



SEAD

Sustainable Employment in the Age of Digitalisation: challenges, obstacles and opportunities

CONTRAT N° B2/191/P3/SEAD

Case reports for specific occupations: the case of middle managers

Chiara FOCACCI, Giseline RONDEAUX, François PICHAULT
HEC Liège, Université de Liège

Table of content

1. Preliminary information.....	2
1.1 Overall profile of respondents.....	2
1.2 Contextual information.....	2
2. Type of technology(ies) used.....	4
3. Changes / modifications of work.....	8
3.1 Changes in work content	8
3.2 Changes in working conditions	10
3.3 Changes in employment conditions	11
3.4 Changes in employment relations	12
3.5 Changes in the work organisation	13
4. Digital tools perceptions.....	14
5. Quality of working life	15
6. Conclusions.....	16
Appendix.....	18
Profile of respondents	18
Contextual information	18

1. Preliminary information

1.1 Overall profile of respondents

Overall, the managers at the companies selected for this case study are mostly men, while the seniority at their companies varies, ranging from a minimum of 1 year to a maximum of 34 years. There are a total of ten male managers and five female managers, excluding those with no information available. There are six managers with a seniority in the 10-15 years range, seven in the 1-6 years range, and three with a seniority between 16-25, and one with a seniority of over 30 years. Details for each company are provided in the Appendix.

1.2 Contextual information

We observe thirteen managers in the secondary sector and seven managers in the tertiary sector. Managers supervise their staff, distribute tasks, solve issues, schedule the plan for the working day, and sometimes take care of training. While managers' original tasks have survived digitalization, it seems that technologies have helped them in monitoring employees, on the one hand, and overseeing the progress of tasks and objectives, on the other. Through digital tools and tracking technologies, managing teams has become more efficient and transparent. Details for each profile are provided in the Appendix.

Sector of reference	Role	Age	Gender	Seniority in the company	Main tasks
Motor vehicle parts & manufacturing	Logistics middle manager	47	Male	15	Managing logistics & anything related to navigation; detecting problems; guaranteeing that instructions & responsibilities of staff (15 people) are clear
Motor vehicle parts & manufacturing	Mechanics middle manager	38	Female	6	Managing conflicts, holidays, teams, and problems (10 people).
Motor vehicle parts & manufacturing	Team leader in electronics	37	N/A	12	Overseeing the situation and the problems (7 teams; 37 people).
Roofs & frames	Project manager	N/A	N/A	25	Managing mailboxes, customers' orders, dispatches (7 people).
Production	Line manager	N/A	Female	1	Visiting client companies, organizing green maintenance, cleaning (6 people).

Production	Packing service manager	N/A	Female	12	Printing orders for employees, overseeing orders, and products in the warehouse.
Production	Wood manager	N/A	Male	2	N/A
Logistics	Night line operations manager	49	Male	18	Picking packages and sorting them to destination.
Frames & doors	Manager	N/A	Male	15	Making sure the team carries out their assigned tasks.
Tutoring	Account manager	N/A	Female	4.5	Managing questions from the staff, problems with clients, communication, and training of new employees.
Construction	Site manager	32	Male	5	Managing the budget and the contracts, as well as the sharing of information with the team.
Construction	Project manager	N/A	Female	5	Taking care of what projects will be carried out and orders.
Construction	Safety & quality manager	55	Male	12	Ensuring safety and quality (6 people).
Panels & wires	Manager	N/A	Male	N/A	Assessing the schematics, managing problems, making adjustments.
Retail & wholesaling	Manager	41	Male	6	Managing responsibilities for what is produced.
Bank & insurance services	Supervisor of operations	61	Male	10	Coordinating activities, ensuring financial stability and compliance with the rules.
Bank & insurance services	Bank insurance advisor	30	Male	N/A	Managing remote advice within the bank (35 people).
Bank & insurance services	Helpdesk manager	48	N/A	20	Managing the Helpdesk (50 people), organizing training.

Bank & insurance services	Responsible of operations	N/A	N/A	N/A	Checking/solving delivery/operational issues.
Bank & insurance services	Branch manager	59	N/A	34	Managing orders, ensuring respect of hygiene regulations, enforcing schedules.

2. Type of technology(ies) used

Overall, we observe a large number of automation technologies in all sectors analysed, whether these include machines or digital tools. Collaboration technologies also appear to be significant in number and type. With digitalization, tracking technologies are easier to implement, allowing for a more detailed monitoring of both products and people in the company. On the other hand, interaction technologies are not excessively present. While a degree of interaction is almost always required for automation and tracking technologies, whether to initiate them or solve problems, only one type of interaction technology is observed in our case study. This may indicate that human and automated work are still not carried out in a complementary way.

At a company for motor vehicle parts and manufacturing, technologies used are mainly for tracking. The logistics middle manager uses E-one, which allows to trace products and record their entry in the system, and Reflex to manage the stock in the warehouse. The mechanics middle manager mainly uses Zebras, which generates a label for the customer, and Guns, which 'is actually scanning the box with the kanban': this generates interaction with human and machine work. As regards automation, the electronics middle manager also mentions the CMMS (maintenance management by computer assistance) and the LMS, which instead is a tracking technology that monitors operator trainings.

In a roofs and frames company, technologies are mainly of automated nature as they automate tasks normally carried out by employees, including computations. The project manager explains, in the design team, they use a software that knows 'to determine that for a steel 3, there will be a radius of 3.52 and it will make the bend loss'. They also use a Digital Power Management System (DPMS) for optimized data mining. The fact that employees use the results computed by the technology ensures an interaction between human and machine work.

Speaking of collaboration technologies, for the line manager at a company specialized in production, 'the only thing [she has] to do for [her] monitor job is to check emails on [her] cell phone'. The wood manager explains that, with his team, they 'use information technologies on a daily basis such as the Outlook package, e-mail traffic with colleagues and calendars, and then [they] also use an ERP package', where you 'can actually track all the production information of the company', as well as Excel documents. As regards automation, the line manager mentions that they also introduced a 'conveyor belt for containers, for very large boxes of 20 kilos', while

the packing manager mentions machines used to pack products. Tracking technologies are also used consistently. The packing service line manager mentions 'two digitization systems, partly [for] timekeeping': this means that 'if there is a box here' in the workshop, they know that it is not in the warehouse. 'If you then move the box with the scan to the warehouse and physically bring it there, it will be there'.

At the logistics company the operations manager explains '[they] just introduced 185 new ring scanners' as a tracking technology. After shipments are scanned and put in a container, there is a sorting machine with 'various sensors that indicate its filling level'. 'At 50% occupancy, the machine will decide to let the turning packages pass'. This machine is also automated, as it can sort around '15,000 items per hour', depending 'on how fast the loader scans the package'. The scanning system also contributes to having a 'faster track and trace in the warehouse', see what and where 'it went wrong'. This eventually requires the intervention of the employee, making the technology interactive.

The manager of workers at the frames and doors company explains they use an app, still in development, which helps with planning and prioritizing which window needs to be done first. This is the only automation technology mentioned.

At the tutoring company they use Vectera, an 'online platform with which [they] actually organize [their] tutoring', as well as meetings. As a matter of fact, the platform 'is actually like Teams, but of course better because you can also work simultaneously with a whiteboard'. In addition to this collaboration technology, they also have automation. In particular, there is a filtering system as regards the selection of personnel needed for a specific course: 'if [subjects] are looking for a teacher or a match, this map is linked in our CRM system with [their] database, with [their] teachers that [they] have'. Training is also digitized through LucidChart, 'a tool for building flowcharts and workflows'. Finally, they have an estimation programme, 'a full overview page where [she] can also see the influx of students coming in, which [the responsible for this task] can sometimes use to predict growth a bit'.

At a construction company, the site manager explains they recently introduced automation with Cutter Plan and BlueBim, which are 'calculation and digital measurement tools based on a plan that allowed [them] to produce reports in Excel form' or 'in the form of a tracking plan' with colors indicating what has been measured and which allow 'to filter according to demand', 'to release the quantity [they] want of such a product'. They also use Aproplan (now replaced by LetsBuild), which allows to check 'if everything is in order more or less at the worksite' from a security perspective, as well as 'for self-checks when [they] have made good progress in the work'. It is extremely useful as it allows to identify remarks on a specific place, 'take a photo, a comment, draw a subcontractor'. In other words, this is a fully interactive technology. Traxeo, on the other hand, is a tracking technology used to 'for presences for construction sites'. There is a terminal 'that allows [them] to badge in every morning and if [they] are in order at the document level, the turnstile is released and [they] can pass'. The project manager also mentions SharePoint as regards collaboration technologies: this includes 'all the data' for organizational purposes, as well as 'all kinds of applications or programs that are used for invoicing, the evaluation of invoicing'.

The planner at a panels and wires company mentions two automation technologies. He explains that they first used a milling machine and then ‘went electronic’ because ‘you can get even more out of it’. They also introduced e-plan in parallel, which allows to connect structures of equal importance.

At a retail and wholesaling company, they introduced several collaboration technologies. ‘You have WhatsApp, Workplace, the specific Carrefour intranet, emails, Google chat and Workplace chat’, as well as ‘a smartphone without a SIM card inside’, so the manager. In general, it is the communication channels that significantly increased in number. According to the manager, digital tools have allowed to save time, understand ‘sales averages’, and settle orders much quickly.

At a company specialized in bank and insurance services, the responsible for bank insurance advisors mentions that they use communication technologies in their website, where clients ‘can ask questions via chat channels’, and digital technologies such as Tableau, where they ‘report everything’ and are able to ‘track every action from the moment the employee’s PC opens’. Training courses are also digital through webinars. Finally, they all have a smartphone and laptops to work from home. As regards tracking technologies, ‘electronic labels [also] represent a huge change for retail for stores, so there is no longer a discrepancy between the price at the checkout and the receipts’, so the responsible for operations.

Sector of the company	Automation technologies	Collaboration technologies	Interaction technologies	Tracking technologies
Motor vehicle parts & manufacturing	YES: Maintenance management by computer assistance.	N/A	N/A	YES: Tracking products, monitoring trainings.
Roofs & frames	YES: Computational software & data mining.	N/A	N/A	N/A
Production	YES: Conveyor belt & machines for packing.	YES: Communication (e.g., emails) & organizational tools (e.g., Outlook, Excel).		YES: Timekeeping system, tracking of products, scanning.
Logistics	YES: Sorting machine.	N/A	N/A	YES: Scanning system.

Frames & doors	YES: Planning & prioritizing orders.	N/A	N/A	N/A
Tutoring	YES: Digital training, filtering options.	YES: Meetings	N/A	YES: Estimation programme on number of clients
Construction	YES: Calculation & measurement tools, filtering products.	YES: Organizational & invoicing tools (e.g., SharePoint).	YES: In-progress tool with possibility to add comments/pictures on site.	YES: Tracking quantities, security checking, badging.
Panels & wires	YES: Electronic milling machine & e-plan for connecting structures.	N/A	N/A	N/A
Retail & wholesaling	N/A	YES: Emailing, company's Intranet, chats (e.g., WhatsApp, Workplace, Google, Workplace), smartphone.	N/A	YES: Tracking of sales averages & orders.
Bank & insurance services	YES: Digital training.	YES: Chat box for clients, communication & organizational tools (e.g., Teams, SharePoint), personal tables, smartphones.	N/A	YES: Sharing common data system, ordering, tracking employees' actions, electronic labels.

3. Changes / modifications of work

3.1 Changes in work content

Overall, we observe a **higher degree of fragmentation and complexity of tasks**. Tasks are also more diverse, faster, and digital. The range of collaboration technologies encourage continuous communication and sharing of information. Despite automation has made work more autonomous for some, workload has increased in general due to the progressive acceleration in output. Digitalization has forced managers to become more flexible, dynamic, and independent in their decision-making process. In companies where repetitive tasks have been replaced by automation technologies and the focus has shifted to the content, managers also experienced an **increase in creativity**. Technologies have also encouraged managers to develop more extended communication and organizational skills. On the other hand, digitalization has provided some managers with an **opportunity to learn** digital and technical skills to co-work with machines and software. When considering all sectors analysed, automation and digitalization appear to influence managers' professional behaviour and style of work to a larger extent than their digital knowledge per se.

According to the logistics middle manager of a company specialized in motor vehicle parts and manufacturing, tasks are now 'a little more complex, because there are a lot more stages in the process', 'a lot more knowledge at the IT level' is required from operators. This also leads to middle managers **having to teach their teams**, 'which was not planned at the start'. At the same time, work has also become 'more pleasant', because the tools created diversity ('I appreciate that not all days are the same') and increased predictability: '[he knows] how to find parts or bugs in the program more easily' and it is possible 'to manage large volumes faster and better'. According to the mechanics middle manager, her work has not changed 'at all' following digitalization. On the contrary, tasks seem to have become **more repetitive**: she claims she 'sometimes [hopes] to have problems, because there are times when it's too quiet, in fact the day is very long'. For the electronics middle manager, 'what has changed is that [they] see that in terms of improving line performance, it has given us better follow-up'. It has become easier to find and study data, giving 'a support' to the team. With respect to task autonomy, he explains that decisions are always '**collegial**'. Communication is fundamental in their work, and they act on the 'one team one company' philosophy.

Overall, the tools are now doing most of the work at a roofs and frames company. In the words of the project manager, 'apart from cleaning a little bit in the corners and knowing if it was necessary to weld, adjust one thing or the other', 'there is not much more to do'. This is particularly true when they have to produce repeated pieces: if he has a part 'made a month ago that is totally the same, it is imported back into [their] calculator', run in the DPMS and then 'all the information that was done a month ago comes out and everyone follows again the small range that [they] had done a month ago'. Tasks are now '**more complex**', '**more pointed**'. In terms of responsibility in managing an order, for him, it is 'a bit like [being] an orchestra

conductor'. Communication, on the other hand, 'can now be easily done with the whole workshop'.

For the line manager at a company specialized in production, tasks are quite easy and have not been affected by digitalization. For the packing service line manager, what changed is the fact that they 'moved to **self-managed teams**'. At the same time, there is now 'more IT work'. The wood manager explains that he is now able to outsource some responsibilities, which 'provides opportunities for employees to engage and grow'. As a matter of fact, work now is 'much more dynamic, more fun'.

According to the operations manager at a logistics company, there is 'a completely different way of working'. While before 'the harder [he] worked physically, the better, now you just have to work smarter'. It also requires acting 'fast enough'.

According to the site manager of a construction company, digital tools they can easily 'see what [they have] measured, what dimension [they have] taken, have a look'. It has become easier to show the subcontractors what areas they have to work on, and it takes less time than going to five different buildings 'to show them everything': according to him, 'this is a significant time saver'. It also makes it easier to submit a price for the subcontractor based on correct measurements, as well as adapt the price 'if there are modifications that have been made'. It also made it **easier to predict tasks**; 'it allows you to have dates, a schedule'. Overall, however, the site manager claims the workload has increased: 'generally, [they] do a little more than [their] contract in terms of hours' and 'even if the tools have facilitated the tasks, there are always other tasks, so the time saved is used for other things'. These can be both repetitive and complex and related to the usage of the technology itself (e.g., coding and recording actions), the necessity to solve technology-related issues, and the possibility to focus on additional clients and demands. For the project manager, the distracted use of certain tools (e.g., emails) and the existence of multiple ways of communicating has **removed structure and organization from tasks**. While her tasks 'have remained the same', 'the processing of tasks is a bit different' as more information and organization is always required. The tools have also **accelerated** the tasks, making tasks more '**fragmented**'. According to the Safety, Quality, Environment and Organization Unit Manager, they are now **more autonomous as regards organization** and 'may save a little time'. As regards his tasks, the major change has been coding the team's objectives, but otherwise no significant changes are recorded.

At the beginning, according to the planner at a company specialized in panels and wires, e-plan made it much more difficult and frustrating to manage the staff because 'it's very technical'. Now, it is **easier to manage timetables and to be more productive**. Communication and sharing of information have also significantly improved.

At a retail and wholesaling company, the manager says that his tasks have remained the same, but they are 'significantly faster'. However, workload has increased and so has his time in the office, which makes him 'unhappy'.

As regards tasks at a company specialized in bank and insurance services, they have remained the same in content, according to the supervisor of operations. 'Control is much more

complete than before', as well as tasks are done '100 times faster'. Overall, however, the workload has increased as 'you have to spend more hours on your work to get the same result' due to technology-related issues or coordination problems across teams. For the supervisor of bank insurance advisors, they now 'work more efficiently, faster, more thoroughly', with 'more time to concentrate on the heart of your work'. Digital tools also made tasks **more diversified**. The Helpdesk manager explains that 'what [they] used to do manually, now is brought to a tray by the system, nicely displayed'. Tasks are now more cognitive and digital tools enhance new technical knowledge ('what good techniques exist'). Overall, the tasks become **more complex** because technology evolves and 'one must be able to [use] it'. The responsible for operations claims that 'the main difference is that [they] can spend **less time creating and more time working with information**'. The focus has now shifted to the content rather than the layout. According to the branch manager, **work is much more structured following time slots** ('It must be ordered at this time, it must be arranged at this time'). Digital tools also gave them 'more insight', as it is sufficient to 'open a program' and 'see how much [they] sell per week, what is [their] average, what did [they] do last week'. In other words, they have 'all the numbers at hand'.

3.2 Changes in working conditions

In general, changes in working conditions due to digitalization were mainly reflected in **an increase in stress and psychological burden**, accompanied by episodes of over-connection, constant monitoring, as well as issues of work-life balance. Physically, digitalization has also caused **ergonomic problems** to managers due to the consequent decrease in mobility.

According to the mechanics middle manager at company specialized in motor vehicle parts and manufacturing, now there are 'a lot more charges' as 'it shoots from everywhere' and they 'can't have peace of mind'. While tasks may have not increased in number, the increase in productivity consequent to automation, has pushed the company to welcome a higher number of clients' demands, sometimes overwhelming employees.

Physically, the project manager at roofs and frames company explains that 'there are days, we're there static behind [their] screen' and 'if there hasn't been a problem in the workshop', it means '[they] haven't moved from [their] chair'. They did, however, have 'a course 2-3 months ago on office ergonomics'.

The Safety, Quality, Environment and Organization Unit Manager at a construction company explains that their indicators are regularly sent to the production department, 'since they are essentially indicators on the construction sites, so [they investigate whether] the construction site running well in terms of quality, safety, environment'.

At a retail and wholesaling company, the manager thinks the new channels of information and communication have made things 'complicated', from a psychological point of view, including too much communication and 'cold communication'.

As regards health, the supervisor of operations at a company specialized in bank and insurance services explains that he has suffered 'from a stress fracture' due to an ergonomic issue connected to the usage of the mouse. Ergonomic issues are also shared by the Helpdesk manager, especially when working from home and using 'ordinary chairs'. On the other hand, digitalization has allowed for **more flexibility**, which gives people 'a lot more freedom in how they do things and when they do them', so the supervisor of bank insurance advisors. This is confirmed by the responsible of operations, who explains that, before, 'the option to do something in between and schedule it and pick up at a different time' was not present, while it is now. For the branch manager, however, the 'constant planning' has made work more 'mentally difficult'.

3.3 Changes in employment conditions

Overall, digitalization seems to have somewhat impacted managers' employment conditions. While contractual arrangements and working hours have not changed in theory, in practice managers claim they work more. In parallel, technologies have been progressively introduced; however, the corresponding ad hoc training has usually not been provided, remaining general. No specific opportunities for career or salary advancements are shared. However, bonuses are made available to managers in some cases when they prove they are able to use the technologies.

All of the middle managers interviewed at a company for motor vehicle parts and manufacturing have a long-term contract. In terms of working hours, the logistics middle manager claims work is determined 'through volumes'. Now, they 'no longer work on breaks in the afternoon because there is no point in making people stay until 10 p.m. when the work will be absorbed by 4 p.m'. No changes is observed with respect to his contract. With respect to their salary, the digital tool did not increase their salary directly but contributed to receiving a bonus, following evaluation. The possibility of career advancement, on the other hand, are 'very, very complex' and he has always been told 'there are no vacancies'. As regards training, the logistics middle manager explains that 'there are no official trainings' for the tools.

According to the project manager at a company for roofs and frames, it is now easier to be monitored, 'to see the error rate of a person'. As regards training, he explains that '[they] did [it] for 2-3 weeks each time on [their] turn' for the DPMS.

With respect to training, the line manager at a company specialized in production claims they have not really received any, but 'the work is not that difficult either'.

The strong monitoring is confirmed by the operations manager at a logistics company, who claims at the end of each day they 'know who failed to top up what'. In the company, training does not seem to be significantly present ('2.5 % and that's it', so the night line manager). More than training, it is experience and 'common sense' that guide managers in what they do.

At a construction company, the site manager explains that there is 'an internal person who comes to see if everything related to safety is in order, if the well-being of the workers is respected', which then 'gives rise to a report which is sent to the management' and becomes visible to everyone in the company. It is a report that can be 'every week, every month or every 3 months', so more frequent than before. As regards training, the project manager claims it was not 'not enough and not really [present]'. Once a digital tool was introduced, the training consisted in saying 'voila, the tool brings you this, this and this'.

No training has been put in place to provide the manager of a retail and wholesaling company with new skills. In the company, '[they] are in prehistory' from that point of view. He claims they received 'a half-hour training, with a power point'.

'There are trainings out there' but they are very general, so the planner at a panels and wires company.

Monitoring has now taken priority over other tasks, especially as regards 'the consequences of [one's] actions for [their] neighbour', so the operations manager at a logistics company.

The Helpdesk manager at a company specialized in bank and insurance services claims that, now, everything is digitally monitored. They have received 'some clarifications and advice', together with demonstrations, rather than proper training courses. The supervisor of bank insurance advisors adds that 'a general session is always given first, in class, [with] everyone together'.

3.4 Changes in employment relations

In general, digitalization seems to have influenced employment relations to some extent: in-team meetings have become more frequent and informal, also thanks to hybrid possibilities and employees are able to share their perspectives more easily, due to the increase in collaboration technologies. When it comes to the involvement of employees and trade unions in regard to the introduction of new technologies, this is not yet substantial.

At a company for motor vehicle parts and manufacturing, the logistics middle manager explains that trade unions are consulted 'as soon as there are new projects', but 'they never had too many worries', as the members are often 'workers who were with [him] before'. According to the mechanics middle manager, in their company 'there is a big communication problem'. There are continuous changes of which they 'are not even aware of'. Overall, 'to be heard, you have to insist, you have to have a problem', which can be 'ridiculous'. As told by the electronics middle manager, they have 'daily meetings with all the managers of each department', 'every day at 10am'. He also explains that when someone has a good idea, she can encode it in their common SIM system, and if it is feasible, her name will appear for everyone, so 'she can feel valued 'and 'empowered' and this is all thanks to digitalization.

At a roofs and frames company, the project manager explains that 'every Friday' they have a discussion, 'a meeting between area managers', where they share problems, approaches, notes and 'everyone is worth their problem or their request or even their questions'.

At a company specialized in production, the line manager and their team have a meeting every year. Conversations are 'always very fluid', 'the target group has a say, [she has] a say, the social services have a say'. The packing service manager claims they 'every week' 'about what's planned and what new jobs are coming up'. They put all the input on a digital calendar (e.g., 'which goods must be finished'), which is 'accessible to everyone'.

The operations manager at a logistics company explains that '[they] have a suggestion box where people can give feedback', as well as the trade union, 'which will raise certain things', including the modernization of the equipment used. The night manager also says that they recently employed a therapist in the company, 'where you can also go if you just want to rage, huff or complain'.

As regards relations, the manager of workers at a frames and doors company explains that, with the team, they have a daily 'meeting here in the morning at eight o'clock'.

At a panels and wires company, they did not have evaluation meeting for 8 years. When digital tools were introduced, they also introduced such meetings, which have not been 'easy' due to people having different opinions. They also do not have a trade union.

The supervisor of bank insurance at bank and insurance services advisors explains that relationships have become 'more honest, as it is more difficult to hide behind [problems]'. At the company, they 'try to make the [work] space a little more fun' so that 'it becomes more pleasant, the clothes are also more pleasant, the working atmosphere in itself is good'. Meetings are also very regular. They meet 'twice a week with the director' and if 'things [employees] feel are not right, [he is] very open to communication'. Meetings are also much easier to organize and more informal. For instance, with Teams and zoom, 'it's convenient (you can use it, but you don't have to) and it's easy to plan'. The unions also take part in safety committee and 'there is also a doctor, who helps follow up on issues'. The responsible for operations claims that 'not everyone can have their say'. When a new tool is introduced, 'that is sometimes discussed, but ultimately someone, who is often the owner of the process, has to determine what ultimately is the process that will be used' for the tool.

3.5 Changes in the work organisation

Overall, digitalization has impacted work organization in terms of tasks coordination: direct conversations are accompanied, and sometimes substituted, by online meetings and organizational software. While collaboration technologies have spread in all companies, employees are now asked to work much more autonomously than before. In parallel, the original hierarchical structure of companies is progressively disappearing, leaving space to self-organized teams.

According to the logistics middle manager at a motor vehicle parts and manufacturing company, they now have 'very few contacts' across teams.

At the organizational level, the site manager of a construction company explains that 'now [they] work with seconded workers where there are a lot more documents to follow'.

At a frames and doors company, digital tools have allowed people 'to work alone'.

At a retail and wholesaling company, the new digital means of communication, which 'work really well', increased reactivity on behalf of employees.

According to the responsible for operations at a company specialized in bank and insurance services, with digitalization 'hierarchy is gone, as you will be gathering people from different departments into teams and having them work on topics' together. Teams are more empowered and the organization flatter.

Overall, contacts have become more impersonal, communication more hybrid, autonomy and empowerment levels have risen up, and so has isolation.

4. Digital tools perceptions

Overall, perceptions on new digital tools appear mixed. In general, managers agree on the necessity to keep human intervention present in digitalization: in other words, digital tools are not perceived as potential substitute to human qualities. Managers also acknowledge an initial resistance to digitalization, especially on behalf of the older working population. The lack of a support system that helps employees understand how digital tools are implemented and work seems to stir confusion and tension too. At the same time, it is observed that digitalization reflects a progressive evolution of the company itself, which is appreciated by some.

According to the mechanics middle manager at a motor vehicle parts and manufacturing company, there has been 'a small evolution' with respect to technology in their company. However, the main problem is they 'do not know which person necessarily takes care of what'. Sometimes it is an ICT problem that can be managed internally, sometimes 'it is a problem of the company that installed the program'.

At a company specialized in production, the wood line manager explains that 'at first there was some resistance to [digitalization], especially for [...] the role models. But with time it has been accepted by everyone and it's a free choice, they also see it as more of a help than a lot of work'.

The operations manager at a logistics company, '[doesn't] consider [the company] that innovative'. Where they have innovated, they did so 'because otherwise the process and the volume will no longer be manageable, and of course because labour is increasingly hard to find'. He also thinks that employees get 'a bit of a Big Brother feeling'.

As told by the site manager at a construction company, there are people around the ages of 50, 55, 59 who 'don't want to change for the few years [they] have left to work'. One issue

that is illustrated by the Safety, Quality, Environment and Organization Unit Manager is that employees can trust the work of digital tools without questioning it. He mentions that ‘the younger ones’ are often in awe of the digital. They say “oh look, it’s magic, you enter your data, you press the button, you have everything that is pretty, that is beautiful, you have beautiful graphics and all that”. To that he always replies whether they have really looked at the graph, whether it is right and consistent with ‘what’s behind the graph’.

According to the manager at a retail and wholesaling company, ‘what is very complex [in the company]’ is that ‘when you want to question people on their work (for them everything is perfect), you have to prove it to them’, especially when it is related to their use of digital tools.

While digital tools improve the quality of performance, the supervisor of bank insurance advisors at a company specialized in bank and insurance services ‘still [thinks] there’s a need for human intervention to really get it done right’. While digital tools have made work more interesting and efficient, the responsible of operations claims that ‘the human aspect cannot be underestimated’, especially ‘empathy, motivation’, which are very important qualities in management.

5. Quality of working life

In general, we observe opposite trends in terms of quality of working life due to digitalization. For some, quality has significantly increased as it has allowed for flexibility, informality, and a channel to creativity and knowledge thanks to new skills learned. For others, digitalization has decreased it, as it has generated stress due to over-connectivity, repetitive working days, and a lack of balance between working and private life. The impact of digitalization on the quality of working life is, therefore, of double nature.

For the logistics middle manager at a company specialized in motor vehicle parts and manufacturing, digitalization has become ‘a daily comfort and well-being because of learning more, assimilating more and more things, and staying active’. For example, he was able to learn analytical skills for information data processing. For the mechanics middle manager this is not the case. The atmosphere at work is ‘cumbersome’ as they ‘are not necessarily given the necessary resources to achieve something’. For the electronics middle manager, satisfaction at work has increased. Digitalization has been ‘positive in any case’, ‘it helped [them] a lot’. According to the team leader, skills have not changed.

For the project manager at a construction company, the email management aspect ‘has become more painful’ due to a decrease in clarity by users and makes it difficult to reconcile private and professional life. On the other hand, an increase in communication, organizational, and digital skills has been observed.

At a company specialized in bank and insurance services, the responsible of operations says that ‘disconnecting from work becomes more difficult’, with ‘a lot of people still messaging at 10-11pm, which means they are still working’. According to the branch manager, having to ‘cut meat for 100 people on a Saturday [with] all that digital stuff in between’ is problematic in terms of stress.

In terms of new skills development, the company invests in providing employees with ‘eternal apprenticeships’ to learn new skills.

According to the project manager at roofs and frames company, the working atmosphere is ‘very good’ and ‘homely’. It is, overall, ‘positive’ because work has become ‘much clearer’. No specific new skills developed following digitalization, but rather a new and ‘sharper’ approach to work naturally emerged.

6. Conclusions

Most managers are males and have a rather significant seniority in their company or have built experience in previous employment contracts. The size of the team they manage depends on the size of their company, as well as their sector.

In addition to their specific expertise, they all manage teams, conflicts, and issues. Digitalization has introduced or expanded managers’ supporting and coaching role towards their employees. While this may have caused an increase in time spent for people management, digitalization has made tasks related to communication, organization, and monitoring more efficient and quicker.

All companies have experienced an increase in collaboration technologies, which has made communication and organization easier to manager. Tracking technologies are also used in most of the companies, whereas automation technologies are mostly used in companies dealing with machines in the first place. Interactive technologies are not significantly present.

Digitalization has made tasks quicker and, therefore, increased their workload and workplace, following hybridization of tasks. However, they have become more interesting as managers can focus more on the content rather than the layout or organizing aspect of the task. It also created learning opportunities as tasks have become more complex and, sometimes, new technical and organizational skills need to be used.

Physically, tasks have become more static, which has called for ergonomic measures to be implemented. Work is more flexible, allowing managers to work from home when possible and to do tasks when convenient for them — in the limit of existing deadlines. However, a common problem underlined by managers is the hyper connectivity and the difficulty to separate working and private life.

Contracts have stayed the same, while monitoring has become easier and more frequent. Training opportunities are present but not sufficient or based on in-depth knowledge. They are rather brief and follow a hands-in attitude.

While managers are not directly consulted for the introduction of digital tools, meetings, and exchanges within teams and with directors have become much more regular with digitalization thanks to hybrid and virtual meetings. These are carried out also with trade unions but only for a limited proportion of the sample analysed.

The atmosphere at work has become of higher quality for most of the managers, due to flexible times, better coordination within the team, and higher levels of organization. This leaves space for fun and satisfying moments. Most of the managers are also motivated by the digital tools, which make their work more interesting and pleasant.

All managers agree that, while digital tools can replace administrative or repetitive tasks, human values typical of managers, including empathy and motivation, will never be threatened by digitalization and will always be fundamental in management.

Appendix

Profile of respondents

At a company specialized in motor vehicle parts and manufacturing the logistics, the middle manager is a male of 47 years with a seniority of 15 years as a team leader. The mechanics middle manager is a female of 38 years with a seniority of 6 years in the team. The middle manager responsible for electronics is 37 years and has worked as a team leader at AW Europe for 12 years.

At a roofs and frames company, the project manager has worked in the company for 25 years.

The line manager at a company specialized in production has joined the company one year ago and is a female. The line manager for the packing service is also a female and she has worked in the company for 12 years. The manager for anything related to wood is a male who has worked there for 2 years.

The night line manager at a logistics company is a male of 49 years who has worked in the company for 18 years.

The manager interviewed at a company for frames and doors is a male who has worked in the company for 15 years.

The account manager and team leader at tutoring company is a female and has worked for the company for 4.5 years.

The site manager at construction company is a 32-year-old male and has worked at the company for 5 years. The project manager is a female who has worked there for 5 years. Their Safety, Quality, Environment and Organization Unit Manager is 55 years old, a male, and has worked for the company for 12 years.

The planner at a company for panels and wires is a male.

The manager at a retail and wholesaling company is 41 years old, a male, and has worked in the company for 6 years.

The supervisor of operations at a company specialized in bank and insurance services is a male, 61 years old, and has worked in the insurance sector for 40 years and in this role for 10 years. The responsible of bank insurance advisors is a male of 30 years old. The manager of the Helpdesk is 48 years old and has worked 'in different posts' for 20 years. The branch manager and goldsmiths has a seniority of 34 years and is 59 years old.

Contextual information

As a team leader at a company specialized in motor vehicle parts and manufacturing, the logistics middle manager manages 'three sectors within logistics', including 'anything

concerning GPS' and navigation, as well as 'spare parts for automatic transmissions'. Before the sectors diversified, he used to manage 60 people; now, he has 'about fifteen people under [his] charge. His role consists of making sure the process is fluid, that 'each person knows exactly what their task is', that 'they have instructions to follow', and that these are 'up to date' and 'understood'. According to him, 3/4 of his working day is dedicated to 'blockages, detection of problems'. The mechanics team leader manages around 10-11 people. What she does is managing conflicts, holidays, teams, and problems. For the electronics team leader a classic day means going around the teams first 'to see the situation', 'list all the problems [they] have' and try to solve them. He supervises 7 teams, so around 37 people overall.

At a roofs and frames company, the project manager looks at all the mailboxes, what customers have sent in, and the order is dispatched 'between the 7 designers'.

The line manager at a company specialized in production works in a team of 6 men. They usually work offsite: depending on the company they are visiting, they 'empty the containers', 'do some green maintenance', 'clean the docks and clean up some fly dumps'. The other line manager is responsible for the packing service. It includes printing the order for their employees, 'go and see if the goods are already there for order follow-up, the leftovers that then go to the warehouse' and check 'that all parts that go to the warehouse have a return batch to go there'.

The line manager of the operations management team at a logistics company explains that at their company '[they] simply pick up the packages and start sorting to a destination'. Compared to other transport companies, '[their] portfolio is slightly larger', which allows one-day deliveries and other exceptional services. In his function, he '[covers] the entire dangerous goods history of [their] airport product and equipment room 24/7'.

The manager interviewed at a company for frames and doors is foreman and is responsible for a team of workers. He 'direct[s] the boys on what to do and getting the day's work actually done'. The company is specialized in making aluminum windows.

The account manager and leader at team management at a tutoring company manages, on the one hand, 'everyday life, so the questions [she gets] from colleagues, difficult cases with tutoring, people who don't want to pay' and, on the other hand, 'their communication'. She also takes care of training new colleagues.

The site manager at a construction company 'manages the budget of the site, takes care of all that is contract with subcontractors, customer relations or architects and takes care that all that is important information is well disseminated'. The project manager takes care of 'the technical designs that [they] will take on a project', in agreement with the team, as well as 'everything related to ordering'. The Safety, Quality, Environment and Organization Unit Manager manages a team of 6 people and follows around 2-3 sites.

The planner at a panels and wires company needs 'to make sure [he has] the schematics, as well as the BOMs for the execution', as well as manage problems when 'something goes wrong somewhere or there are changes, adjustments'.

The manager at a retail and wholesaling company is responsible 'for all that is produced, food and dry non-food'.

The supervisor of operations at a a company specialized in bank and insurance services coordinates the activities of the local business group 'to ensure that these companies [part of the group] remain financially healthy and that they carry out their activity in accordance with the rules applicable to them'. The responsible for bank insurance advisors manages 35 people and, together, 'they are responsible for everything related to remote advice within the Bank'. The manager of the Helpdesk manages 50 employees working in the Helpdesk centre, both from a technical and functional perspective. The manager also takes care of training. The responsible for operations looks at whether 'there are delivery issues, where there are operational issues and [tries] to resolve them', with the objective being to 'ensure that the customer is impacted as little as possible'. The branch manager does 'orders of meat and packaging and accessories to ensure the operation of the butchery', quantifies orders, makes sure that 'all regulations are respected in terms of hygiene, cooling', and checks schedules.