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Faculteit Geneeskunde en Levenswetenschappen

master in systeem- en procesinnovatie in de gezondheidszorg

Masterthesis

Conceptualizing work organization patterns: a scoping review and a taxonomy

An Vanthienen

Scriptie ingediend tot het behalen van de graad van master in systeem- en procesinnovatie in de gezondheidszorg

PROMOTOR :

Prof. dr. Niels MARTIN

2024
2025

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Acknowledgments

First and foremost, I would like to express my sincere gratitude to my promoter, Prof. Dr. Niels Martin, whose valuable and insightful feedback has been essential throughout this journey. I am equally grateful to Prof. Dr. Benoît Depaire for his remarkable ability to think through complex conceptual questions. Whenever I felt stuck, lost direction, or found myself going in circles and doubting every step, the two of them always managed to guide me back onto the right path.

I am also deeply thankful to my fellow students, Maxine Vos, Luc Hendrix, and Christina Grutman, for being a constant source of support, for their listening ear, their thoughtful feedback, and, most importantly, for their friendship and encouragement throughout the entire process.

I also wish to extend my heartfelt thanks to my family, who gave me the time and space to dedicate myself to this thesis. I am well aware that this was not always easy and that my commitment to this project has inevitably had its impact on them as well.

Lastly, I am grateful to my current colleagues for enduring my presence during this process – sighs and all – with patience and good humor.

Abstract

Introduction: Healthcare systems are under increasing pressure as a result of an ageing population, the growing prevalence of chronic diseases and persistent workforce shortages. These pressures affect how work is organized on a daily basis. Although recurring work organization patterns (WOP) are widely observed across sectors, there is no comprehensive, transferable taxonomy to capture these patterns systematically. Such a framework could facilitate cross-sector learning, help organizations systematically analyze and refine their own practices, and enable a structured evaluation of work processes. Therefore, this research developed a taxonomy to systematically classify and compare WOPs. **Methodology:** This study adopted a two-phased approach. First, a scoping review of empirical studies investigating WOPs that were published between 2020 and 2025 was conducted in Scopus, Web of Science, and ProQuest Central. Eligible studies were screened for explicitly or implicitly described WOPs. Thirty-five studies met the predetermined inclusion criteria, yielding an inventory of 134 distinct patterns. Second, an inductive qualitative content analysis was performed. The process included an open coding stage of the inventory of the 134 patterns, followed by a conceptual grouping of codes, categorization, and abstraction, leading to the construction of a structured taxonomy. **Results:** The final taxonomy comprises three overarching category groups: Structuring of Work, Enabling and Supporting Mechanisms, and Adaptive and Deviant Practices. These category groups contain ten categories and 27 subcategories, encompassing the diversity of WOPs observed in healthcare, business, education and other sectors. The mapping of identified patterns to the taxonomy showed its capability to place patterns in their corresponding categories. Therefore, enabling systematic comparison of patterns across individuals, teams, departments, and organizations. **Conclusion:** The developed taxonomy offers a classification system and a shared language for describing WOPs. It can be used to guide observational research, inform workflow redesign, and investigate links between WOPs and outcomes such as quality, efficiency and resilience. Conceived as a 'living' instrument, it is intended for iterative refinement in the future through empirical validation, contextual adaptation, and expansion. Its application in healthcare and beyond helps making implicit WOPs explicit, making it possible to critically evaluate them and link them to relevant outcomes such as quality, efficiency and flexibility.

1 Introduction

Healthcare systems worldwide are under increasing pressure from multiple directions, challenging their sustainability and capacity to deliver high-quality care. Factors such as population ageing, the rise of chronic diseases, and persistent workforce shortages, further amplified by the COVID-19 pandemic have placed healthcare systems under considerable strain [24, 34, 36]. Simultaneously, many systems are constrained by limited financial resources and infrastructural bottlenecks [24, 15]. For instance, in Belgium projections indicate a structural mismatch between care demands and workforce availability [15].

The pressure on our systems not only affects access and quality of care, but also reshapes how care is organized on a daily basis. Research by Page et al. [36] shows that clinical teams often rely on improvised adaptations, such as reallocating tasks or adjusting communication routines, to cope with increasing work pressure. In addition, Kickbusch and Gleicher [25] argue for a reconsideration of how health systems are organized, calling for example on stronger cross-sectoral inspiration. While many current organizational models remain anchored in structures shaped by medical specialization and hierarchical control, they often fall short in responding to the complexity, interdependence and adaptiveness that characterize today's health challenges [25]. There is growing recognition that sustainable healthcare not only requires sufficient resources but also demands new ways of thinking, for example about how work is organized [26].

Against this backdrop, examining how healthcare professionals organize their work becomes increasingly important. Studying how work is structured, distributed and coordinated across individuals and teams offers a valuable lens to better understand how care is operationalized. Decisions on these matters at the organizational or personal level are often made in recurring patterns. Mapping and comparing such work organization patterns (WOP) may offer critical insights into how organizations can adapt their practices in more deliberate and sustainable ways to meet the evolving demands in healthcare [37].

When studying the work organization of a healthcare professional, all phenomena with regards to the allocation of tasks, the sequence in which these tasks are executed, the collaboration among teams and individuals, task scheduling and the communication between team(member)s is considered [14]. For example, a nurse might decide to first measure all vital signs of patients and subsequently record them into the information system, whereas a colleague might decide to register these values immediately after measuring them.

Despite increasing interest in how work is organized at the operational level, there is currently no comprehensive taxonomy that captures WOPs in a structured way in healthcare, nor in related research domains such as organizational behavior. Existing studies often describe such patterns in a fragmented or isolated manner. As a result, healthcare organizations may struggle to recognize, evaluate, or learn from recurring patterns that emerge within their own workforce. By offering a systematic classification of recurring phenomena, taxonomies can play a crucial role in bridging this gap and open possibilities for knowledge transfer across teams or departments.

In this study, a taxonomy of WOPs was developed through a two-phased approach. First, a scoping review was conducted to identify a broad range of WOPs across different sectors and research domains. This resulted in a comprehensive inventory of empirically observed patterns. In the second phase, this inventory was used as the unit of analyses for building a structured taxonomy through a qualitative content analysis (QCA), grouping patterns in category groups, categories and subcategories based on shared characteristics. The developed taxonomy enables healthcare professionals and organizations to reflect on their own practices through the lens of patterns observed both within and beyond their sector, facilitating cross-domain learning. In addition, the taxonomy supports the identification of process improvement opportunities by making WOPs more explicit and comparable. Beyond its practical relevance, this taxonomy also contributes to the scientific community by offering a first step towards a shared language for describing WOPs in healthcare. As such, it can serve as a conceptual foundation for further research in healthcare, particularly within process-oriented studies and applications such as process mining.

2 Methodology

The study was conducted in two stages. First, a scoping review was performed to identify empirical studies that describe WOPs. Second, an inductive QCA was applied to build a taxonomy of the identified patterns. Each stage was conducted with its own methodology as described in the following subsections.

2.1 Scoping review

Scoping reviews are a systematic knowledge synthesis method used to map the breadth and characteristics of available evidence on a particular topic across diverse sources. They aim to clarify key concepts and identify knowledge gaps [6, 41]. Given that this study seeks to clarify the concept of WOPs, a broad and exploratory review methodology was required. Additionally, our preliminary search indicated that prior research primarily examined WOPs in a fragmented and context-specific manner, often focusing on one or a few patterns. These reasons align with established guidance on when to conduct a scoping review, as outlined by Munn et al. [32] and Aromataris et al. [6]. To ensure methodological rigor, we conducted the review following the JBI guidelines [38] and adhered to the PRISMA-ScR framework [41] for reporting.

This scoping review aims to identify WOPs as described in the existing literature, with a specific focus on studies that empirically investigate these patterns. Rather than restricting the scope to healthcare, the review also incorporated studies from other sectors to enable cross-sectoral reflection. Therefore, the following research question was formulated:

What are the key WOPs identified in empirical studies?

The literature search for this scoping review was conducted using three major academic databases: Scopus, Web of Science, and ProQuest Central. To ensure the retrieval of relevant studies, a search string was constructed and refined through team discussions.

To construct an effective search string, the PCC framework (Participants, Concept, Context) was applied, focusing on employees (Participants), work organization (Context), and patterns (Concept). Additionally, the term organizational behavior was added based on insights from preliminary searches. Many relevant studies on WOPs were situated within the research domain of organizational behavior, justifying its inclusion as an additional contextual element in the search string.

Relevant terms for each component were initially combined using the AND operator. However, this yielded many articles with limited relevance to the research question. As a result, several iterations of the search string were tested, including the selective inclusion or exclusion of the PCC terms described above, the application of filters (e.g. publication date, document type, topic exclusions) and the addition of terms related to frameworks and taxonomies. While some adjustments reduced the volume of results, they often overly constrained the search. As a final step, an exploratory search was conducted to identify additional relevant articles, from which new search terms were derived to further refine the search string. This iterative process resulted in a final search string composed of three primary components: work habits and work style, employee workflow, and a final part ensuring the inclusion of empirical studies. The finalized search strings for the three databases is provided in appendices A, B and C.

After executing the searches, all retrieved results were exported, and duplicate records were removed. Subsequently, a two-step screening procedure was carried out, beginning with a title and abstract review, followed by a full-text assessment to determine final eligibility based on the predefined criteria stated below.

Inclusion criteria:

1. Articles that explicitly or implicitly describe a WOP.

Exclusion criteria:

1. Articles published before 2020 were excluded to ensure the inclusion of recent literature while maintaining the feasibility of this master's thesis.

2. Articles that do not explicitly or implicitly describe a WOP. For example:
   (a) Articles focusing on employee behavior without describing a WOP (e.g., research on leadership styles, trust of employees, or employee innovative behavior).
   (b) Articles examining employee personality or well-being to determine their impact on organizational outcomes.
3. Articles for which the full report was not accessible.

Following the screening process, data was extracted from all included articles using a structured checklist developed for this review. The extracted data consisted of: (1) year of publication, (2) sector in which the study was situated, (3) the described WOP(s), (4) research methodology and (5) the country in which the study was conducted. Data extraction was performed by a single reviewer.

Subsequently, an inventory was compiled of all WOPs identified in the included studies. This inventory included both explicitly and implicitly described patterns, together with their corresponding labels (pattern names) and definitions. When labels or definitions were only provided implicitly, the researcher formulated them based on the contextual description within the article. This inventory then served as the unit of analysis for the subsequent QCA process.

2.2 Qualitative content analysis

QCA is a systematic and flexible method for the subjective interpretation of textual data through a structured process of coding and categorization. It examines language in depth and classifies large volumes of text into coherent categories that reflect either explicit or latent meanings [22]. The analytical process is suitable to condense large volumes of textual information into a set of conceptually meaningful categories [13]. The outcome of such an analysis is a structured set of categories that covers the essential aspects of the phenomenon, aligning directly with the aim of this study to develop a taxonomy of WOPs.

In this study, QCA was applied to the inventory of WOPs identified through the scoping review. The intermediate creation of the inventory was necessary because many of the included studies described patterns only implicitly or without an explicit definition. By first extracting all patterns and formulating a clear label and definition where needed, a uniform dataset was created, suitable as a unit of analysis for a QCA. This step ensured that the subsequent QCA could be conducted in a systematic manner, focusing directly on the conceptual characteristics of the patterns rather than on the heterogeneous reporting styles of individual studies.

The QCA process distinguishes three main phases: preparation, organization and reporting. In the preparation phase, the unit of analysis was defined as the inventory of WOPs and their accompanying definitions. An inductive approach was selected because, to the best of our knowledge, no existing taxonomy of WOPs has been developed to date.

The organizing stage consisted of four steps. Firstly, during an open coding process, each of the WOPs was examined by analyzing its definition to identify its core meaning. For each pattern, up to three primary codes and up to three secondary codes were assigned to capture the essential conceptual elements. To ensure clarity and consistency in the coding process, a code book containing an explicit definition for each potentially ambiguous code (i.e. codes for which the researcher foresaw a risk of interpretive uncertainty or inconsistent use during later stages of the analysis), guidance on when the code should or should not be applied, and a list of synonyms to be avoided was developed. In parallel, a set of coding rules was established to guide decision making and maintain uniformity.

Secondly, the analysis proceeded with a consolidation step aimed at identifying conceptually identical patterns. If two or more patterns shared an identical set of primary codes, their secondary codes were examined to determine whether any conceptual distinctions existed. If no distinction was found, the patterns were considered equivalent in meaning and differed only in their label. In these cases, all versions were merged under a single label. The selection of the retained label followed a predefined decision rule: the label from the

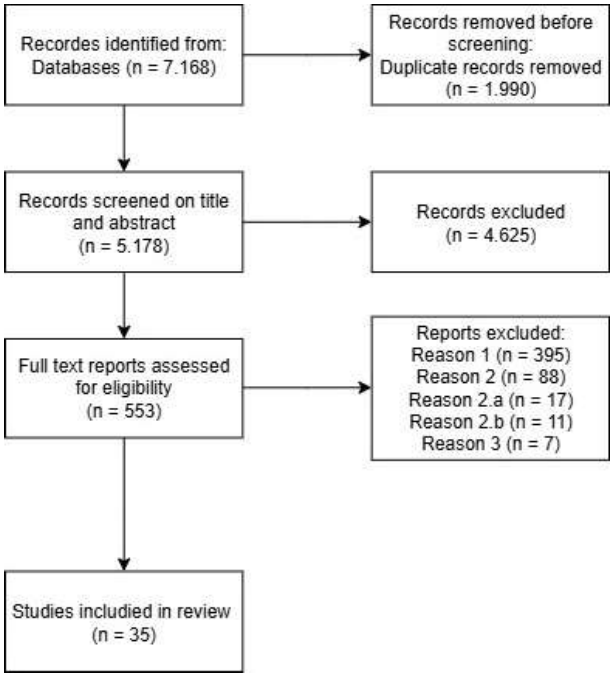

Figure 1: Prisma flow chart presenting the screening process

pattern reported in the highest number of articles was retained. In case of equal reporting frequencies, the label from the most recently published article was used.

Thirdly, a first version of the taxonomy was created. In four iterations codes were grouped into category groups, categories and subcategories based on perceived thematic relatedness.

Finally, as a final validation step, each pattern was checked to ensure it could be placed within the taxonomy, and where placement was uncertain, the taxonomy was refined until a final version was established.

3 Results

This section is structured in two parts. The first part presents the results of the scoping review, including the inventory of WOPs. The second part builds upon these findings to develop a taxonomy through the QCA process.

3.1 Scoping review

The scoping review conducted for this study aimed to extract WOPs that have been previously studied. The primary outcome of this scoping review is therefore an inventory of such patterns. To provide additional context to these findings, a descriptive overview of the included studies is offered first.

The screening process of all identified articles is summarized in the PRISMA flowchart presented in Figure 1. The flowchart outlines the number of records identified, screened, and assessed for eligibility, as well as the final number of studies included in the review. Reasons for exclusion at the full-text screening stage are included in the figure and correspond to the exclusion categories described in section 2.1. An overview of all studies included in the review is provided in Appendix D.

3.1.1 Descriptive analysis of included studies

Figure 2 shows the distribution of included studies across organizational sectors. The majority of studies (18 out of 35) were conducted in Business / Industry / Services settings,

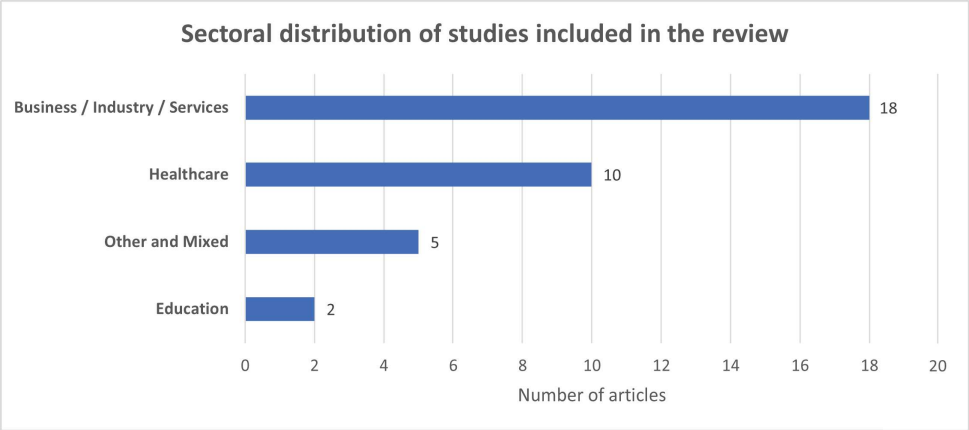

Figure 2: Sectoral distribution of studies included in the review

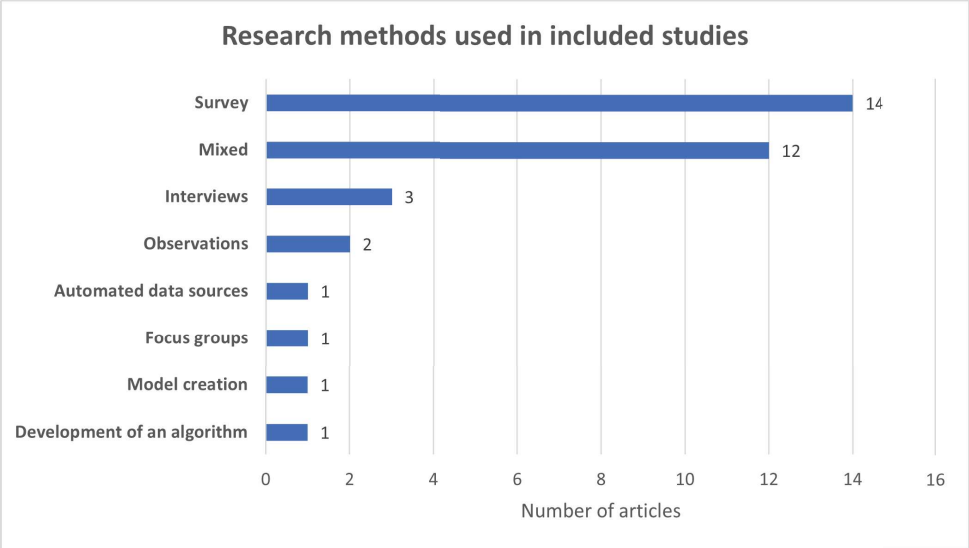

Figure 3: Research methods used in included studies

followed by Healthcare, with 10 studies.

Figure 3 presents the distribution of research methodologies used in the included studies. Surveys were the most frequently applied method (28 studies), followed by interviews (21 studies). Observations and diary keeping appeared less frequently, while only a few studies relied on automatically collected data, such as task-related entries in electronic health records or location tracking information. Overall, this distribution reflects a dominance of self-reported and qualitative approaches.

Twelve studies used a combination of research methods rather than a single approach. The most common combination was interviews and surveys (4 studies), followed by interviews and observations (3 studies), and diary keeping and interviews (2 studies). The remaining combinations each occurred once, and included focus groups and surveys, literature review and surveys, and automated data collection combined with surveys.

Lastly, the geographical distribution of the included studies is presented in Figure 4. The majority of studies were conducted in Europe (12 studies), followed by North America and Asia, each with 8 studies. A limited number of studies were carried out in South America and Australia, with 1 study each. In addition, two studies were classified as multi-continental, as they reported data collection across more than one continent. Three studies were classified under Not Applicable / Not specified. This category includes studies in which the geographical setting was either not reported or not relevant to the research design. For

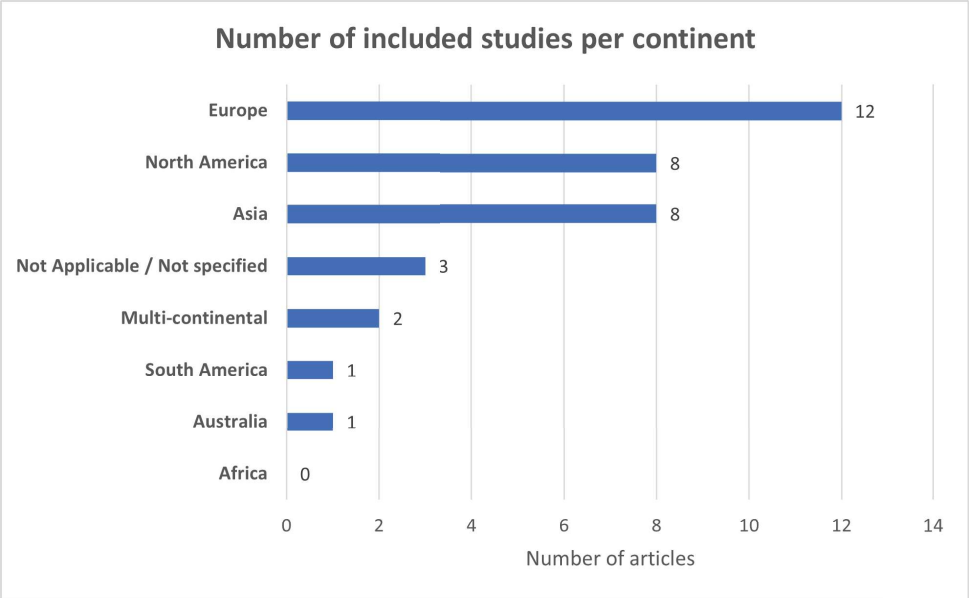

Figure 4: Number of included studies per continent

instance, one study focused on extending a modeling language with a semantic notation to represent priority, without involving data collection in a specific geographical context. The geographical distribution highlights a strong concentration of research in European, North American, and Asian contexts.

3.1.2 Inventory of identified WOPs

Building on the scoping review, a total of 134 WOPs were identified across the 35 included studies. At this stage, no conceptual grouping, synthesis, or interpretation of the patterns was applied. The full inventory, including pattern labels, definitions, and corresponding references, is provided in Appendix E. This inventory forms the empirical foundation for the taxonomy development process described in subsection 3.2.

3.2 Qualitative content analysis and taxonomy creation

In accordance with the QCA process outlined by Elo and Kyngäs [13], the inventory of the 134 WOPs with their definitions served as the unit of analysis. After familiarization with the data through multiple thorough readings, the organizing phase described by Elo and Kyngäs [13] resulted in a final taxonomy. The following subsections present the results of that process.

3.2.1 Open coding of the inventory of WOPs

Firstly, during the open coding phase, each pattern and its definition was examined in detail to identify its core conceptual meaning. Up to three primary and three secondary codes were assigned per pattern to capture its essential conceptual dimension.

To enhance code consistency and transparency, a code book was developed throughout the analysis. For each code whose label could potentially lead to confusion, the code book included an explicit definition together with a list of closely related terms to avoid. In addition, a set of coding rules was established to clarify the distinction between conceptually similar codes.

The complete coding framework, including the full set of assigned codes, the finalized code book with definitions, and the coding rules applied, is provided in Appendices F, G and H for reference. To illustrate the coding process and clarify how conceptual elements were derived from the pattern descriptions, three example WOPs are presented in Table 1.

Table 1: Examples of coded patterns

Ex.	Label	Description	Primary codes	Secondary codes	Rationale
1	Alternative work locations	Locations from which you are allowed to work that are not the company's office buildings.	location; off-site	–	This pattern was coded with the primary code *location* because it specifies the physical place where work is performed. The code *off-site* was assigned to capture the explicit distinction from the organization's main office buildings. No secondary codes were applied as the assigned primary codes unambiguously and contextually fully covered the essence of the pattern.
2	Customer order prioritization	Orders are selectively accepted or prioritized based on profitability, strategic fit, or resource constraints, rather than processing all incoming orders similarly.	characteristic; priority; task	customer order	The primary code *characteristic* reflects the role of task attributes in determining processing order, while *priority* indicates the explicit ordering of tasks. The code *task* was applied to capture the work unit subject to prioritization. The secondary code *customer order* specifies the prioritization context.
3	Automation	The automation of routine tasks previously performed by manual labor.	automation; routine; task	manual labor	The primary code *automation* captures the technological replacement of human activity, *routine* indicates the repetitive nature of the task, and *task* denotes the unit of work automated. The secondary code *manual labor* contextualizes the type of work being replaced.

3.2.2 Consolidation of identical WOPs

Following the coding stage, a consolidation step was undertaken to remove duplicate patterns. Patterns were considered duplicates when they shared an identical set of primary codes. In these cases, their secondary codes were examined to verify the absence of conceptual distinctions. Where no such distinctions were found, the patterns were considered equivalent in meaning and retained under a single label, following the decision rules outlined in section 2.2. This process identified eight instances of duplication, resulting in the removal of twelve redundant patterns as depicted in Table 2. Consequently, the total number of patterns was reduced from 134 to 122.

Table 2: Overview of equivalent patterns with retained labels indicated in bold.

Equivalent patterns
Activity-based working (P002) + Using core functional spaces (P019)
Rotational assignment system (P088) + **Scheduling tool (P090)**
Flexitime (P035) + Staggered work hours (P103) + **Use flex time (P119)**
Fragmentation of work (P036) + Microproductivity (P061)
Linear processing (P056) + **Sequential (P094)** + Round up before embarking on next task (P130)

Continued on next page

Table 2: Overview of equivalent patterns with retained labels indicated in bold. (Continued)

Equivalent patterns
Alternative work locations (P006) + Blended working (P014) + Multi-location work (P063) + **Telework (P114)**
Part-time work (P073) + **Short working hours (P097)**
Task switching (P109) + Task transition (P110)

3.2.3 Construction of the taxonomy

Following the consolidation of patterns, the analysis proceeded with the construction of an initial version of the taxonomy. This required four iterative rounds, in which the coded patterns were successively clustered, refined, and reorganized.

During the *first iteration* all unique codes were reviewed and clustered into provisional groups, referred to as categories, based on thematic relatedness. Grouping was performed manually using the code definitions established during the coding phase. At this stage, no formal category labels were assigned. Where the conceptual fit of a code was ambiguous, its placement was either postponed or the code was temporarily assigned to more than one category. These unassigned codes were revisited once the (sub)categories had been further developed and assigned labels and definitions, which facilitated their placement. In total, 11 categories were identified. An overview of these categories is presented in Table 3.

Table 3: Initial categorization of codes. Codes assigned to multiple categories are indicated in italics.

Category Number	Associated codes
1	task, characteristic, priority, sequence, task assignment, execution sequence, algorithm-based, simultaneous, workload-based, interruption, frequency, customer order, innate, iteration, matrix, sequential, parallel, batching, routine, linear
2	location, off-site, setup, workspace, office building, home based, alternative locations, shared desk, work location
3	tool, *duplication*, screen expanding, screen mirroring, usage, electronic device, *information entry*, multiple devices, digital tool, online, splitting, *demonstration*, ICT-based, *PowerPoint*, pop-up, device, tablet
4	meeting, collaboration, information, communication, team, coworker, leader, *demonstration*, relationship management, professional relationship, external, handover, *PowerPoint*
5	data omission, workaround, incorrect location, out system, in system, verbal consent, *information entry*, pre-execution, incorrect data, alert, login details
6	pending, periodically, fewer days, shiftwork, workdays, overtime, full-time, schedule, part-time, flexible, calendar, planning, time, unplanned, procrastination, weekend, availability
7	consolidation, governance, hierarchical, cross-functional, role assignment, self-determined, non-hierarchical, task force, crowd control, hiring
8	paper, organized storage, *duplication*, print
9	goal, job, project, work organization, responsibility
10	workload, workload-based
11	fixed payment, contract, fixed duration, variable payment
unassigned codes	continuous improvement, manual labor, automation, self-sufficient, transfer, exclusive, acquisition, fixed, unexpected, instant, increase, adaptation, non-work related, fragmentation, compressed, progress, rotation, limitation, specific, sharing, necessary, list, customer, dynamic, productive, supportive

In the *second iteration* a further refinement step within each of the 11 provisional categories, was undertaken to identify preliminary subcategories of closely related codes. This process was guided by the definitions established in the code book and by examining the definitions of the patterns in which the codes appeared. At this stage, preliminary (sub)category

names were assigned. In parallel, the provisional categories were reviewed for codes that had been assigned to more than one category. For each duplicate occurrence, the associated patterns and their definitions were revisited to determine the most conceptually appropriate placement. This iteration resulted in the creation of 10 preliminary categories and 19 preliminary subcategories, presented in Table 4.

Table 4: Preliminary (sub)categories of codes following refinement and removal of duplicate assignments. (Subcategories indicated in bold)

Provisional category	Associated preliminary subcategories and codes
Task	**Assignment**: algorithm-based, characteristic, workload-based; **Sequence**: execution sequence, frequency, iteration, interruption, simultaneous, batching, linear, parallel; **Priority**: innate, characteristic, matrix, customer order
Work location	**Location**: home-based, alternative locations, office building, off-site; **Workspace**: setup, shared desk
Tools	**Usage**: splitting, screen duplication, screen expanding, screen mirroring, online; **Type**: electronic device, multiple devices, digital tool, ICT-based, tablet
Communication	**Method**: meeting, PowerPoint; **Receiver**: team, coworker, leader, professional relationship; **Reason**: collaboration, external handover, relationship management, demonstration, information
Time	**Schedule**: fewer days, shift work, workdays, full-time, overtime, part-time, weekend; **Planning**: procrastination, flexible, pending, calendar, periodically, availability, unplanned
Workaround	**In system**: data omission, sharing login details, incorrect location, incorrect data, pre-execution; **Out system**: information entry, alert, verbal consent
Quality	**Continuous improvement**
Storage	paper, print, information, duplication, organized storage
Governance	**Payment**: variable payment, fixed payment; **Hiring**: contract, fixed duration; **Policy**: crowd control, automation, role assignment, cross-functional, self-determined; **Structure**: non-hierarchical, hierarchical, consolidation, task force
Job	work organization, project, goal, manual labor, responsibility

Subsequently, in the *third iteration*, categories and subcategories were formalized and definitions were created for each of the categories in order to conceptually define them. This resulted in the creation of the additional category *Quality and information management* as a combination of the provisional categories *Quality* and *Storage*. Additionally, within the category *Job characteristics*, two subcategories were identified. The final structure comprised nine categories and 22 subcategories. An overview is provided in Table 5, followed by the definitions of the categories in Table 6. In parallel with this formalization of (sub)categories, codes that had not yet been assigned to a (sub)category were revisited in the context of the original patterns and their description to determine their most appropriate placement. During this process, four codes were renamed or split to allow for more precise categorization. For example, *fragmentation* was divided into *task fragmentation* and *team fragmentation* to reflect differences in scope, and *rotation* was split into *role rotation* and *task rotation*. Similarly, *limitation* was refined into *limitation of process steps*, *limitation of availability* and *limitation of meetings*, while *necessary* was divided into *ad hoc meetings* and *ad hoc task force creation*. These refinements illustrate the iterative character of inductive content analysis. As the structure of categories emerged, some codes were revisited and refined to ensure a closer conceptual fit with the underlying data. This is consistent with the non-linear, cyclical nature of the analysis process described by Elo and Kyngäs [13].

Table 5: Categories and subcategories with associated codes.

Category	Subcategory	Associated codes
Task flow organization	Task allocation	algorithm-based, workload-based
	Prioritization	innate, customer order, characteristic, matrix
	Task sequence	linear, parallel, batching, interruption, iteration, execution sequence, simultaneous, fixed, unexpected, task fragmentation, task rotation
Spatial work organization	Workplace layout and setup	setup, shared desk, workspace, adaptation, non-work related
	Workplace location	home-based, alternative locations, location, off-site, office building
Use of tools and technology	Tool types and platforms	tablet, multiple devices, electronic device, ICT-based, digital tool, exclusive
	Tool usage practices	usage, screen duplication, online, screen mirroring, splitting, screen expanding, alert, transfer, progress
Communication and interaction	Communication direction and target audience	coworker, team, customer
	Communication purpose and relationship context	demonstration, relationship management, information, collaboration, external handover, limitation of availability, productive
	Communication methods	meeting, PowerPoint, instant, limitation of meetings, ad hoc meetings, dynamic, supportive
Work planning	Work time scheduling	part-time, full-time, weekend, overtime, fewer days, shift work, workdays
	Time organization	frequency, unplanned, pending, flexible, availability, procrastination, periodically, calendar, increase, list
Workaround	Out system	paper, verbal consent
	In system	data omission, login details, incorrect location, information entry, pre-execution, incorrect data, pop-up
Quality and information management	Quality assurance	continuous improvement, limitation of process steps, compressed
	Information storage and archiving	print, duplication, organized storage
Organization structure and framework	Role distribution and hierarchy	hierarchical, non-hierarchical, self-determined, consolidation, cross-functional, role assignment, task force, leader, self-sufficient, team fragmentation, role rotation, ad hoc task force creation
	Policy and governance	automation, policy, crowd control
	Compensation structure	fixed payment, variable payment
	Recruitment and contract	fixed duration, contract
Job characteristics	Job type	work organization, goal, project, manual labor, sharing
	Responsibility	responsibility

Table 6: Definitions of categories

Category	Definition
Task flow organization	The structuring and sequencing of work tasks, including their allocation, prioritization and execution order, to optimize workflow efficiency and effectiveness.

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Table 6: Definitions of categories (Continued)

Category	Definition
Spatial work organization	The physical arrangement, setup and location of the workplace, indicating how employees interact with their work environment.
Use of tools and technology	The selection, integration and application of technical tools, platforms and devices to support, facilitate, enhance or execute work processes.
Communication and interaction	The patterns, purposes and methods of information exchange and interpersonal engagement within and beyond the organization.
Work planning	The structuring and scheduling of work time and activities including time allocation, flexibility and temporal coordination of tasks.
Workaround	The deliberate deviation from formal processes or systems to bypass (subjective) constraints or inefficiencies.
Quality and information management	The practices and procedures aimed at ensuring process quality, continuous improvement and the organization and preservation of information.
Organization structure and framework	The formal and informal arrangements of roles, governance, policies and recruitment.
Job characteristics	The defining attributes of a job, including its nature, goals, responsibilities and scope of work.

During the final and *fourth iteration*, categories and subcategories were reviewed to identify additional abstraction levels. This abstraction stage led to the identification of three overarching category groups:

1. Structuring of work – Covering all categories that describe how work is formally organized and planned.
2. Enabling & supporting mechanisms – Comprising the tools, interactions and quality-related processes that facilitate the execution of work.
3. Adaptive & deviant practices – Encompassing deliberate deviations and adaptations to formal processes.

After the identification of the three overarching category groups, the initial categories and subcategories were revisited to check for internal consistency across abstraction levels. This final iteration resulted in several refinements to better reflect distinctions between the extracted WOPs. For example, the category *Workaround* was divided into *In system workarounds* and *Out system workarounds* to capture a recurrent differentiation across patterns. In addition, the labels of certain subcategories were adjusted to more accurately reflect their content, and new subcategories were introduced to more precisely define the scope of the codes they encompass. The full first version of the taxonomy including all codes associated with each subcategory is provided in tabular form in Appendix I. A visual representation of this first version is presented in Appendix J and represents the overarching category groups and their constituent categories and subcategories.

3.2.4 Mapping of patterns to the taxonomy

Following the development of the first version of the taxonomy, a deductive mapping exercise was conducted to verify the alignment between the final inventory of 122 WOPs and the taxonomy. In line with the reporting phase described by Elo and Kyngäs [13], this step aimed to ensure traceability between the source data (i.e. the inventory of WOPs) and the analytical result (i.e. the taxonomy), thereby strengthening the credibility and trustworthiness of the findings.

The mapping was performed layer-by-layer, first determining the appropriate category group before assigning the pattern to a category and subcategory within that scope. This approach was adopted to preserve the contextual meaning of the pattern, which could otherwise be lost if it were directly allocated at the lowest level. To facilitate the mapping and to enable precise referencing throughout the analysis, each category group, category and subcategory was assigned a unique alphanumeric code.

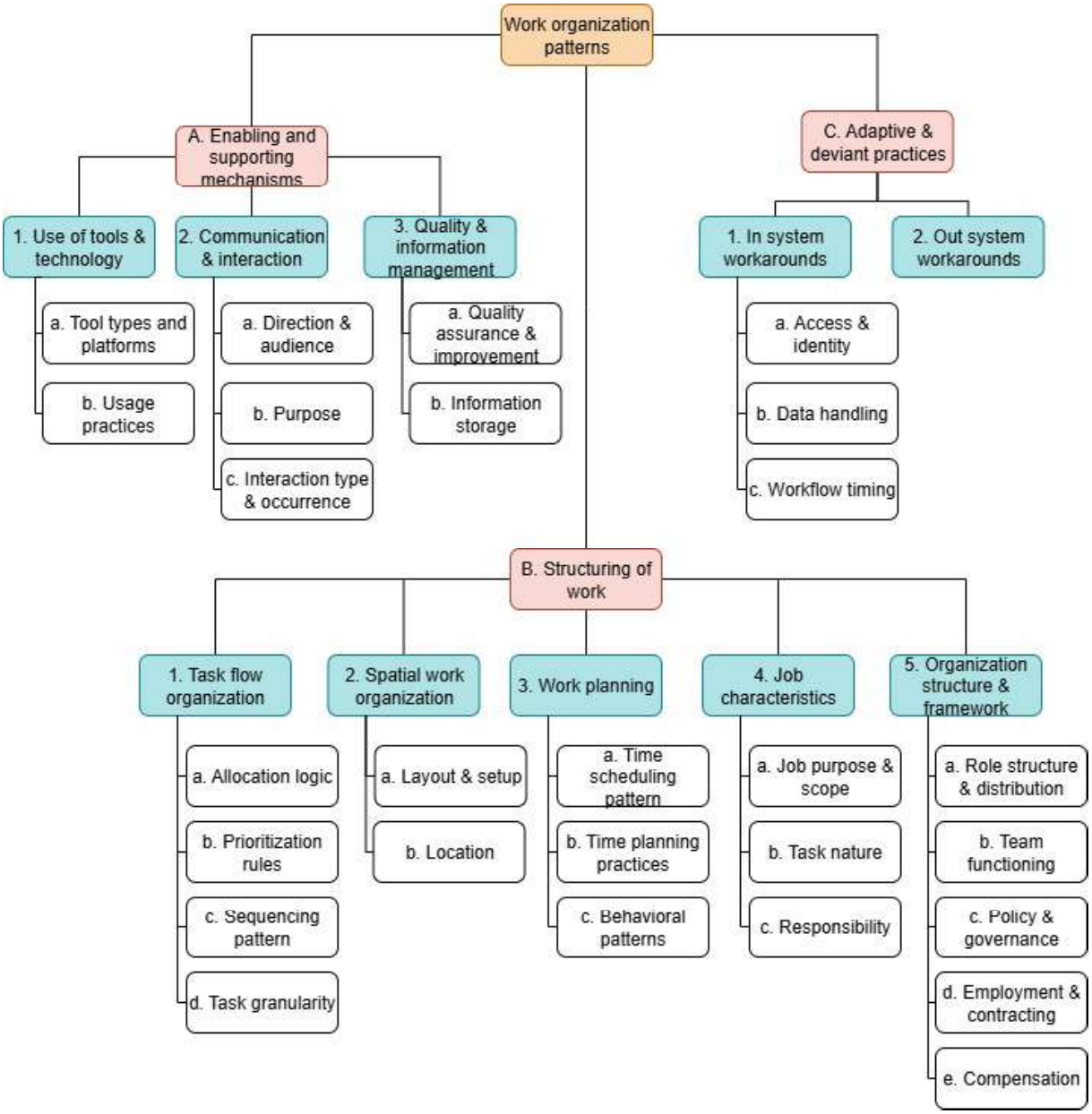

Figure 5: Final taxonomy

Assignment decisions were guided by the principle of focusing on the central conceptual aspect of each pattern. While many patterns encompassed multiple facets, categorization was based on the dominant conceptual feature as expressed in its definition. In cases of ambiguity, the mapping was revisited and its dominant conceptual feature was determined. Notes were kept to record patterns for which alternative placements were considered.

The mapping process led to one minor refinement to the taxonomy. The generic category label *Task granularity & assignment rotation* was revised into *Task granularity* to more precisely reflect its conceptual scope. No new categories were required, and all 122 patterns could be allocated without forcing or stretching the category boundaries. This demonstrated that the taxonomy was conceptually comprehensive and sufficiently fine-grained.

The complete mapping, including notes on alternative classifications, is presented in Appendix K. The final taxonomy of WOPs is presented in figure 5.

4 Discussion

This study developed a taxonomy of WOPs through an inductive QCA based on an inventory of WOPs obtained via a scoping review. Its novelty lies in providing the first structured and comprehensive overview of such patterns, whereas previous research primarily examined them in a fragmented manner, often focusing on individual or context-specific examples. By consolidating these dispersed insights into an integrated classification taxonomy, the study offers a shared language that enables patterns to be positioned in relation to each other, making it possible to compare their characteristics, prevalence, and contextual variations across settings. In doing so, the taxonomy facilitates more targeted reflection by healthcare organizations on the conditions under which certain patterns emerge. Moreover, it enables future studies to accumulate knowledge by comparing patterns within and across healthcare organizations.

The scope of this taxonomy extends beyond more narrow constructs such as workflows, behavioral styles, or organizational policies. Consistent with the broad conceptualization of work organization by the European Foundation for the Improvement of Living and Working Conditions [14], it encompasses all phenomena related to task allocation, sequencing, collaboration, and communication.

4.1 Reflections on the scoping review

The performed scoping review served as the empirical foundation for the taxonomy, therefore its design choices influenced the resulting classification. Its main strength lies in the systematic, transparent, and sector-crossing search process. This broad, exploratory approach was appropriate given the fragmented state of literature on WOPs.

However, several limitations need to be acknowledged. The decision to restrict inclusions to the past five years possibly excluded older potentially relevant patterns. The review also revealed geographical and methodological biases. Most studies originated from Europe, North America or Asia, with an overrepresentation of self-reported methods such as surveys and interviews. Furthermore, when patterns were described in the literature but not explicitly labeled as such, a label was assigned by the researcher. Similarly, when no definition was provided in the original source, a definition was formulated based on the contextual information in the article. While this approach ensured that all patterns could be included in the inventory, it also introduces a potential source of bias, as another researcher might have labeled or defined these patterns differently.

These constraints may have led to gaps in the inventory, potentially omitting certain dimensions or categories from the taxonomy. At the same time, this underscores the rationale for designing the taxonomy as a 'living' instrument, open to iterative refinement as new evidence emerges.

4.2 Methodological reflections on the QCA process

The taxonomy was constructed following the three-phase QCA process described by Elo and Kyngäs [13]. The open coding stage used iterative code book development and coding rules to mitigate subjectivity and ensure internal consistency. In this phase, the 134 patterns identified in the inventory were systematically coded. This systematic approach aligns with best practices for enhancing trustworthiness: clear definitions, decision rules for ambiguous cases and documentation of all analytical choices.

Nonetheless, several methodological challenges inherent to inductive QCA remain relevant. Firstly, although coding rules reduced inconsistency, the single-coder design increases the risk of selective attention or implicit bias. Secondly, as indicated by Elo and Kyngäs [13], the interpretive nature of category creation means that decisions are unavoidably shaped by the researcher's perspective. Thirdly, the abstraction process required balancing breadth and specificity: overly broad categories risked obscuring nuances, while overly narrow ones undermine the taxonomy's integrative aim. These tensions were managed by mapping all patterns back to the taxonomy and refining categories until conceptual fit was achieved. However, further inter-coder testing is advised to strengthen reproducibility.

4.3 Applications and conceptual contribution

The constructed taxonomy provides a conceptual foundation for further academic research as well as applied research in healthcare organizations. Firstly, the taxonomy can serve as guide for conducting observational research. Empirically observed patterns can be classified within the taxonomy, enabling comparison across contexts. For example, measuring the prevalence of *Interruption* patterns across hospital wards could discover the drivers of workflow disruptions. Beyond observational studies, the taxonomy also enables systematic analysis through methods such as process mining, as it provides a structured lens that allows the abstract concept of WOPs to be operationalized and measured.

Secondly, the taxonomy can guide organizations in organizational redesign. When a disruptive or inefficient pattern is identified, the taxonomy can help organizations reflect on alternative arrangements by locating the pattern within its conceptual category. For instance, when repeated interruptions during ward rounds are observed, the taxonomy can highlight alternative coordination mechanisms that reduce disruption.

Thirdly, the taxonomy can support linking WOPs to organizational outcomes. By providing a consistent classification, it facilitates studies that examine how specific patterns relate to performance indicators such as quality, efficiency, safety, or resilience. For instance, research could investigate whether adopting parallel rather than sequential approaches to patient processing affects indicators such as waiting times, throughput time or patient satisfaction. Such analyses are particularly relevant in healthcare, where efficiency must be balanced with safety and quality of care.

Conceptually, the taxonomy serves as a bridge between research domains and different sectors. This cross-contextual scope allows healthcare organizations to learn from patterns observed in other domains, while retaining the ability to situate findings within their own operational realities.

4.4 Future research

Given its 'living' design, the taxonomy is subject to iterative refinement, which is also encouraged by the researcher. Hence, future studies could:

- Validate its usability and completeness across sectors, organizational levels, and cultural contexts. For example, studies might test whether the developed categories adequately capture WOPs in multidisciplinary care teams.
- Test its ability to capture patterns in underrepresented geographical regions and sectors.
- Investigate associations between taxonomy categories, the patterns within and organizational outcomes such as quality of care, patient safety, efficiency, or resilience. For instance, examining whether frequent *Interruption* patterns in hospital wards are associated with increased medication errors or delayed care delivery.
- Expand the taxonomy where new patterns emerge, revisiting category structures and placement if conceptual boundaries change. In healthcare, this could include new organizational forms linked to digital health innovations or integrated care pathways.
- Translate patterns into algorithmic representations that allow for automated detection in event data (e.g. through process mining of electronic health records).

To conclude, this study serves as a call to further investigate, validate, and apply the developed taxonomy in diverse contexts, thereby contributing to its refinement and maturation into a robust and useful construct.

5 Conclusion

This study set out to develop a taxonomy of WOPs. Through a scoping review and an inductive QCA, an inventory of empirically observed patterns was compiled and abstracted into a taxonomy comprising three overarching category groups and ten categories. The

taxonomy offers a clear classification framework that captures the diversity and complexity of work organization, addressing a notable gap in scientific literature. By providing conceptual clarity and a shared terminology, it enables comparison, cumulative knowledge building and theoretical refinement across domains. In the healthcare sector, it offers a concrete instrument for making implicit WOPs explicit, critically evaluating them and linking them to relevant outcomes such as quality, efficiency, cost-effectiveness and flexibility.

The current taxonomy should be considered a starting point rather than a final product. Further empirical validation is essential to assess its usability, completeness and applicability across diverse contexts. Future research should expand coverage to underrepresented settings, test the relationship between patterns and organizational outcomes and explore its integration into digital monitoring and process improvement initiatives. Through interdisciplinary collaboration, the taxonomy could gradually evolve into a widely recognized reference that supports closer alignment between science and practice and that may, over time, help healthcare systems under pressure revisiting how they organize work.

References

[1] Ghassan A Ahmed and Meervat R Altaie. Investigation the opportunity of bim with agile management approach in iraqi construction projects. In *E3S web of conferences*, volume 318, page 02001. EDP Sciences, 2021.

[2] Magnus Akerstrom, Anna Wessberg, Emina Hadžibajramović, Sofie Graner, Ylva Carlsson, Ola Andersson, Maria Jonsson, Elin Naurin, Malin Veje, Verena Sengpiel, et al. Maintaining operability at a high personal cost–a mixed method study on maternal healthcare workers' experiences during the covid-19 pandemic. *BMC Health Services Research*, 25(1):173, 2025.

[3] Jumana Almahmoud, Robert DeLine, and Steven M Drucker. How teams communicate about the quality of ml models: a case study at an international technology company. *Proceedings of the ACM on Human-Computer Interaction*, 5(GROUP):1–24, 2021.

[4] Alanoud Alsulami, Fatma Mabrouk, and Jihen Bousrih. Flexible working arrangements and social sustainability: study on women academics post-covid-19. *Sustainability*, 15(1):544, 2022.

[5] Juan Carlos Alvarez de la Vega, Marta E Cecchinato, John Rooksby, and Joseph Newbold. Understanding platform mediated work-life: a diary study with gig economy freelancers. *Proceedings of the ACM on Human-Computer Interaction*, 7(CSCW1): 1–32, 2023.

[6] E. Aromataris, C. Lockwood, K. Porritt, B. Pilla, and Z. Jordan. *JBI Manual for Evidence Synthesis*. JBI, 2024. ISBN 978-0-6488488-2-0.

[7] Lindsey Barrick, Danny TY Wu, Theresa Frey, Derek Shu, Ruthvik Abbu, Stephen C Porter, and Kevin M Overmann. Improving care delivery: location timestamps to enhance process measurement of a clinical workflow. *Pediatric Quality & Safety*, 6(5): e475, 2021.

[8] Albert Boonstra, Tess L Jonker, Marjolein AG van Offenbeek, and Janita FJ Vos. Persisting workarounds in electronic health record system use: types, risks and benefits. *BMC medical informatics and decision making*, 21(1):183, 2021.

[9] Behnaz Changizi, Natallia Kokash, Farhad Arbab, and Leonid Makhnist. Compositional workflow modeling with priority constraints. *Science of Computer Programming*, 203: 102578, 2021.

[10] Cameron Coleman, David Gotz, Samantha Eaker, Elaine James, Thomas Bice, Shannon Carson, and Saif Khairat. Analysing ehr navigation patterns and digital workflows among physicians during icu pre-rounds. *Health Information Management Journal*, 50 (3):107–117, 2021.

[11] JP Edwards, B Kuhn-Sherlock, BT Dela Rue, and CR Eastwood. Technologies and milking practices that reduce hours of work and increase flexibility through milking efficiency in pasture-based dairy farm systems. *Journal of Dairy Science*, 103(8): 7172–7179, 2020.

[12] Tobias T Eismann, Oscar Pakos, Marc Rücker, Martin Meinel, Lukas Maier, and Kai-Ingo Voigt. Understanding the mechanisms of activity-based workspaces: A case study. *Environment and Behavior*, 54(1):170–210, 2022.

[13] Satu Elo and Helvi Kyngäs. The qualitative content analysis process. *Journal of advanced nursing*, 62(1):107–115, 2008.

[14] European Foundation for the Improvement of Living and Working Conditions. Work organisation | European Foundation for the Improvement of Living and Working Conditions, 2024. URL `https://www.eurofound.europa.eu/en/topic/work-organisation`. Accessed: 2024-09-26.

[15] Sophie Gerkens, Mélanie Lefevre, Nicolas Bouckaert, Muriel Levy, Charline Maertens de

Noordhout, Caroline Obyn, Carl Devos, Aline Scohy, Annemie Vlayen, Harun Yaras, et al. Performance of the belgian health system: Report 2024. 2024.

[16] Cameron Guthrie. Knowledge worker fitness in the workspace: self-managing at the edge of chaos. *Knowledge Management Research & Practice*, 19(2):181–196, 2021.

[17] María D Lozano Gutiérrez, Franco Rojas López, and Guadalupe Rovira Ochoa. Adaptive strategies: Algorithmic analysis of pre-and post-pandemic manager-frontline employee communication model in restaurants. *Emerging Science Journal*, 8(5):2023–2046, 2024.

[18] Lisa Handke, Giverny De Boeck, and Sharon K Parker. Exploring the use of icts as a tool for job crafting. *Journal of Vocational Behavior*, 156:104081, 2025.

[19] Carey L Higgins-Dobney. News work: The impact of corporate-implemented technology on local television newsroom labor. *Journalism Practice*, 15(8):1054–1071, 2021.

[20] Karin Högberg. Multiple social media in practice–investigating emergent work practices. *Journal of Computer Information Systems*, 63(1):68–80, 2023.

[21] Kenneth C Hohmeier, Chasity Shelton, Dawn Havrda, and Justin Gatwood. The need to prioritize "prioritization" in clinical pharmacy service practice and implementation. *Research in Social and Administrative Pharmacy*, 16(12):1785–1788, 2020.

[22] Hsiu-Fang Hsieh and Sarah E Shannon. Three approaches to qualitative content analysis. *Qualitative health research*, 15(9):1277–1288, 2005.

[23] Mohammad Javad Koohsari, Tomoki Nakaya, Ai Shibata, Kaori Ishii, and Koichiro Oka. Working from home after the covid-19 pandemic: do company employees sit more and move less? *Sustainability*, 13(2):939, 2021.

[24] G Kacholi and MG Anasel. Health at a glance 2023: Oecd indicators, 2023.

[25] Ilona Kickbusch and David Eric Gleicher. *Governance for health in the 21st century*. WHO Regional office for Europe, 2012.

[26] Margaret E. Kruk, Anna D. Gage, Catherine Arsenault, Keely Jordan, Hannah H. Leslie, Sanam Roder-DeWan, Olusoji Adeyi, Pierre Barker, Bernadette Daelmans, Svetlana V. Doubova, Mike English, Ezequiel García-Elorrio, Frederico Guanais, Oye Gureje, Lisa R. Hirschhorn, Lixin Jiang, Edward Kelley, Ephrem Tekle Lemango, Jerker Liljestrand, Address Malata, Tanya Marchant, Malebona Precious Matsoso, John G. Meara, Manoj Mohanan, Youssoupha Ndiaye, Ole F. Norheim, K. Srinath Reddy, Alexander K. Rowe, Joshua A. Salomon, Gagan Thapa, Nana A. Y. Twum-Danso, and Muhammad Pate. High-quality health systems in the sustainable development goals era: time for a revolution. 6(11):e1196–e1252. ISSN 2214-109X. Publisher: Elsevier.

[27] Christian Kruse, Daniela Becks, and Sebastian Venhuis. User-centered assembly knowledge documentation: a graph-based visualization approach. In *International Conference on Human-Computer Interaction*, pages 194–207. Springer, 2022.

[28] Fulya Aydinli Kulak and Vala Lale Tuzuner. A comparative analysis of flexible working patterns in germany and turkey. *International Journal of Research in Business and Social Science*, 9(4):1–14, 2020.

[29] Qingchuan Li, Zhao Xu, and Yang Chen. Understanding college students' cross-device learning behavior in the wild: Device ecologies, physical configurations, usage patterns, and attention issues. *Computers & Education*, page 105259, 2025.

[30] Lesley Meng, Robert J Batt, and Christian Terwiesch. The impact of facility layout on service worker behavior: An empirical study of nurses in the emergency department. *Manufacturing & Service Operations Management*, 23(4):819–834, 2021.

[31] Katelyn Morrison, Shamsi T Iqbal, and Eric Horvitz. Ai-powered reminders for collaborative tasks: Experiences and futures. *Proceedings of the ACM on Human-Computer Interaction*, 8(CSCW1):1–20, 2024.

[32] Zachary Munn, Micah DJ Peters, Cindy Stern, Catalin Tufanaru, Alexa McArthur, and Edoardo Aromataris. Systematic review or scoping review? guidance for authors when choosing between a systematic or scoping review approach. *BMC medical research methodology*, 18:1–7, 2018.

[33] Olugbenga Timo Oladinrin, Wadu Mesthrige Jayantha, and Lekan Damilola Ojo. New work practices and their drivers in fireb firms: evidence from hong kong. *Journal of Corporate Real Estate*, 25(3):205–228, 2022.

[34] World Health Organization et al. *COP26 special report on climate change and health: the health argument for climate action*. World Health Organization, 2021.

[35] Johanna Maria Ospel, Mohammed A Almekhlafi, Bijoy K Menon, Nima Kashani, René Chapot, Jens Fiehler, Ameer E Hassan, Dileep Yavagal, Charles B LM Majoie, Mahesh V Jayaraman, et al. Workflow patterns and potential for optimization in endovascular stroke treatment across the world: results from a multinational survey. *Journal of neurointerventional surgery*, 12(12):1194–1198, 2020.

[36] Bethan Page, Dulcie Irving, Rene Amalberti, and Charles Vincent. Health services under pressure: a scoping review and development of a taxonomy of adaptive strategies. *BMJ Quality & Safety*, 33(11):738–747, 2024.

[37] Vimla L Patel, Courtney A Denton, Hiral C Soni, Thomas G Kannampallil, Stephen J Traub, and Jason S Shapiro. Physician workflow in two distinctive emergency departments: an observational study. *Applied clinical informatics*, 12(01):141–152, 2021.

[38] Micah Peters, Christina Godfrey, Patricia Mcinerney, Cassia Soares, Hanan Khalil, and Deborah Parker. Methodology for JBI Scoping Reviews. In *The Joanna Briggs institute reviewers manual 2015*, pages 1–24. Joanna Briggs Institute, August 2015.

[39] Chiara Tagliaro and Alessandra Migliore. "covid-working": what to keep and what to leave? evidence from an italian company. *Journal of Corporate Real Estate*, 24(2): 76–92, 2022.

[40] Kohei Takahashi, Naomi Kodama, Kentaro Arita, Haruka Kazama, Saisuke Sakai, Masaya Takeuchi, and Hideo Owan. Has japan's work style reform had the intended effect? *Applied Economics*, 57(21):2757–2780, 2025.

[41] Andrea C Tricco, Erin Lillie, Wasifa Zarin, Kelly K O'Brien, Heather Colquhoun, Danielle Levac, David Moher, Micah DJ Peters, Tanya Horsley, Laura Weeks, et al. Prisma extension for scoping reviews (prisma-scr): checklist and explanation. *Annals of internal medicine*, 169(7):467–473, 2018.

[42] Kirtana Vallabhaneni, Jemma Hazan, Lucinda Donaldson, and Fredrik Johansson. Improving the handover process in a psychiatry liaison setting. *BMJ Open Quality*, 11 (1):e001627, 2022.

[43] Outi Vanharanta, Matti Vartiainen, and Kirsi Polvinen. Job challenges are hindrances too: examining experiences of managers and employees in finnish smes. *Journal of Small Business and Enterprise Development*, 29(6):975–992, 2022.

[44] Daniel Walker, Martin Ruane, Jaume Bacardit, and Shirley Coleman. Insight from data analytics in a facilities management company. *Quality and Reliability Engineering International*, 38(3):1416–1440, 2022.

[45] Louie HM Wong, Luminita Hurbean, Robert M Davison, Carol XJ Ou, and Mihaela Muntean. Working around inadequate information systems in the workplace: An empirical study in romania. *International Journal of Information Management*, 64: 102471, 2022.

[46] Danny TY Wu, Derek Shu, Khanh Le, Ruthik Abbu, and Kai Zheng. Applying visual analytics to develop a clinical workflow analysis tool (cwat) to explore time and motion data in healthcare. In *2022 Workshop on Visual Analytics in Healthcare (VAHC)*, pages 01–05. IEEE, 2022.

[47] Halil Yorulmaz and Elif Baykal. Telework as a dynamic capability of firms: A qualitative research and narratives. *Управленец*, 15(1):2–14, 2024.

[48] Zheng Zhang, Bo Li, and Wei He. Double-edged sword effect of informal status on work procrastination: the roles of career calling and workload. *Current Psychology*, 43(17):15633–15648, 2024.

Appendices

A Finalized search string for Web of Science

TS=(”work* habit*” OR ”work* pattern*” OR ”work* routine*” OR ”workflow habit*” OR ”work* practice*” OR ”work* behavio$r” OR ”work* style*” OR ”employee habit*” OR ”job routine*” OR ”task interdependence” OR ”workload management” OR ”organi$ation* behavior*” OR ”organization* behavio$r*”)

AND

TS=(”employee*” OR ”corporate work*” OR ”knowledge worker*” OR ”office worker*” OR ”workflow” OR ”workplace productivity” OR ”work* design” OR ”task complexity” OR ”work* autonomy” OR ”time management” OR ”efficiency” OR ”task engagement” OR ”behavio$r* operation*” OR ”organi$ation* structure” OR ”behavio$r* operations management” OR ”organi$ation* behavior*” OR ”organization* behavio$r*”)

AND

TS=(”empirical study” OR ”longitudinal study” OR ”observational study” OR ”naturalistic study” OR ”behavio$ral tracking study” OR ”time-use study” OR ”workflow analysis” OR ”real-world study” OR ”field experiment” OR ”diary study” OR ”case study” OR ”experimental study” OR ”survey”)

B Finalized search string for Scopus

TITLE-ABS-KEY (”work* habit*” OR ”work* routine*” OR ”work* pattern*” OR ”work* behavio$r” OR ”work* style*” OR ”work* practice*” OR ”employee habit*” OR ”job routine*” OR ”workflow habit*” OR ”task interdependence” OR ”workload management” OR ”organi$ation* behavior*” OR ”organization* behavio$r*”)

AND

TITLE-ABS-KEY (”knowledge worker*” OR ”employee*” OR ”corporate work*” OR ”office worker*” OR ”workplace productivity” OR ”behavio$r* operation*” OR ”work* design” OR ”task complexity” OR ”work* autonomy” OR ”workflow” OR ”time management” OR ”efficiency” OR ”task engagement” OR ”organi$ation* structure” OR ”behavio$r* operations management” OR ”organi$ation* behavior*” OR ”organization* behavio$r*”)

AND

TITLE-ABS-KEY (”empirical study” OR ”longitudinal study” OR ”observational study” OR ”naturalistic study” OR ”behavio$ral tracking study” OR ”time-use study” OR ”workflow analysis” OR ”real-world study” OR ”field experiment” OR ”diary study” OR ”case study” OR ”experimental study” OR ”survey”)

C Finalized search string for Proquest Central

summary((”work* habit*” OR ”work* routine*” OR ”work* pattern*” OR ”work* behavio?r” OR ”work* style*” OR ”work* practice*” OR ”employee habit*” OR ”job routine*” OR ”workflow habit*” OR ”task interdependence” OR ”workload management” OR ”organi?ation* behavior*” OR ”organization* behavio?r*”))

AND

summary((”knowledge worker*” OR ”employee*” OR ”corporate work*” OR ”office worker*” OR ”workplace productivity” OR ”behavio?r* operation*” OR ”work* design” OR ”task complexity” OR ”work* autonomy” OR ”workflow” OR ”time management” OR ”efficiency” OR ”task engagement” OR ”organi?ation* structure” OR ”behavio?r* operations management” OR ”organi?ation* behavior*” OR ”organization* behavio?r*”))

AND

summary((”empirical study” OR ”longitudinal study” OR ”observational study” OR ”naturalistic study” OR ”behavio?ral tracking study” OR ”time-use study” OR ”workflow analysis” OR ”real-world study” OR ”field experiment” OR ”diary study” OR ”case study” OR ”experimental study” OR ”survey”))

D Metadata of included studies

Table 7: Metadata of included studies

ID	Author (Year)	Context	Method	Level	Country	No. of patterns
1	Zhang et al. (2024) [48]	Business	Survey	Individual	China	1
2	Li et al. (2025) [29]	Education	Diary keeping	Individual	China	8
3	Handke et al. (2025) [18]	Multiple sectors	Interviews and Surveys	Individual	Germany	17
4	Akerstrom et al. (2025) [2]	Healthcare	Focus groups	Mixed levels	Sweden	2
5	Morrison et al. (2024) [31]	Business	Interviews and Surveys	Organization	USA	6
6	Yorulmaz and Baykal (2024) [47]	Business	Interviews	Individual	Turkey	5
7	Takahashi et al. (2025) [40]	Multiple sectors	Survey	Mixed levels	Japan	13
8	Gutiérrez et al. (2024) [17]	Business	Survey	Mixed levels	Mexico	3
9	Alsulami et al. (2022) [4]	Education	Survey	Across organizations	Saudi Arabia	1
10	Alvarez de la Vega et al. (2023) [5]	Business	Diary keeping and Interviews	Individual	International	4
11	Oladinrin et al. (2022) [33]	Business	Survey	Mixed levels	China	17
12	Wong et al. (2022) [45]	Business	Survey	Individual	Romania	1
13	Walker et al. (2022) [44]	Business	Model creation	Team	UK	1
14	Eismann et al. (2022) [12]	Business	Interviews	Organization	Germany	4
15	Vanharanta et al. (2022) [43]	Business	Survey	Individual	Finland	3
16	Tagliaro and Migliore (2022) [39]	Business	Survey	Individual	Italy	3
17	Wu et al. (2022) [46]	Healthcare	Interviews and Observations	Individual	USA	3
18	Kruse et al. (2022) [27]	Business	Workshops	Organization	Germany	1
19	Vallabhaneni et al. (2022) [42]	Healthcare	Survey	Team	UK	4
20	Coleman et al. (2021) [10]	Healthcare	Observations	Individual	USA	1
21	Guthrie (2021) [16]	Business	Interviews and Observations	Mixed levels	International	12

Continued on next page

Table 7: Metadata of included studies (Continued)

ID	Author (Year)	Context	Method	Level	Country	No. of patterns
22	Changizi et al. (2021) [9]	Technical paper	Algorithm development	Not Applicable	Not Applicable	2
23	Almahmoud et al. (2021) [3]	Business	Interviews and Surveys	Individual	Not mentioned	8
24	Higgins-Dobney (2021) [19]	Business	Interviews and Surveys	Individual	USA	2
25	Boonstra et al. (2021) [8]	Healthcare	Interviews and Observations	Individual	Netherlands	15
26	Javad Koohsari et al. (2021) [23]	Multiple sectors	Survey	Individual	Japan	1
27	Ahmed and Altaie (2021) [1]	Business	Literature review and Surveys	Team	Iraq	9
28	Patel et al. (2021) [37]	Healthcare	Observations	Mixed levels	USA	13
29	Meng et al. (2021) [30]	Healthcare	Analysis of automatically gathered data	Individual	USA	4
30	Barrick et al. (2021) [7]	Healthcare	Analysis of automatically gathered data	Team	USA	3
31	Ospel et al. (2020) [35]	Healthcare	Survey	Across organizations	International	3
32	Hohmeier et al. (2020) [21]	Healthcare	Survey	Individual	USA	2
33	Edwards et al. (2020) [11]	Business	Survey	Organization	New Zealand	7
34	Kulak and Tuzuner (2020) [28]	Multiple sectors	Survey	Across organizations	International	10
35	Högberg (2023) [20]	Business	Interviews	Organization	International	2

E Inventory of identified WOPs

Table 8: Inventory of identified WOPs

Pattern ID	Pattern label	Short description	Source(s)
P001	Acquired priority	Task that has been given priority because of its characteristics.	[9]
P002	Activity-based working	The use of a workspace adopted for a specific task.	[33], [12], [16], [37]
P003	Ad-hoc meetings	Having meetings when they are necessary, without planning them beforehand.	[16]
P004	Ad-hoc task forces	Creating a task force when it is necessary, without planning to create one beforehand.	[33]
P005	Allocate time in calendar	Scheduling / Reserving time in a calendar to work on a specific task.	[18], [5], [46]
P006	Alternative work locations	Locations from which you are allowed to work that are not the companies office buildings.	[28]
P007	Announcing incoming workload	Communication expected workload to inform coworkers of your limited available time.	[35]
P008	Assign a leader	Assignment of a person within a team that will take the lead.	[42]
P009	Assign roles in the team	Assignment of designated roles and responsibilities within the members of a team.	[1]
P010	Assignment according to workload	Assigning tasks according to the workload of employees.	[30]
P011	Automation	The automation of routine tasks previously performed by manual labor.	[40], [11]
P012	Autonomy	The freedom of performing, scheduling, ... tasks in the personally most convenient way.	[33]
P013	Batching	Grouping multiple tasks, items, or operations together for simultaneous or sequential processing.	[30]
P014	Blended working	Working from different locations.	[33]
P015	Casual conversation	Professional communication within a team without planning it beforehand.	[3]
P016	Clone screen	Using two screens from different devices, showing the exact same content.	[29]
P017	Compressed workweek	Working fewer days in a week, but longer hours each day. Working hours per week are not shortened.	[28]
P018	Copy pasting	Transferring information form one place to another through multiplication.	[8]
P019	Using core functional spaces	The use of a workspace adopted for a specific task.	[12]
P020	Covid-working	A working policy that allows workers to work from different locations, other than their homes while strongly discouraging full presence of people in the office buildings.	[39]
P021	Create a to do list	Making a list of all tasks that still have to be completed.	[18], [31]
P022	Customer order prioritization	Orders are selectively accepted or prioritized based on profitability, strategic fit, or resource constraints, rather than processing all incoming orders similarly.	[40]
P023	Delayering	Organizational structure deliberately removing hierarchical structures.	[33]
P024	Demo	A way to share information by showing how a product, software, service, ... works or is being delivered.	[3]
P025	Desk-sharing	The practice of multiple employees using the same, non-assigned desk at different times.	[12]
P026	Digital appointments	Organizing meetings with clients or consumers online.	[2]

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Table 8: Inventory of identified WOPs (Continued)

Pattern ID	Pattern label	Short description	Source(s)
P027	Discretionary labor system	System in which an employee is payed a fixed amount of money to obtain a previously agreed upon goal, regardless of the hours of work needed to reach that goal.	[40]
P028	Dynamic communication	An interactive way of exchanging information between managers and frontline employees, where mutual feedback helps both sides to stay aligned and support each other.	[17]
P029	Electronic communication	The use of digital tools to share information regardless of time or place.	[18], [2], [31], [16], [3]
P030	Electronic libraries	Way of storing information facilitating rapid retrieval of various types of documents.	[1]
P031	Entering incorrect data	Entering data that does not represent reality to work around a system.	[8]
P032	Expanding screen	The practice of extending a single digital workspace across multiple monitors, allowing users to view and interact with several windows or tabs at once.	[29]
P033	Fixed-term contracts	A contract that ends on an agreed date.	[28]
P034	Flexible work arrangement	Arrangements have been made with regards to a flexibility in location, time and workload between employers and employees.	[4], [33], [28]
P035	Flexitime	Employees have opportunities to determine their own working periods within certain limits.	[28]
P036	Fragmentation of work	The division of tasks into smaller pieces that are carried out at different times.	[43], [37]
P037	Giving verbal consent for dispensing medication	The practice where physicians authorize medication administration orally rather than through formal documentation often as a workaround in time-pressured or urgent situations.	[8]
P038	Hierarchies	The way work is organized through different layers of authority, where tasks, decisions and communication follow a clear chain, shaping who controls what and who is accountable to whom.	[20]
P039	High-mobility telework	All work is carried out from any place other than the workplace.	[47]
P040	Home-based telework	All work is carried out from home.	[47]
P041	Ignoring pop-ups	A practice in which employees ignore to act on signals given to them through their software system.	[8]
P042	In system data entry workaround	A working routine of entering data within the system that differs from the usage prescribed by the system design.	[8]
P043	In system workflow sequence workarounds	Executing a task sequence within the system that differs from the usage prescribed by the system design.	[8]
P044	Increased workload	Having an increased amount of tasks to complete.	[19]
P045	Information sharing	Professional communication with coworkers to share information in order to complete tasks.	[18], [27], [3]
P046	Innate priority	Tasks that get executed before other ones because of certain characteristics of that task.	[9]
P047	Instant communication	Immediate communication with coworkers at the moment the information is needed.	[16]
P048	Integrated tool use	The use of different electronic tools at the same time.	[29]
P049	Integrated teams	A way of working where people from different roles or departments collaborate as one team.	[16]
P050	Interruption	Any unexpected input or event that breaks the flow of someone's work, forcing a switch in attention.	[37], [16], [43]

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Table 8: Inventory of identified WOPs (Continued)

Pattern ID	Pattern label	Short description	Source(s)
P051	Job consolidating	When jobs that previously had to be performed by two separate individuals with different capabilities are now performed by one.	[19]
P052	Job rotation	The practice of regularly switching roles or tasks between employees.	[33]
P053	Job sharing	A special form of part-time work in which minimum two employees perform the work of one full-time job.	[28]
P054	Leaving data fields empty	The practice of skipping required input fields.	[8]
P055	Linear communication	The generation of messages in a vertically descending manner or in the form of instructions	[17]
P056	Linear processing	The handling tasks or steps one at a time, in a fixed sequence.	[37]
P057	Low-mobility telework	Working from a place other than the workplace once in the last four weeks.	[47]
P058	Manual labor	Tasks that are not automated or executed by machines and thus involving a human employee completing the task.	[11]
P059	Meetings	Live communication between team members, either virtually or physically.	[3]
P060	Meeting reduction	A strategy in which the amount of meetings is limited.	[40]
P061	Microproductivity	Breaking down project tasks into smaller pieces.	[5]
P062	Migrated	The practice of starting a task on one device and then continuing or finishing it on another.	[29]
P063	Multi-location work	Being allowed to work from different sites (e.g. home, the office, library, ...).	[39]
P064	Multifunctional teams	The composition of teams in such a way that all the competencies needed to get the job done are part of the team. There is no need to rely on others who are not part of that team.	[1]
P065	Multiskilling	Enabling employees to take on different types of tasks across roles or functions, so they can switch flexibly when needed and support a wider range of work demands.	[33]
P066	Networking	Building and maintaining professional relationships—inside and outside the organization.	[33]
P067	Occasional work at home	Working primarily at the office, in exceptional cases, work at home, but the primary workplace is not home.	[47]
P068	Organizational structures and roles	The way in which work is divided, coordinated and supervised within an organization.	[20]
P069	Out-system workaround	Not using the system as intended or prescribed through using other systems or relying on other routines.	[8]
P070	Outsourcing	Handing over specific tasks or services to external parties.	[40], [33]
P071	Overtime work	Working additional hours beyond standard schedules that is compensated for with additional time off or by overtime bonus.	[28]
P072	Parallel processing	Organizing work so that different tasks or steps run independently of each other, allowing progress in multiple parts of the process without waiting for one to finish before starting another.	[18], [37]
P073	Part-time work	Jobs that have significantly less amount of hours than the determined hours per week.	[28]
P074	Partition	Splitting different types of tasks across separate devices or spaces.	[29]
P075	Periodic meetings	Regularly scheduled moments where team members come together.	[1]

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Table 8: Inventory of identified WOPs (Continued)

Pattern ID	Pattern label	Short description	Source(s)
P076	Plan meetings	Meetings that are scheduled in advance.	[16]
P077	Planned task frequency	Setting a fixed rhythm or number of times a task is carried out within a given time frame.	[11]
P078	PowerPoint	Use of the software PowerPoint to communicate a message to others.	[3]
P079	Pre-recording	Entering or triggering system actions before the actual event happens.	[8]
P080	Prioritization	The practice of deciding which tasks need to be handled first.	[43]
P081	Process flow determined	Organizing work in a fixed, predefined sequence of steps, where each task follows a set path and must be done in the right order.	[7]
P082	Procrastination	Delaying or putting off tasks.	[48], [31]
P083	Productive communication	Process of aligning both information and feedback between individuals, teams, and/or areas in a productive unit of the organization (business), which results in the fulfillment of the staff's individual goals, the teams, the areas, and the business itself, in addition to its purpose as an organization.	[17]
P084	Profit sharing or pay for performance	Linking (part of) employees' compensation directly to individual, team, or company results.	[33]
P085	Quality circles	Recurring moments in the workflow where teams reflect on what's working, identify issues, and take action to improve.	[33]
P086	Regular work at home	At least one day a week is spent at the workplace. However, the primary workplace of the employee is still not home.	[47]
P087	Responsibility communication	Deliberately using communication tools to clarify who is responsible for a task.	[18]
P088	Rotational assignment system	Employing a predetermined algorithm to assign tasks, rather than self-assignment.	[37]
P089	Schedule in appointments	Actively blocking time in a calendar to structure the day.	[18]
P090	Scheduling tool	Using a digital system that automatically allocates tasks across people, based on rules and data.	[44]
P091	Scrum processes	Breaking projects into short iterations called sprints.	[1]
P092	Selective hiring	Choosing new employees based on specific skills, values or fit with the organization.	[33]
P093	Uncoupling tools from each other	Physically separating two different tools that usually are not meant to be decoupled.	[8]
P094	Sequential	Organizing tasks or steps in a fixed order, where each one must be completed before the next one can begin.	[29], [10], [16], [37], [35]
P095	Sharing login details	Sharing personal login detail, allowing other employees to enter data in someone else name.	[8]
P096	Shiftwork	In shiftwork, at least two workers share the same job by regularly shifting due to a shift plan.	[28]
P097	Short working hours	A formal arrangement that limits employees' daily or weekly working time below standard levels.	[40]
P098	Simplify procedures	Reducing unnecessary steps in daily operations.	[40]
P099	Simultaneous / Multitasking	Doing several things at the same time.	[29], [5], [33], [46], [16], [37]
P100	Spatial setup	The setup of the working environment.	[35]
P101	Specific timing of tasks	The practice of scheduling or performing certain steps at defined moments in the workflow.	[7]

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Table 8: Inventory of identified WOPs (Continued)

Pattern ID	Pattern label	Short description	Source(s)
P102	Split flow	Organizing work by dividing incoming tasks into separate pathways based on their characteristics.	[37]
P103	Staggered work hours	The practice of letting employees start and end their workday at different times.	[40]
P104	Structure data	Organizing data in such a way it is easily retrieved when necessary.	[18], [31]
P105	Supportive functional spaces	Including office spaces that have no direct productive value.	[12]
P106	Tablet use	The use of a tablet device to support the execution of tasks.	[40]
P107	Task allocation	A way of assigning tasks across people or roles, based on skills, availability, or workflow needs.	[18], [31], [42], [1]
P108	Task shortening	The practice of skipping or compressing steps within a task.	[37]
P109	Task switching	Shifting attention from one task to another before the first is completed.	[16], [37]
P110	Task transition	Shifting from one type of work activity to another.	[37]
P111	Team autonomy	The freedom offered to a team of performing, scheduling, ... tasks in the personally most convenient way.	[33], [16], [1]
P112	Team composition	The predetermination of how a work team should be set up in terms of roles and expertise, shaping who is involved in the process and how responsibilities are shared.	[7]
P113	Teleconference	The use of audio or video technology to hold meetings remotely, allowing people in different locations to collaborate.	[40]
P114	Telework	Performing job tasks from a location outside the traditional office.	[40], [33], [39], [23]
P115	Time planning	Setting a timeline for projects as a whole, as well as for each individual stage or task within that project.	[1]
P116	Total quality management	Using a continuous improvement approach where everyone in the organization takes shared responsibility for quality.	[33]
P117	Transfer	The deliberate act of moving information or tasks from one tool, device, or context to another.	[29]
P118	Triage	The initial sorting of incoming work based on urgency or priority.	[30]
P119	Use flex time	Allowing employees to choose, within certain limits, when they start and end their workday.	[40], [33]
P120	Use of a prioritization matrix	The practice of deciding which tasks need to be handled first based on a tool.	[21]
P121	Use of communication tools	Using digital or physical tools to communicate.	[42], [3]
P122	Use of electronic tools to collaborate	Using digital tools to collaborate.	[1]
P123	Use of electronic tools to track tasks	The use of digital tools to organize, monitor, and manage work tasks across multiple responsibilities and projects.	[5]
P124	Use of subgroups	Organizing a team into several smaller groups with their own responsibilities.	[16]
P125	Use printed information	The act of printing out information that is stored digitally, making it usable offline.	[37]
P126	Use reminders	The practice of using digital tools to stay on top of tasks, appointments or deadlines by triggering timely reminders.	[18]
P127	Using paper	Taking notes on paper instead of immediately entering information into the software system.	[8]

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Table 8: Inventory of identified WOPs (Continued)

Pattern ID	Pattern label	Short description	Source(s)
P128	Using separate text fields	Using separate text fields in addition to the required data entry fields created in the software.	[8]
P129	Using shadow systems	The use of a system other than the software system intended by the company.	[8]
P130	Round up before embarking on next task	The practice of fully completing one task before starting the next.	[30]
P131	Weekend work	The practice of performing job-related tasks on Saturdays or Sundays.	[28]
P132	Work paperless	Organizing and completing tasks using only digital tools and documents.	[40], [3]
P133	Workaround	Behaviors that may differ from organizationally prescribed or intended procedures. They circumvent or temporarily fix an evident or perceived workflow hindrance.	[45], [46], [8]
P134	Workload communication	The deliberate act of sharing information about one's current workload.	[18]

F Full set of assigned codes

Table 9: Patterns with their assigned set of primary and secondary codes

Pattern ID	Pattern label	Primary codes	Secondary codes
P001	Acquired priority	characteristic, priority, task	acquisition
P002	Activity-based working	adaptation, specific, workspace	task, usage
P003	Ad-hoc meetings	meeting, planning, unplanned	necessary
P004	Ad-hoc task forces	planning, task force, unplanned	necessary
P005	Allocate time in calendar	calendar, schedule, time	specific, task
P006	Alternative work locations	location, off-site	
P007	Announcing incoming workload	availability, communication, coworker	limitation, workload
P008	Assign a leader	leader, role assignment, team	
P009	Assign roles in team	role assignment, team	responsibility
P010	Assignment according to workload	task assignment, workload-based	
P011	Automation	automation, routine, task	manual labor
P012	Autonomy	self-determined, task, work organization	
P013	Batching	batching, task	sequential, simultaneous
P014	Blended working	location, off-site	
P015	Casual conversation	communication, team, unplanned	
P016	Clone screen	electronic device, multiple devices, screen mirroring	usage
P017	Compressed workweek	fewer days, full-time, schedule	workdays
P018	Copy pasting	duplication, information	
P019	Using core functional spaces	adaptation, specific, workspace	task, usage
P020	Covid-working	alternative location, crowd control, office building	
P021	Create a to do list	list, pending, task	
P022	Customer order prioritization	characteristic, priority, task	customer order
P023	Delayering	governance, non-hierarchical	
P024	Demo	communication, demonstration, information	
P025	Desk-sharing	coworker, shared desk, workspace	usage
P026	Digital appointments	customer, meeting, online	
P027	Discretionary labor system	fixed payment, goal	governance
P028	Dynamic communication	communication, coworker, dynamic	supportive
P029	Electronic communication	communication, electronic device, information	usage

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Table 9: Patterns with their assigned set of primary and secondary codes (Continued)

Pattern ID	Pattern label	Primary codes	Secondary codes
P030	Electronic libraries	ICT-based, information, organized storage	
P031	Entering incorrect data	information entry, in system, workaround	incorrect data
P032	Expanding screen	electronic device, screen expanding	
P033	Fixed-term contracts	contract, fixed duration	
P034	Flexible work arrangement	flexible, governance	schedule, workload, location
P035	Flexitime	flexible, schedule	
P036	Fragmentation of work	fragmentation, task	
P037	Giving verbal consent for dispensing medication	verbal consent, workaround	
P038	Hierarchies	governance, hierarchical	
P039	High-mobility telework	full-time, location, off-site	
P040	Home-based telework	full-time, home based, location	
P041	Ignoring pop-ups	pop-up, workaround	
P042	In system data entry workaround	information entry, in system, workaround	
P043	In system workflow sequence workarounds	execution sequence, in system, workaround	task
P044	Increased workload	increase, workload	task
P045	Information sharing	communication, coworker, information	task
P046	Innate priority	characteristic, priority, task	innate
P047	Instant communication	communication, coworker, instant	
P048	Integrated tool use	electronic device, multiple devices	usage
P049	Integrated teams	collaboration, cross-functional, team	
P050	Interruption	interruption, task, unexpected	
P051	Job consolidation	consolidation, cross-functional, job	
P052	Job rotation	coworker, job, rotation	
P053	Job sharing	job, part-time, sharing	coworker, full-time
P054	Leaving data fields empty	information entry, in system, workaround	data omission
P055	Linear communication	communication, non-hierarchical	
P056	Linear processing	linear, sequence, task	
P057	Low-mobility telework	location, off-site, part-time	once a month
P058	Manual labor	manual labor, task	
P059	Meetings	communication, meeting, team	
P060	Meeting reduction	governance, limitation, meeting	
P061	Microproductivity	fragmentation, task	
P062	Migrated	electronic device, multiple devices, sequence	task, usage

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Table 9: Patterns with their assigned set of primary and secondary codes (Continued)

Pattern ID	Pattern label	Primary codes	Secondary codes
P063	Multi-location work	location, off-site	
P064	Multifunctional teams	collaboration, cross-functional, team	self-sufficient
P065	Multiskilling	cross-functional, flexible	
P066	Networking	professional relationship, relationship management	
P067	Occasional work at home	home based, location, part-time	
P068	Organizational structure and roles	governance	
P69	Out-system workaround	out system, workaround	
P070	Outsourcing	external, handover, task	
P071	Overtime work	overtime	
P072	Parallel processing	parallel, sequence, task	
P073	Part-time work	part-time	
P074	Partition	electronic device, multiple devices, splitting	task, usage
P075	Periodic meetings	periodically, schedule, meeting	team
P076	Plan meetings	schedule, meeting	
P077	Planned task frequency	schedule, frequency, task	
P078	PowerPoint	communication, information, PowerPoint	
P079	Pre-recording	in system, pre-execution, workaround	information entry
P080	Prioritization	priority	
P081	Process flow determined	execution sequence, fixed, task	
P082	Procrastination	procrastination	
P083	Productive communication	communication, productive	
P084	Profit sharing or pay for performance	goal, variable payment	governance
P085	Quality circles	continuous improvement, periodically, team	
P086	Regular work at home	location, off-site, part-time	
P087	Responsibility communication	communication, responsibility	
P088	Rotational assignment system	algorithm-based, task assignment	
P089	Schedule in appointments	calendar, schedule, time	meeting
P090	Scheduling tool	algorithm-based, task assignment	
P091	Scrum processes	fragmentation, iteration, project	planning
P092	Selective hiring	cross-functional, hiring	coworker
P093	Uncoupling tools from each other	device, splitting	usage
P094	Sequential	linear, sequence, task	
P095	Sharing login details	communication, information, workaround	coworker, login details

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Table 9: Patterns with their assigned set of primary and secondary codes (Continued)

Pattern ID	Pattern label	Primary codes	Secondary codes
P096	Shiftwork	job, sharing, shiftwork	
P097	Short working hours	part-time	
P098	Simplify procedures	limitation, task	
P099	Simultaneous / Multi-tasking	simultaneous, task	
P100	Spatial setup	setup, workspace	
P101	Specific timing of tasks	planning, task	
P102	Split flow	characteristic, execution sequence, task	
P103	Staggered work hours	flexible, schedule	
P104	Structure data	information, organized storage	
P105	Supportive functional spaces	non-work related, office building, workspace	
P106	Tablet use	electronic device, tablet, usage	
P107	Task allocation	task assignment	
P108	Task shortening	compressed, task	
P109	Task switching	rotation, task	
P110	Task transition	rotation, task	
P111	Team autonomy	self-determined, task, work organization	team
P112	Team composition	cross-functional, team	
P113	Teleconference	meeting, online	coworker, team
P114	Telework	location, off-site	
P115	Time planning	planning	
P116	Total quality management	continuous improvement, governance	
P117	Transfer	information, transfer	
P118	Triage	characteristic, priority, task	
P119	Use flex time	flexible, schedule	
P120	Use of a prioritization matrix	characteristic, priority, task	matrix
P121	Use of communication tools	communication, tool, usage	
P122	Use of electronic tools to collaborate	collaboration, digital tool, usage	
P123	Use of electronic tools to track tasks	digital tool, progress, usage	
P124	Use of subgroups	fragmentation, team	
P125	Use printed information	information, print	
P126	Use reminders	alert, digital tool	
P127	Using paper	out system, paper, workaround	
P128	Using separate text fields	information entry, in system, workaround	incorrect location
P129	Using shadow systems	out system, workaround	
P130	Round up before embarking on next task	linear, sequence, task	
P131	Weekend work	schedule, weekend, workdays	

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Table 9: Patterns with their assigned set of primary and secondary codes (Continued)

Pattern ID	Pattern label	Primary codes	Secondary codes
P132	Work paperless	exclusive, digital tool, usage	
P133	Workaround	workaround	
P134	Workload communication	communication workload	coworker

G Code book

Table 10: Code book describing definitions of used codes and their related terms to avoid

Code	Definition	Related terms to avoid
Acquisition	The gain of a certain characteristic or value through time.	
Adaptation	The deliberate modification of a workspace, tool, or process to better align with the specific requirements of a given task or workflow.	
Alert	A notification or signal designed to draw immediate attention to an event, condition, or required action within a work process.	
Alternative locations	Every work location that is not the organization's primary office building.	
Availability	The state or condition of being accessible and able to engage in work-related tasks during a given period.	time, free time, accessible (may also refer to physical accessibility which is not time-specific)
Batching	The deliberate grouping of multiple similar tasks, activities, items, or operations for collective processing within a single time frame.	
Characteristic	A distinct attribute of a task, process or object that influences its execution.	
Communication	The intentional exchange of work-related information between individuals or groups through verbal, written or digital means.	inform, information
Compressed	A condition in which the duration of a task, workday, process or workweek is shortened through a different time allocation, without eliminating essential components.	
Consolidation	The merging of multiple tasks, functions or roles into a single unit.	
Continuous improvement	An iterative process aimed at systematically enhancing quality through regular evaluation and adaptation.	
Coworker	A colleague who collaborates with you to complete a task in support of the organization's objectives. Every colleague is covered, regardless of hierarchical position.	person, colleague, employee
Cross-functional	Composed of members from different functional areas, professional roles, or departments within an organization or across organizations who work together toward a shared objective.	
Customer	An individual or organization that purchases, uses, or benefits from a product or service provided by the organization. In this codebook, customer is applied broadly to include business-to-business (B2B) clients, business-to-consumer (B2C) end users, and patients when they are recipients of the organization's products, services, or care. The term refers to external parties who engage with the organization as beneficiaries of its output.	
Device use	The purposeful operation of a device (e.g., computer, tablet, smartphone, display, or peripheral) within the work context to perform, facilitate, or support a task or process. Device use serves as an umbrella code that encompasses various specific forms of interaction with devices, which are further detailed through complementary codes describing the nature or purpose of the use.	
Digital tool	A software application or platform that enables the execution, coordination or tracking of work in a digital environment.	
Duplication	The process of creating an exact copy of an existing object, document, data set, or piece of information, regardless of whether the copy is produced in physical or digital form.	reproduction, replication
Dynamic	In this code book, dynamic refers to situations or interactions that involve active two-way engagement, the ability to adjust to changing conditions or needs, and ongoing feedback between participants.	

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Table 10: Code book describing definitions of used codes and their related terms to avoid (Continued)

Code	Definition	Related terms to avoid
Electronic device	A physical tool or piece of equipment used to perform work-related activities.	
Exclusive	Restricted in use to a specific method, tool or environment without the inclusion of alternatives.	
Execution sequence	The order in which tasks are carried out within a process.	
External	Originating outside the organization's boundaries.	
Flexible	Permission of variation in work arrangements such as time, location or methods within defined organizational boundaries.	
Fragmentation	The division of a task or process into smaller, discrete components.	
Frequency	The rate at which a task, event or activity is repeated within a defined timeframe.	
Home based	The work location of the employee is their own residence.	
In system	Actions performed within the software of the organization.	
Incorrect location	An input into the software system of the organization in a field or space not intended for that specific type of information.	
Information	The content or data that is intentionally conveyed, shared, or transferred in the context of a work-related process or interaction.	
Information entry	The act of inputting data into a physical or digital system for recording or processing.	
Linear	Progressing in a straight, step-by-step manner without parallel or overlapping activities.	
Location	A physical place where work is performed.	
Office building	A physical place owned or managed by the organization which serves as an official worksite.	
Off-site	Any work location that is not the office building.	
Out system	Actions or processes carried out outside of the organization's software system.	
Planning	The strategic or conceptual organization of tasks, actions, or responsibilities, focusing on the sequencing, allocation, and coordination required to achieve objectives, irrespective of whether specific dates or times are assigned.	
Pop-up	A temporary visual message or notification that appears on a user interface to convey information.	
Productive	Yielding outputs or results that contribute to work goals or organizational objectives.	
Progress	The advancement towards completion of a task or objective.	
Project	A goal-oriented set of tasks.	
Role assignment	The process of designating specific roles to individuals within a defined group, such as a team, in order to structure responsibilities, tasks, and decision-making authority. Role assignment involves clarifying who is accountable for particular functions and ensuring that each member understands their position within the group's operational framework.	
Rotation	The systematic alternation of tasks or roles among individuals.	
Schedule	The assignment of tasks, meetings, or events to defined time slots or recurring intervals on a calendar or timeline, specifying when activities will take place.	
Self-determined	Allowing an individual or group to decide autonomously.	
Self-sufficient	Possessing all required resources, skills and capacities to complete tasks without external assistance.	
Sequence	A specific arrangement or order in which tasks, steps or events are organized.	

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Table 10: Code book describing definitions of used codes and their related terms to avoid (Continued)

Code	Definition	Related terms to avoid
Sequential	Following a fixed, linear order where each step must be completed before the next begins.	
Setup	The arrangement or configuration of a workspace.	configuration
Splitting	The intentional division of devices into distinct parts for separate use.	
Task	A discrete unit of work undertaken to achieve a specific objective, which may be performed individually or collaboratively.	item, operation
Task assignment	The process of allocating specific tasks to individuals or groups within the organization in order to achieve defined objectives. Task assignment specifies who will perform a particular activity and may be based on various criteria such as expertise, availability, or workload.	
Task force	A temporary group formed to address a specific clearly defined goal.	
Team	A group of individuals working interdependently towards a common goal.	
Tool	An application used to facilitate work.	
Transfer	The deliberate movement of information, materials or responsibilities from one person, place or system to another.	
Unexpected	An unplanned event that occurs without prior anticipation.	
Unplanned	Not scheduled or arranged in advance, occurring spontaneously or reactively.	
Work organization	The structured arrangement of tasks, roles, processes and resources within a work system.	
Workaround	Behavior that may differ from organizationally prescribed or intended procedures. They circumvent or temporarily fix an evident or perceived workflow hindrance.	
Workload-based	A criterion for decision-making in which the allocation of tasks, roles, or responsibilities is determined by the current workload of the individual(s) involved. Workload-based approaches aim to balance or optimize the distribution of work to prevent over- or underutilization.	
Workspace	The immediate physical or digital environment assigned or used for work activities within a given work location, encompassing the arrangement, furniture, equipment, and tools necessary for task performance.	

H Coding rules

Table 11: Rules and clarification used throughout the coding process

Rule	Rule explanation
Primary vs Secondary codes	In this study, the same code may be applied either as a primary code or as a secondary code. The classification (primary or secondary) depends on the role that the concept plays within the specific pattern: Primary codes are assigned to concepts that are essential and decisive for capturing the core meaning of the pattern. Secondary codes are assigned to concepts that are supportive, contextual, or supplementary to the pattern's core meaning. Consequently, the same term may be used as a primary code in one pattern (when the concept is central) and as a secondary code in another pattern (when the concept serves only as an additional attribute or contextual factor). This distinction is made through a careful interpretation of the pattern description and is applied consistently across the entire dataset.
Sequence vs Execution sequence	Sequence is applied when the focus is on the general order of tasks, steps or activities, regardless of whether they are specified in a formal process or system. This code covers both manual and automated contexts. Execution sequence is applied when the order of actions is explicitly linked to a formal process where adherence to or deliberate deviation from the prescribed design is a defining characteristic of the pattern.
Planning vs Schedule	The code planning is applied for patterns that involve the strategic or conceptual arrangement of tasks, action or responsibilities, regardless of a fixed timing. The code schedule is used for patterns where a task, meeting or event is tied to a specific time or recurrence on a calendar or timeline.
Work location vs Workspace	Unlike work location, which denotes the broader geographical or organizational site, workspace focuses on the specific, task-oriented setting where work is carried out.
Cross-functional	In this codebook, cross-functional refers to the deliberate inclusion of diverse skill sets, perspectives, and responsibilities within a single team, workgroup or person to enhance problem-solving, innovation, and coordination.
Information	In this codebook, information is coded as a primary element when the substantive transfer of knowledge, facts, or data is a central and explicit aspect of the pattern, rather than an implicit outcome of communication.
Task	In this codebook, task also encompasses the broader concept of a work unit—any identifiable, bounded activity or operation that forms part of a larger workflow or process.

I Taxonomy - version 1

Table 12: Taxonomy version 1 with an overview of category groups, categories, subcategories and their associated codes

Category group	Category	Subcategory	Associated codes
Enabling and supporting mechanisms	Use of tools & technologies	Tool types and platforms	tablet, electronic device, multiple devices, ICT-based, digital tool, exclusive
		Usage practices	usage, screen duplication, screen mirroring, screen splitting, screen expanding, online, alert, transfer, progress
	Communication & interaction	Direction & audience	coworker, team, customer
		Purpose	information, collaboration, demonstration, relationship management, external handover
		Interaction type & occurrence	meeting, instant, PowerPoint, scheduled meetings, ad hoc meetings, limitation of meetings, limitation of availability, dynamic, supportive
	Quality & information management	Quality assurance & improvement	continuous improvement, limitation of process steps, compressed
		Information storage	organized storage, print, duplication
Structuring of work	Task flow organization	Allocation logic	algorithm-based, workload-based
		Prioritization rules	innate, customer-order, characteristic-based, matrix
		Sequencing pattern	linear, parallel, batching, iteration, interruption, fixed, simultaneous, exection-sequence
		Task granularity & assignment rotation	fragmentation, rotation
	Spatial work organization	Layout & setup	setup, workspace, shared desk, adaptation, non work related
		Location	office building, off site, home based, alternative locations
	Work planning	Time scheduling pattern	full time, part time, shift work, compressed week, weekend, overtime, workdays
		Time planning practices	calendar, periodically, frequency, availability, flexible, pending, unplanned, list
		Behavioral patterns	procrastination, increase
	Job characteristics	Job purpose & scope	goal, project
		Task nature	manual labor, sharing
		Responsibility	responsibility

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Table 12: Taxonomy version 1 with an overview of category groups, categories, subcategories and their associated codes (Continued)

Category group	Category	Subcategory	Associated codes
	Organization structure and framework	Role structure & distribution	hierarchical, non hierarchical, leader, self sufficient, self determined, role assignment, role rotation, consolidation, cross functional, team fragmentation
		Team functioning	task force, ad hoc task force creation
		Policy & governance	policy, automation, crowd control
		Employment & contracting	fixed duration, contract
		Compensation	fixed payment, variable payment
Adaptive & deviant practices	In system workarounds	Acces & identity	login details
		Data handling	data omission, incorrect data, incorrect location, information entry
		Workflow timing	pre execution, pop ups
	Out system workaround		paper, verbal consent

J Taxonomy - version 1 - visual representation

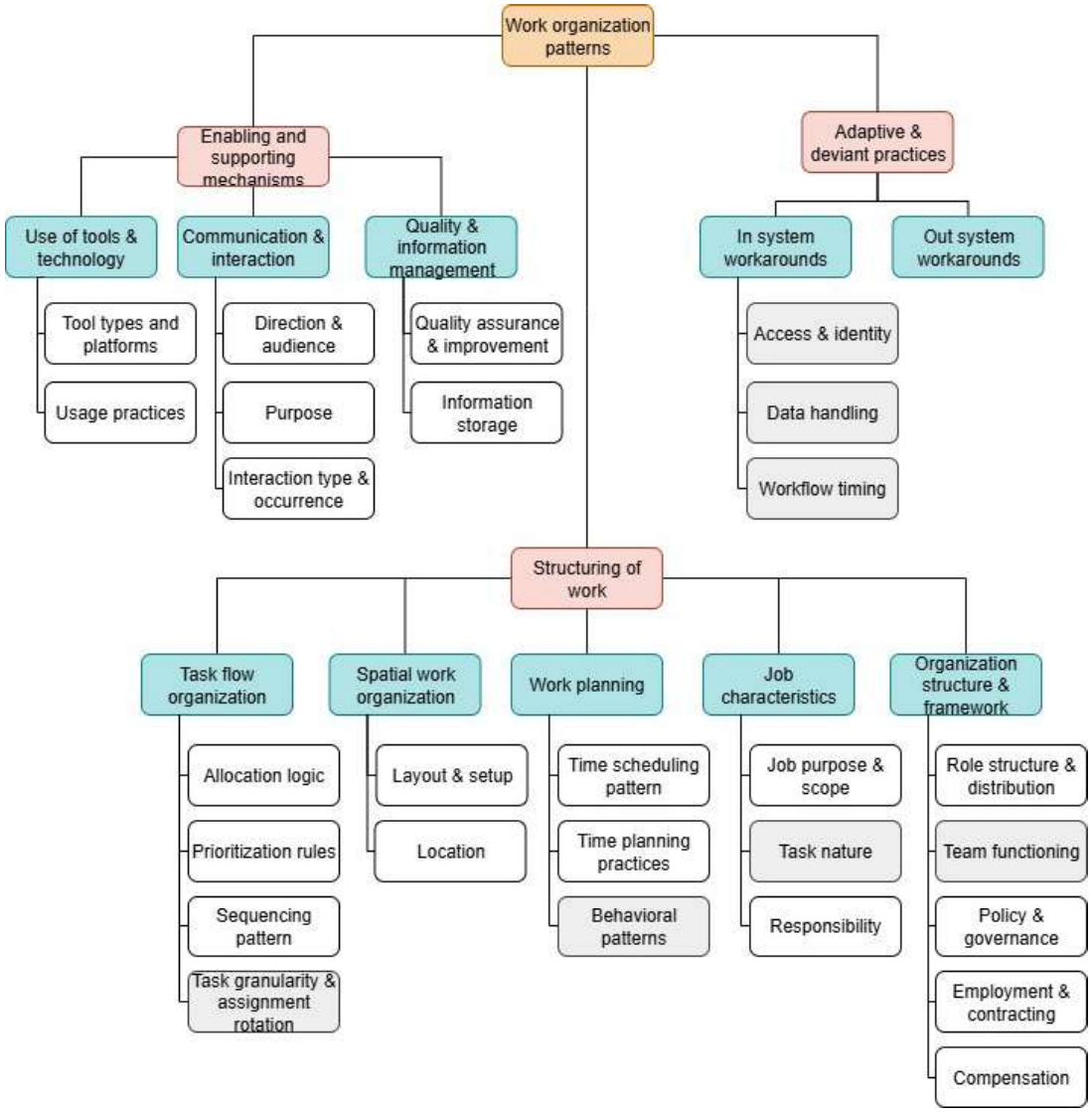

Figure 6: Taxonomy - version 1
Category groups are presented with a red background, categories with a blue one, while added subcategories are presented with a grey background.

K Taxonomy - mapping of the WOPs

Table 13: Mapping of the inventory of WOPs to the final version of the taxonomy

Pattern id	Pattern label	Mapping	Notes
P001	Acquired priority	B1b	
P002	Activity-based working	B2a	
P003	Ad-hoc meetings	B3b	Upon assigning patterns towards B3a or B3b, the distinction between scheduling and planning as outlined in H should be taken into consideration.
P004	Ad-hoc task forces	B3a	The central conceptual aspect of this pattern is considered to be the assignment of tasks and not the functioning of the team. Therefore, the pattern was not mapped towards B5b.
P005	Allocate time in calendar	B3b	
P007	Announcing incoming workload	A2b	
P008	Assign a leader	B5a	
P009	Assign roles in the team	B5a	
P010	Assignment according to workload	B1a	The label of the generic category B1d was adapted to prevent possible ambiguity between both categories.
P011	Automation	B5c	
P012	Autonomy	B5a	The central conceptual aspect of this pattern is considered to be the scope and liberty within performing tasks rather than the responsibility an employee receives. Therefore the pattern was not allocated to B4c.
P013	Batching	B1c	
P015	Casual conversation	A2c	
P016	Clone screen	A1b	
P017	Compressed workweek	B3a	
P018	Copy pasting	A1b	
P020	Covid-working	B2b	
P021	Create a to do list	B3b	The conceptual aspect of this pattern is the creation of the list and not the execution sequence of the tasks on that list. Therefore, the pattern was not allocated to B1c.
P022	Customer order prioritization	B1b	
P023	Delayering	B5c	
P024	Demo	A2b	
P025	Desk-sharing	B2a	
P026	Digital appointments	A1a	The conceptual aspect of this pattern is the type of platform used and not the usage pattern of that platform. Therefore, the pattern was not allocated to A1b.
P027	Discretionary labor system	B5e	
P028	Dynamic communication	A2c	
P029	Electronic communication	A1a	
P030	Electronic libraries	A3b	
P031	Entering incorrect data	C1b	
P032	Expanding screen	A1b	

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Table 13: Mapping of the inventory of WOPs to the final version of the taxonomy (Continued)

Pattern id	Pattern label	Mapping	Notes
P033	Fixed-term contracts	B5d	
P034	Flexible work arrangement	B3a	
P036	Fragmentation of work	B1d	
P037	Giving verbal consent for dispensing medication	C2	
P038	Hierarchies	B5c	
P039	High-mobility telework	B2b	
P040	Home-based telework	B2b	
P041	Ignoring pop-ups	C1c	
P042	In system data entry workaround	C1b	
P043	In system workflow sequence workaround	C1c	
P044	Increased workload	B5c	
P045	Information sharing	A2b	
P046	Innate priority	B1b	
P047	Instant communication	A2c	
P048	Integrated tool use	A1b	
P049	Integrated teams	B5b	
P050	Interruption	B1c	
P051	Job consolidating	B5a	The conceptual aspect of this pattern is the change in scope of the job, not the responsibilities of an employee. Therefore, the pattern was not allocated to B5c.
P052	Job rotation	B5a	The conceptual aspect of this pattern is the varying job content. Therefore, the pattern was not allocated to B4a.
P053	Job sharing	B4c	The conceptual aspect of this pattern is the formal distribution and structure of roles within the organization. Therefore, the pattern was not allocated to B5a, B5b or B5c.
P054	Leaving data fields empty	C1a	
P055	Linear communication	A2c	
P057	Low-mobility telework	B2b	
P058	Manual labor	B4b	
P059	Meetings	A2c	
P060	Meeting reduction	B3b	
P062	Migrated	A1b	
P064	Multifunctional teams	B5b	
P065	Multiskilling	B5a	The conceptual aspect of this pattern is the broadening scope allowing an employee to take on multiple task, functions or roles within an organization.
P066	Networking	A2b	The conceptual aspect of this pattern is the construction of relationships and not the type of interaction. Therefore, the pattern was not allocated to A2c.
P067	Occasional work at home	B2b	
P068	Organizational structures and roles	B5c	
P069	Out system workaround	C2	

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Table 13: Mapping of the inventory of WOPs to the final version of the taxonomy (Continued)

Pattern id	Pattern label	Mapping	Notes
P070	Outsourcing	B5c	
P071	Overtime work	B3a	
P072	Parallel processing	B1c	
P074	Partition	A1b	
P075	Periodic meetings	A2c	
P076	Plan meetings	B3b	
P077	Planned task frequency	B2a	
P078	PowerPoint	A1a	
P079	Pre-recording	C1c	
P080	Prioritization	B1b	
P081	Process flow determined	B1c	
P082	Procrastination	B3c	
P083	Productive communication	A2c	
P084	Profit sharing or pay for performance	B5e	
P085	Quality circles	A3a	
P086	Regular work at home	B2b	
P087	Responsibility communication	A2b	
P089	Schedule in appointments	B3b	
P090	Scheduling tool	A1a	
P091	Scrum processes	B1d	
P092	Selective hiring	B5d	
P093	Uncoupling tools from each other	A1b	
P094	Sequential	B1c	
P095	Sharing login details	C1a	
P096	Shiftwork	B3a	
P097	Short working hours	B3a	
P098	Simplify procedures	A3a	The conceptual aspect of this pattern is the reduction in unnecessary steps in a process, which in turn is a quality improvement pattern.
P099	Simultaneous / Multitasking	B1c	
P100	Spatial setup	B2a	
P101	Specific timing of tasks	B3b	
P102	Split flow	B1c	
P104	Structure data	A3b	
P105	Supportive functional spaces	B2a	
P106	Tablet use	A1a	
P107	Task allocation	B1a	
P108	Task shortening	B1d	
P109	Task switching	B3c	
P111	Team autonomy	B5b	

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Table 13: Mapping of the inventory of WOPs to the final version of the taxonomy (Continued)

Pattern id	Pattern label	Mapping	Notes
P112	Team composition	B5b	The conceptual aspect of this pattern is the composition of the team, the role each member is assigned is a consequence rather than the central conceptual aspect.
P113	Teleconference	A1a	The conceptual aspect of this pattern is the choice of tool rather than how the tool is used. Therefore, the pattern was not allocated to A1b.
P114	Telework	B2b	
P115	Time planning	B3b	
P116	Total quality management	A3a	
P117	Transfer	A1b	The conceptual aspect of this pattern is the movement of information of one place to another.
P118	Triage	B1b	
P119	Use flex time	B3a	
P120	Use of a prioritization matrix	B1b	
P121	Use of communication tools	A1a	
P122	Use of electronic tools to collaborate	A1b	The conceptual aspect of this pattern is the usage of the tool rather than how the tool is being used.
P123	Use of electronic tools to track a task	A1b	The conceptual aspect of this pattern is the usage of the tool rather than how the tool is being used.
P124	Use of subgroups	B5b	
P125	Use printed information	A1a	
P126	Use reminders	A1a	
P127	Using paper	A1a	
P128	Using separate text fields	C1b	
P129	Using shadow systems	C2	
P131	Weekend work	B3a	
P132	Work paperless	A1b	
P133	Workaround	C	
P134	Workload communication	A1b	