuka, MEEHAN, Eóin and POPESCU, Elena Silvia, 2018. *Digitalisation in tourism. In-depth analysis of challenges and opportunities. European Commission's Executive Agency for Small and Medium-sized Enterprises (EASME),* Virtual Tourism Observatory, Aalborg Univeristy, Copenhagen, Low value procedure GRO-SME-17-C-091-A.

FLANDRIN, Pierre, 2023. *Digitalisation dans le tourisme 4.0. L'approche du changement technologique et des transformations de la relation de service par l'étude des régulations et des marges de manœuvre.* Thèse de doctorat réalisée dans le cadre de Cap-SMART, Université libre de Bruxelles, unpublished.

FREY, Carl Benedickt and OSBORNE, Michael A., 2017. The future of employment: how susceptible are jobs to computerisation? In: *Technological Forecasting & Social Change*, 114, pp. 254–280.

GODET, Michel, 2007. *Manuel de prospective stratégique. Tome 2. L'art et la méthode.* 3ème édition, Paris: Dunod.

GREFE, Gwenaëlle, 2022. L'hôtellerie au tournant. De la tentation d'innover à toutes les échelles… à l'urgence d'inventer une GRH sectorielle. In: *Espaces*, octobre 2022.

ING, 2015. *La révolution technologique en Belgique*, Brussels: ING Focus-Emploi.

IVANOV, Stanislav, 2020. The impact of automation of tourism and hospitality jobs. In: *Information Technology & Tourism*, 22, pp. 205-215

MA, Milan and HASSINK, Robert, 2013. An evolutionary perspective on tourism area development. In: *Annals of Tourism Research*, 41, pp. 89-109.

NTG, 2019a. *Next Tourism Generation Alliance*. Survey reports, May 2019. [Retrieved on February 28, 2023] from: https://nexttourismgeneration.eu/research/

NTG, 2019b. *Next Tourism Generation Alliance*. Interview Report. The Netherlands, May 2019. [Retrieved on February 28, 2023] from: https://nexttourismgeneration.eu/research/

NTG, 2019c. *Next Tourism Generation Alliance*. Interview Report. Germany, May 2019. [Retrieved on February 28 2023] from: https://nexttourismgeneration.eu/research/

SAARINEN, Jarkko, 2004. « Destinations in change »: The transformation process of tourist destinations. In: *Tourist Studies*, 4, 161-179. Doi: 10.1177/146879760405381.

SAARINEN, Jarkko and KASK, Tiit, 2008. Transforming tourism spaces in changing socio-political contexts: the case of Pärnu, Estonia, as a tourist destination. In: *Tourism Geographies*, 10(4), 452-473.

STONES, Rob, 2007. Structure and agency. In: RITZER, George (ed.), *The Blackwell Encyclopedia of Sociology* (pp. 4861-4864), Malden, MA: Blackwell Publishing.

TUOMI, Aarni, TUSSYADIAH, Iis, CHAO LING, Erin, MILLER, Graham and LEE, Geunhee, 2020. X = (tourism work) y = (sdg8) while y = true: automate(x). In: *Annals of Tourism research*, 84: 102978. Doi: doi.org/10.1016/j.annals.2020.102978.

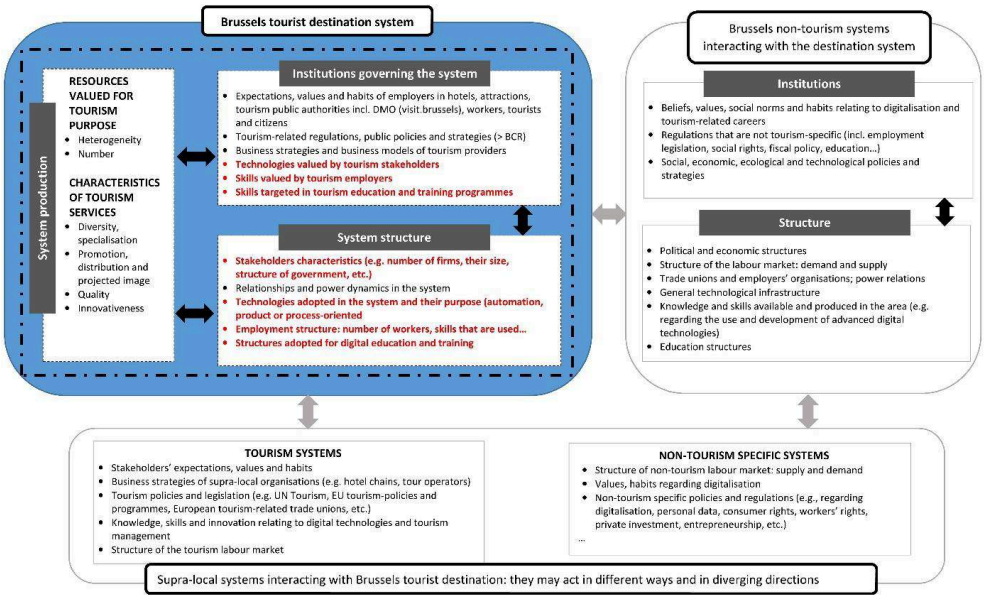
VISIT.BRUSSELS, 2019. Plan d'action 2019.

VALENDUC, Gérard and VENDRAMIN, Patricia, 2016. *Le travail dans l'économie digitale: continuités et rupture*, Working paper 2016.03, Bruxelles, éditions ETUI.

WORLD ECONOMIC FORUM – WEF, 2018. *The future of jobs report 2018*, World economic forum: Geneva, Switzerland.

APPENDIXES

Figure 1. Conceptual framework of Cap-SMART project



Adapted in 2019 from [Ma and Hassink, 2013] to highlight variables which are presumably involved in relationships between digitalisation and employment.

The framework also distinguishes between variables which are tourism specific and those which are not, and between variables which are internal or external to the destination area.

NOTES

1. For the purpose of the study, the BTA was limited to the 19 municipalities of the Brussels-Capital Region. This administrative and pragmatic approach [Saarinen and Kask, 2008] was adopted as it was in line with the area covered by political decisions and statistics regarding tourism and employment. However, this approach fails to embrace a much more complex reality, being just one of several conceptual approaches to a tourist destination area [cf. Saarinen, 2004]. The 2030 horizon should be considered as an indication of a near future which researchers thought could be anticipated based on the attitudes and behaviours of stakeholders at the time of data collection.

2. All figures on tourism jobs in BCR were obtained from visit.brussels based on figures from the Observatoire bruxellois de l'emploi. Ratios were calculated by the authors based on tourism statistics from Statbel.

3. Themes were identified using an inter-subjective method (cross-researchers). No software was used.

4. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en, last retrieved October 2024.

5. Our own calculation based on statistics obtained from visit.brussels (see footnote 2 for further details).

6. Different factors could explain the decline in both ratios. Technology adoption is just one possible explanation. The externalisation of jobs could also have played a role. For instance, some hotels are known to have externalised cleaning to cleaning companies; the employees of the cleaning company are not on the payroll of the hotel, hence not in the hotel statistics.

ABSTRACTS

This paper adopts a systemic approach in order to explore how digitalisation is likely to affect tourism employment in the tourist area of Brussels by 2030. Based on desk research and semi-structured interviews with 63 tourism stakeholders, it highlights the social and economic embeddedness of rationalising and restructuring work in tourism organisations. Digitalisation is and will continue to be used in the industry to increase productivity. This involves reducing costs, including human resources. Elements supporting this view include: the mode of reasoning centred on economics of tourism providers regarding digitalisation, their dependence on digital intermediaries which occupy a dominant position in the system, digitalisation-induced competition, price sensitivity of customers and costs of the human workforce, which is considered particularly high in Brussels. The system structures and institutions in the Brussels-Capital Region adapt to this trend and mitigate some of the effects of changes. Social structures also hinder adaptation of the tourism system and (future) workers, for instance in terms of education.

La présente étude suit une approche systémique afin d'étudier les effets que la digitalisation pourrait avoir sur l'emploi dans le secteur du tourisme, d'ici à 2030, dans la destination touristique de Bruxelles. Sur la base d'une recherche documentaire et d'entretiens semi-structurés avec 63 acteurs du tourisme, il met en évidence l'ancrage social et économique de la rationalisation et de la restructuration du travail dans les organisations concernées. Le numérique est et continuera d'être utilisé dans ce secteur pour accroître la productivité. Il s'agit de réduire les coûts, notamment au niveau des ressources humaines. Les éléments à l'appui de ce point de vue sont les suivants : le mode de raisonnement centré sur les aspects économiques de la digitalisation pour les prestataires de services touristiques, leur dépendance à l'égard des intermédiaires numériques qui occupent une position dominante dans le système, la concurrence induite par la digitalisation, la sensibilité des clients aux prix et les coûts de la main-d'œuvre, considérés comme particulièrement élevés à Bruxelles. Dans la Région de Bruxelles-Capitale, les structures et institutions systémiques s'adaptent à cette tendance et atténuent certains effets des changements. Parallèlement, certaines structures sociales, au niveau de l'enseignement par exemple, entravent l'adaptation du système touristique et de ses (futurs) travailleurs.

In dit artikel hanteren we een systeembenadering om te onderzoeken hoe digitalisering de toeristische werkgelegenheid in het Brusselse toeristische gebied zou kunnen beïnvloeden tegen 2030. Op basis van deskresearch en semigestructureerde interviews met 63 actoren in de toeristische sector gaan we dieper in op de sociale en economische verankering van het stroomlijnen en herstructureren van het werk in toeristische organisaties. In de toeristische sector wordt digitalisering ingezet om de productiviteit te verhogen, en dat zal in de toekomst ook zo blijven. Op die manier kunnen kosten bespaard worden, zoals personeelskosten. Deze visie wordt ondersteund door een aantal factoren, zoals de economisch gestuurde manier waarop toeristische aanbieders naar digitalisering kijken, en het feit dat ze afhankelijk zijn van digitale tussenschakels die een dominante positie innemen in het systeem, maar ook de concurrentie die digitalisering teweegbrengt, de prijsgevoeligheid van de klanten en de kosten van menselijke werkkrachten, die in Brussel zeer hoog bevonden worden. De systeemstructuren en instellingen in het Brussels Hoofdstedelijk Gewest passen zich aan deze trend aan en verzachten bepaalde effecten van de veranderingen. Ook sociale structuren belemmeren de aanpassing van het

toeristische systeem en van (toekomstige) werknemers in deze sector, bijvoorbeeld op het vlak van onderwijs.

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