

Daily Job Rotation Strategies in Industry 5.0: A Literature Review on Operational and Human-Centric Outcomes

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Abstract:

Purpose: Daily job or task rotation is frequently associated with Industry 5.0 principles, particularly in its potential to enhance worker engagement and motivation on the shop floor. However, existing research in this area has predominantly focused on ergonomic considerations. This study aims to investigate the broader effects of daily job rotation on workers and to gain a deeper understanding of how organizations implement and manage such practices within their operational environments.

Design/methodology/approach: A systematic literature review was conducted using three databases in accordance with PRISMA guidelines. Each retained study was classified to highlight operational differences between rotation policies. Reported effects on human factors were analyzed using the Job and Team Design Model (JTDM), while impacts on workers' performance were examined through the Overall Labor Effectiveness (OLE) framework.

Findings: Many studies omit key operational details, limiting understanding of what workers actually experience during rotations. The review also highlights a limited use of technology to support job rotation decisions. While some authors advocate for data-driven approaches, most observed policies occur at predetermined intervals, often aligned with breaks for convenience. Daily job rotation appears to increase job satisfaction and alleviate monotony, yet its effects on perceived workload and motivation require further investigation. Similarly, evidence regarding performance outcomes is inconclusive. Workers' subjective appraisals of their performance tend to be more positive than objective measurements.

Originality/value: This study provides managers with a list of characteristics intrinsic to job rotation's policy design. The results and ensuing discussion outline future research avenues to enhance workers' engagement and motivation in manufacturing contexts aligned with Industry 5.0 principles.

Keywords: job rotation, task rotation, industry 5.0, motivation, performance, shop floor management

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1. Introduction

The industrial landscape is undergoing a profound transformation with the emergence of Industry 5.0, which emphasizes sustainability, resilience, and the human-centric design of production systems (Huang et al., 2022; Ramos-Gutiérrez & García-Gutiérrez, 2025). At the same time, many Western manufacturing sectors are facing significant labor shortages, which threaten economic stability and the long-term viability of their supply chains. Beyond governmental interventions, organizations have a key role to play in keeping shop-floor workers engaged and motivated, thereby promoting retention and ensuring operational continuity (Krajcsák & Kozák, 2018).

Among the available strategies, job rotation has emerged as a promising avenue. It is already widely used in several sectors, including nursing (Alfuqaha et al., 2021; Gamme & Berg, 2016; Kaldal et al., 2024), engineering (Hafezi-Zadeh et al., 2022; Saukkonen, 2022), mining (Jones & James, 2018), and manufacturing (Aptel et al., 2008; Comper et al., 2021).

Two recent reviews have examined job rotation from a broader cross-sector perspective. A meta-analysis conducted by Mlekus and Maier (2021) synthesized psychosocial, organizational, and performance-related outcomes associated with job and task rotation. The first is a lateral transfer of an employee within an organization that does not include a change of salary or hierarchy. The latter involves a less significant change such as being appointed to another task within the same department or unit. Their results show that task rotation leads to higher attitudinal outcomes while job rotation is more strongly associated with the learning and development, psychological health, and organisational performance outcomes. Furthermore, a bibliometric analysis by Saputra and Tjahjono (2024) mapped emerging research trends related to worker satisfaction, motivation, talent management, and operational performance. Although these contributions offer valuable high-level insights, their general scope provides limited guidance for manufacturing environments, where production rhythms, workload, and job design constraints highly influence human factors (Omair et al., 2019).

When focusing on the literature in the manufacturing context involving production personnel, job rotation policies typically aim to:

- Reduce musculoskeletal disorders (MSDs) and other occupational risks (Bagheri & Ghaljahi, 2019; Dias et al., 2019);
- Support skill development and maintenance (Henaio et al., 2023);
- Stimulate operational performance (Moussavi et al., 2020b); and
- Alleviate boredom while nurturing motivation (Azizi et al., 2010).

The scientific literature in that particular domain includes numerous studies and several reviews focused primarily on the reduction of ergonomic risks associated with repetitive and physical tasks (Guimaraes et al., 2012; Vadeboncoeur et al., 2025). These studies typically describe work environments where workers are exposed to one or more ergonomic risk factors and demonstrate how job rotation can help distribute physical workload more evenly across the workforce within a shift. Common risk assessment tools used in this context include RULA, REBA, NIOSH, and MAC, among others (Ijaz et al., 2020; Jafarian et al., 2023).

However, as highlighted in the two previous literature reviews, the impact of job rotation extends beyond ergonomics. While exposure to greater rotation seems to offer more benefits for employees, many contextual parameters are not addressed, such as rotation frequency, the type of tasks embedded in the rotation, and the interdependence between workstations. This lack of knowledge leads to limited insights for managers when designing a rotation policy.

These insights are particularly relevant in a time where the nature of manufacturing work is rapidly evolving. As automation gradually reduces the prevalence of manual, routine, and repetitive tasks, the role of the worker is being profoundly reshaped. While researchers may not agree on the exact nature of residual tasks left to human workers, they do concur that these tasks are undergoing transformation (De-Assis-Dornelles et al., 2022; Rosin et al., 2021). Consequently, the challenges facing workers will no longer be limited to physical strain. Job rotation policies will therefore need to serve a broader purpose than merely balancing physical workloads, as it is often suggested in ergonomics-focused studies (Hanif & Hakim, 2020; Moussavi et al., 2019).

In light of these challenges and new perspectives, it appears essential to develop a more comprehensive understanding of the benefits of job rotation, extending beyond its ergonomical implications. From an operational standpoint, relatively few studies have investigated how job rotation policies are designed and implemented (Vadeboncoeur et al., 2025). There is a clear need to better understand how operational decisions regarding job rotation can help improve working conditions, support individual needs, and ultimately align with the Industry 5.0 vision in sustaining organizational performance, human-centricity, and resilience.

To address this gap, we propose conducting a systematic literature review to characterize how daily job rotation policies are operationalized in manufacturing settings and to examine their reported effects on workers. More specifically, we seek to answer the following research questions:

RQ1: How do organizations operationalize daily job rotation policies?

RQ2: What technological tools are used to support job rotation policies?

RQ3: What are the reported effects of job rotation on human factors?

RQ4: What are the reported effects of job rotation on organizational performance?

The remainder of this paper is structured as follows. Section 2 presents the systematic review protocol used to identify relevant studies. Section 3 summarizes the findings of the literature review. Section 4 provides an in-depth analysis and outlines directions for future research. Finally, Section 5 concludes with future research opportunities towards daily job rotation in manufacturing.

2. Methodology

2.1. Definition of Rotation and Scope of Review

As part of the methodology, it is important to clarify the type of rotation addressed in the current literature. As underlined by Mlekus and Maier (2021), there is a lack of clarity surrounding the terms used in the literature when defining job rotation. Thus, we adopted the definition proposed by Prunet et al. (2024). The authors define it as “a managerial method that organizes worker shifts, such that an employee is assigned to different tasks/workstations throughout his/her shift”. For the remainder of the paper, the term daily job rotation (DJR) will also be used to clarify the type of job rotation under consideration in this literature review. Accordingly, articles addressing both job and task rotation were included, provided it was possible to assess that a premeditated change in manufacturing task occurred at least once during a shift.

In other cases, workers may change tasks or workstations due to line balancing or unexpected disruptions in production planning. Since these changes are operational rather than part of a deliberate rotation policy, such studies are excluded from the review. Other exclusion criteria were defined for this study, including papers that studied rotation at a macro level. For example, some researchers have studied high-performance business practices that include job rotation (Lynch, 2012; Rungrueang et al., 2020; Shi et al., 2013). Methodologically, these studies are typically based on surveys completed by management executives, who report on general organizational practices. The results are then used to associate certain practices with various outcomes. However, these studies provide no operational details about how rotation is implemented, making them irrelevant for this review.

As mentioned earlier, many articles and literature reviews have focused primarily on job rotation as a means of reducing MSDs and other injury risks. Thus, articles with a sole focus on ergonomic risks were excluded from the review. We also excluded studies that provide no empirical results on the effects of daily job rotation on human factors. This group mainly includes papers presenting mathematical models, heuristics, or simulation models

designed to minimize one or more objective functions. These studies report only computational results, with no real-world data.

Literature reviews or any other research in which it was not possible to clearly assess the rotation policies were also excluded. Unfortunately, these lack important operational details, making the assessment of daily job rotation nearly impossible to conduct. Finally, Table 1 presents each inclusion and exclusion criterion used to assess the type of DJR study in each reviewed paper.

Inclusion criteria	Exclusion criteria
<ol style="list-style-type: none"> 1. Research being conducted in the manufacturing sector. 2. Research involves a policy in which a rotation is scheduled to happen at least once a shift. 3. The policy involves tasks for shop-floor employees. 	<ol style="list-style-type: none"> 1. Macro management studies about high-performance business practices. 2. Studies focusing solely on ergonomic risks. 3. Studies providing no empirical results about human factors. 4. Papers in which the assessment of the rotation policy involved is not possible.

Table 1: Inclusion and exclusion criteria used to characterize DJR policies

2.2. Systematic Literature Review Protocol

To identify relevant papers, we conducted a systematic literature review in accordance with the PRISMA guidelines (Page et al., 2021). The search was conducted using the Scopus, Web of Science, and PubPsych databases, in line with the scope of our review. The selected databases were considered appropriate given the interdisciplinary nature of this review. Our focus spans several fields, including management, engineering, human factors and ergonomics, and psychology.

Results were collected up to July 2025. The keywords used in the search query are presented in Table 2. They relate to the concept of worker rotation, encompassing both job rotation and task rotation, as mentioned by Mlekus and Maier (2021), along with additional terms related to the manufacturing domain. The search was limited to peer-reviewed articles published in English. The complete identification protocol, including the number of papers screened at each stage, is shown in Figure 1.

Concept	Keywords
Rotation of workers	Job rotation Task rotation
Manufacturing	Manufactur* Production Fabrication Assembly Operat* Processing Organization*

Table 2. List of concepts and keywords used for systematic review

For all three databases, this exact query was used: (“Task rotation” OR “Job rotation”) AND (“Manufactur*” OR “Production” OR “Fabrication” OR “Assembly” OR “Operat*” OR “Processing” OR “Organization*”). No specific range of years was used, meaning all past papers were searched. In Scopus, the search query covered the article title, abstract, and keywords. Also, an initial screening was performed for English papers only, and another filter was applied to retain only peer-reviewed publications (i.e., articles, conference papers, and reviews). For Web of Science, the same initial screening parameters were used. Finally, in PubPsych, the same query was run, and filters on language and article type were applied to retain only English papers and journal articles. The search in Scopus returned 481 papers, and the search in Web of Science returned 384 papers. Finally, the search in PubPsych returned 14 papers.

Altogether, these searches returned 879 papers. Of these, 244 duplicates were automatically removed using *Citavi's* duplicate detection tool. An additional 20 duplicates were identified manually during a preliminary review. To begin the screening process, the titles and abstracts of the remaining 615 papers were reviewed. Papers that did not focus on job rotation of workers in manufacturing environments (i.e., all three inclusion criteria) were removed at this stage.

This initial screening yielded a total of 380 papers. Unfortunately, two papers were deemed unretrievable. A total of 378 papers were carefully reviewed to assess their relevance to this review, using the exclusion criteria presented in Table 1. Thus:

- 76 papers were removed for exclusion criterion #1;
- 79 papers were removed for exclusion criteria #2;
- 139 papers were removed for exclusion criteria #3;
- 55 papers were removed for exclusion criteria #4;
- 18 additional literature reviews were removed for having an unclear scope of job rotation (i.e., criteria #4); and
- One paper was removed for not being written in English.

Consequently, a total of 10 papers were kept for this literature review. From those papers, 15 different daily rotation policies were identified and will be discussed in the next section, in accordance with the research question raised in this review.

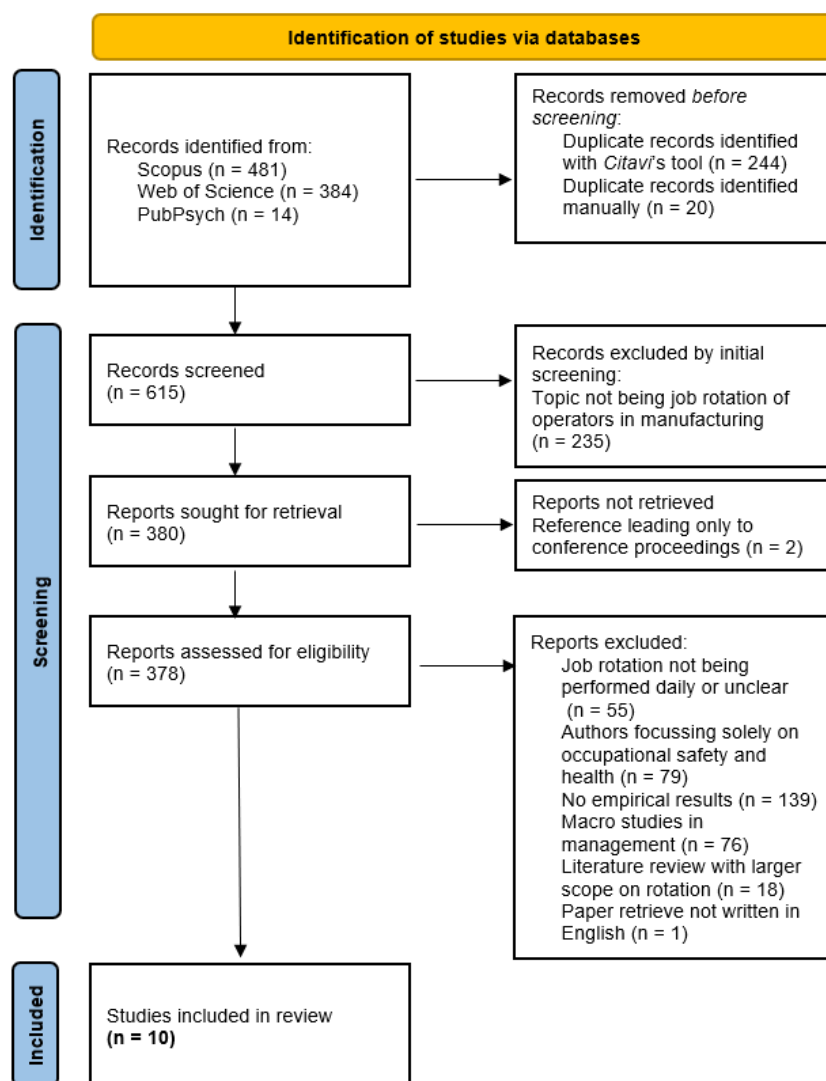


Figure 1. Paper identification protocol

3. Results

This section presents the key findings of the systematic literature review, with an emphasis on the operationalization of policies and their impact on human factors. The 10 selected papers, published between 2008 and 2024, are summarized in Table 3. Researchers used a variety of research designs, ranging from case studies conducted in specific organizations to quasi-experimental approaches (e.g., vignette studies) involving controlled setups and recruited participants. The number of participants varies widely, from 17 to 422, reflecting differences in the statistical strength of the findings. However, most studies included more than 100 participants, suggesting a generally strong empirical basis. The study populations are generally diverse, including both men and women in most cases. In the majority of studies, participants were under 55 years old.

The selected studies cover a variety of manufacturing sectors, including slaughterhouses, shoe production, automotive, electrical appliances, children's toys, and generic assembly tasks in simulated experimental settings. At first glance, these contexts may appear similar. However, a closer examination of the rotation policies reveals differences that may be relevant from a motivational perspective. These differences will be highlighted and discussed in Section 4. Additionally, DJR appears to be practiced globally, as studies have been conducted in organizations across Western and Eastern countries.

Two studies adopted a cross-sectional design as their methodological approach (Tirioni et al., 2024; Vogel et al., 2013). These studies provide valuable insights into the effects of implementing a daily rotation policy. However, Tirioni et al. (2024) provide very limited information beyond rotation frequency, offering no additional details about the policies used in the studied slaughterhouses. In the case of Vogel et al. (2013), despite reporting several ergonomic factors such as the weights lifted during tasks, important details remain missing. These include the rotation scheme and the number of workstations involved. As a result, the ability to draw broader conclusions about daily rotation policies remains limited. This is mainly due to the lack of operational details reported in many cross-sectional studies on job and task rotation.

#	Authors/ Year	Country	Manuf. sector	Methodology	Research objective(s)	Population	Study duration
1	Aptel et al. (2008)	France	Electric appliances	Case study using questionnaires (INRS' MSD and OREGÉ)	Suggest an approach to defining a workstation rotation system that reduces MSD factors and identifies factors of implementation success.	N=38. Age average = 44,7±8,6 years Gender distribution: 25 women and 13 men.	Years
2	Comper et al. (2021)	Brazil	Automotive industry	Case study using questionnaires (NMQ, JFQ, QEC, WAI, EWA)	Investigate if autonomous job rotation adherence influences the prevalence of musculoskeletal symptoms, occupational exposure, and work ability.	N=120. Most workers are around 30 years old. All men.	Immediate
3	De- Anchieta- Messias et al. (2022)	Brazil	Meat slaughtering	Case study using systematic observations and questionnaires	Study the acceptance and perception of workers in the implementation of job rotation in the context of standard compliance (i.e., N-36, Brazil).	N=79. Age range: 40-54 years. 91% of workers are male.	2 months

#	Authors/ Year	Country	Manuf. sector	Methodology	Research objective(s)	Population	Study duration
4	Guimaraes et al. (2012)	Brazil	Shoe- making industry	Case study using learning curve analysis, EDI, and historical data	Implement a multifunctional team on a new production line using Macroergonomics Work Analysis (MWA) and learning curve analysis to study the impact of job rotation on the assembly time.	The initial learning curve analysis involved (N=17) participants. The implementation of the new assembly line was done and involved (N=100) workers.	3,5 years
5	Jeon & Jeong (2016)	South Korea	Automotive sector	Case study using a custom questionnaire	Investigate the preferred autonomous job rotation types and workers' satisfaction scores in an automobile company.	N=422. Average age: 42±2,8 years. Years of experience: 17,3±3 years.	Immediate
6	Jeon et al. (2016)	South Korea	Automotive sector	Case study using a custom questionnaire and 5 years of historical data	Analyze workers' favored rotation types by age and compare scores for subjective and actual impact of the implemented rotation type on productivity, quality, and MSDs.	N=422. Average age: 42±2,8 years. Years of experience: 17,3±3 years.	Immediate
7	Mlekus et al. (2022)	Germany	Children toys assembly	Two quasi- experimental studies (vignette study) with a control group	Investigate if task rotation has a unique, causal effect on the expected work design outcomes of job satisfaction, intrinsic work motivation, subjective performance, and affect. Additionally, investigate whether task rotation is effective and universally applicable.	Study 1: N=135 (84 women and 51 men). Age (Mean= 32,36; SD= 11,46 years). Study 2: N=159 (70 women and 86 men). Age (Mean= 41,38; SD=12,35 years).	Years
8	Tirloni et al. (2024)	Brazil	Poultry slaughtering	A cross- sectional study from two slaughterhouses	Analyze the poultry slaughterhouse workers' satisfaction of job rotations, as well as verify the association of job rotation schemes (rotation <1h and > 1h) and bodily discomfort perception.	N=235. Gender proportion not reported. Women had (31,6±10,2) years. Men had (29,6±10,6) years. Also, supervisors were interviewed (N=9).	Immediate
9	Vogel et al. (2013)	Sweden	Beef and pork slaughtering	Case study on 3 different units of one large company (beef, beef and pork, pork)	Describe the changes implemented in the case company. Assess the effects on the individual meat cutter and his/her work from an ergonomics perspective and assess the effects for the organization.	N=247. 11% women/ 89% men. Average age: 38 years [20-62]. Average experience: 11 years [0,3-42].	Immediate

#	Authors/ Year	Country	Manuf. sector	Methodology	Research objective(s)	Population	Study duration
10	Walczok & Bipp (2024)	Germany	General assembly tasks	EVM (experimental vignette methodology) with a 2 X 2 (between-subject) design	Investigate the interaction effect of Intelligent assistant systems and task rotation on Motivational Work Characteristics.	N=176. 53,3% are female. Age (Mean=37,37; SD=13,71).	Immediate

Table 3. Description of the studies included in the review

The examination of the study duration reveals that only two longitudinal studies (De-Anchieta-Messias et al., 2022; Guimaraes et al., 2012) were led on DJR. Both emphasize predominantly the implementation process of daily job rotation policies. As a result, there are not many studies focusing on longitudinal effects of daily job rotation on human factors.

Incorporating different points of view in the context of job rotation may be beneficial for understanding the challenges involved and broadening our comprehension of this socio-technical system. For example, research on the managerial aspects of DJR offers valuable insights for organizations seeking to implement or design such policies. From a managerial perspective, only Vogel et al. (2013) reports results from interviews with supervisors regarding the impacts of rotation on productivity and yield. This result underscores that little research has been conducted on the managerial aspects and challenges of DJR.

Another methodological aspect observed in most of the reviewed papers is the frequent use of interviews and questionnaires based on instruments from various disciplines. Details of these instruments are provided in Table 4. For example, Mlekus et al. (2022) used a total of seven different questionnaires in their study. In this case, the absence of a real manufacturing setting allowed for richer data collection. In contrast, real-life constraints in high-paced production environments, such as those involving daily rotations, may necessitate that researchers limit the time allocated for data collection with production personnel. This often leads to more strategic and constrained methodological choices.

Article #	Instrument(s)/Questionnaire(s)
1	1. INRS' MSD questionnaire (Cail et al., 2000); 2. Nordic questionnaire (Kuorinka et al., 1987); 3. ROTATION Implementation questionnaire (Falardeau & Vézina, 2004); 4. OREGÉ (Aptel et al., 2000).
2	Mix of custom and existing instruments: 1. Job rotation adherence (custom); 2. Nordic Musculoskeletal Questionnaire (NMQ) (De-Barros & Alexandre, 2003); 3. Job Factor Questionnaire (Coluci et al., 2009); 4. Quick exposure Check (QEC) (Comper et al. 2012); 5. Work Ability Index (Martinez et al., 2009).
3	1. Custom instrument with open-ended and closed-ended questions.
4	Following the Macroergonomic Work Analysis (Guimaraes, 1999), two questionnaires were taken: 1. Open-ended custom questionnaire; 2. Ergonomic Demand Items (EDI) related to 6 constructs.
5	1. Custom instrument with demographic questions. Answers were cross-referenced with production data dating back five years.
6	1. Custom instrument with demographic questions. Answers were cross-referenced with production data dating back five years.

Article #	Instrument(s)/Questionnaire(s)
7	1. Big Five Inventory (John et al., 1991); 2. Work Design Questionnaire (Morgeson & Humphrey, 2006); 3. Work-related Basic Need Satisfaction Scale (van den Broeck et al., 2010); 4. Job satisfaction adapted from Neuberger and Allerbeck (1978); 5. Multidimensional Work Motivation Scale (Gagné et al., 2015); 6. Subjective performance (custom); 7. Positive and Negative Affect Schedule (Watson et al., 1988).
8	1. Custom instrument with close-ended questions.
9	1. Custom questionnaire with 7 background, 15 multiple-choice, and 3 open questions concerning advantages, shortcomings, and any comments; 2. Questions to assess physical and mental exertion were used by Engkvist (2010); 3. Semi-structured interviews were performed with supervisors.
10	1. Motivational Work Characteristics (MWC) from Gagné et al., 2022.

Table 4. List of instruments and questionnaires used in selected studies

Table 5 summarizes all rotation policies identified in the selected papers, totaling 15 distinct policies. Information regarding the rotation scope, the characteristics of the tasks involved, the rotation scheme, the rotation frequency, and the number of workstations included in each rotation was extracted and documented when possible. Additionally, information about the manufacturing context was retrieved from the selected papers. An assessment of interdependence between workstations and the presence of an imposed work pace is presented.

The interdependence assessment indicates whether buffers are present between workstations. This was deemed important because previous research shows that workers on serial production lines behave differently depending on whether inventory levels are high or low (Schultz et al., 1998). When interdependence was rated “high”, it meant that a machine, most likely a conveyor, set the pace for the entire line, with no possibility of stopping the flow at a specific workstation and no buffers in between. A “moderate” rating indicated that independent stops were possible for a specific workstation, allowing temporary buffers to form without disrupting the entire line. Interestingly, no context was rated “low”, meaning that none of the observed production units operated with substantial buffers between workstations.

Finally, we reported if production units were subject to an imposed work pace. One policy exposes workers to a “mixed” pace. In policy #3, one of the tasks embedded in the rotation was outside of the production line and not subject to an imposed pace. Results related to specific topics of interest are discussed in more detail in the following sub-sections.

Policy #	Paper	Unit/sector	Scope of rotation	Task characteristics reported	Scheme of rotation	Assessment of interdependency between the workstations	Imposed work pace	Number of workstations in rotation	Rotation frequency
1	1a	Electric stove main assembly line	10 assembly stations (wiring, clipping, screwing) and 1 inspection station	Three end-of-the-line stations are reserved for workers with limitations and are not part of the rotation.	Rotate in between odd stations, and then, between even stations, changing teammates at every rotation	Moderate (automated platens moving from station to station)	Yes (NR*)	11	2h (each break)
2	1b	Electric stove shell sub-line	Assembly and clipping of the stove shell	Reserved for men since physical effort is deemed greater than the main line	Rotation "+1" for every worker	Moderate (automated platens moving from station to station)	Yes (NR)	3	2h (each break)
3	2	Car seats, interior trim, and accessories	Mixed design of cells and serial layouts.	Preparation of material, labeling, foaming, packaging, assembly, etc. The authors mention the use of one or more machines for one workstation	NR	NR	Mixed (Yes and No)	NR	Average of 2h
4	3a	Cattle slaughtering	Splitting carcass Head removal	Alternating between saw utilization and working on a platform	Direct rotation with the same colleague	High (automated conveyor)	Yes (NR)	2	Every 250 cycles or when the line is stopped
5	3b	Cattle slaughtering	Filet mignon cleaning Pelvis cleaning (trimming pieces of meat)	Upper limb movements and high paces from both tasks by using a knife. Workstations are lined up beside each other on the same line. Pelvis cleaning is considered less tiring	Direct rotation with the same colleague	High (automated conveyor)	Yes (3 to 4 cycles/m in)	2	Every 100 cycles
6	4	New assembly line	Assembly and stitching of shoes	"Easy" tasks such as applying glue and supplying the line "Hard" tasks such as making points and inspecting shoes	NR	NR	NR	6 to 8 workers	Average of 1,5h
7	5a, 6a	NR*	Within a production unit	NR	Each production unit chooses its own scheme of rotation	NR	NR	Approx. 8	Either 1, 2, or 4 h

Policy #	Paper	Unit/sector	Scope of rotation	Task characteristics reported	Scheme of rotation	Assessment of interdependency between the workstations	Imposed work pace	Number of workstations in rotation	Rotation frequency
8	5b, 6b	NR	Rotation performed within 3 to 4 production units	NR	All workers rotate between tasks and fluently change production unit while rotating	NR	NR	Approx. 23	Either 1, 2, or 4 h
9	5c, 6c	NR	Rotation is mainly performed within a production unit. But additionally, workers are periodically appointed to another production unit.	NR	Mainly a mix of the rotation policy #7 and 8	NR	NR	Approx. 20	A rotation frequency depends on the production unit (either 1, 2, or 4 h). Additionally, another frequency is applied for the rotation of production unit which is not reported.
10	7	Simulated cell	Different simulated tasks (cutting, assembling, inspecting and fixing errors/analyzing)	NR	Rotation "+1" for every worker	Moderate	NR	4	2h
11	8	Poultry slaughterhouse	NR	NR	NR	NR	NR	Between 2 and 9	From 0,5h to 3,5h
12	9a	Beef slaughtering (B)	Meat cutting is performed along a line where all meat cutter performs all tasks. The task required heavy lifting (20 kg)	A new regulation sets a maximum of 6 hours per shift for cutting. The rest of the shift is mostly packing operations or control that requires low skills and low physical demand	NR*	High (automated conveyor)	Yes (NR)	NR	From 65 to 75 min

Policy #	Paper	Unit/sector	Scope of rotation	Task characteristics reported	Scheme of rotation	Assessment of interdependency between the workstations	Imposed work pace	Number of workstations in rotation	Rotation frequency
13	9b	Beef and pork slaughtering (B&P)	Beef flowline including meat cutter of quarter carcass (80kg) and cutting and sorting of residual chunks (15kg) Pork paced line (<30s) with various cutting operations	A new regulation sets a maximum of 6 hours per shift for cutting. The rest of the shift is mostly packing operations or control that requires low skills and low physical demand	NR	High (automated conveyor)	Yes (< 30 s for pork processing line)	NR	From 65 to 75 min
14	9c	Pork slaughtering (P)	Three departments specialize in cutting one part of the pig each. Production is a mix of paced lines and separate tables	The new regulation sets a maximum of 6h per shift for cutting. The rest of the shift is mostly packing operations or control that requires low skills and low physical demand	In addition to the hourly rotation, some meat cutters biweekly rotate between departments (pace line or separate table)	High (automated conveyor)	Mixed (Yes and No)	NR	From 65 to 75 min
15	10	Simulated assembly station of twist stops	Assembly tasks	One station is a repetitive assembly with product changes every 2 hours, and another is for custom orders	Direct rotation with the same colleague	NR	NR	2	1h

*NR= Not reported by searchers

Table 5. Rotation policies reported in selected papers

3.1. Operationalization of Daily Job Rotation

3.1.1. Implementation of Daily Job Rotation Policies

Three papers reported results or insights related to the implementation of daily rotation policies. De-Anchieta-Messias et al. (2022) examined the implementation of daily job rotation in a slaughterhouse, initiated to comply with regulation N-36 in Brazil. Their study provides valuable insights into how workers perceive management initiatives such as job rotation. Prior to implementation, worker acceptance was low (28%). However, involving them in the process appeared to improve buy-in. In some departments, the acceptance rate increased to over 80% after participation in the implementation process. This finding is notable, given that rotation policies are typically designed with human-centric benefits in mind.

In another study, Aptel et al. (2008) reported a high satisfaction rate among workers regarding job rotation, despite a very low level of worker participation in the implementation process (less than 5%). This contrast in participation levels may stem from the fact that, as noted by De-Anchieta-Messias et al. (2022), regulations such as N-36 mandate worker involvement but provide no clear guidance on how this participation should be structured. This methodological gap highlights the need to provide organizations with practical guidance on how to effectively implement job rotation policies.

De-Anchieta-Messias et al. (2022) also conducted interviews with workers to gather their views on the advantages and disadvantages of job rotation before its implementation. Workers had a positive perception of the variety of work, opportunities to gain experience, physical relief, and movement variability. These perceptions align with

benefits frequently reported in the literature (Mlekus & Maier, 2021; Padula et al., 2017). However, some concerns also emerged. Workers expressed a fear of change and an anticipated lack of skills to perform the full range of tasks required by rotation. This highlights a critical aspect of implementation: training. As noted by Guimaraes et al. (2012), one of the main barriers to implementing job rotation is the scheduling of dedicated timeslots for worker training. Organizations must recognize that implementing such policies takes time and that structured training efforts are essential to develop multi-skilled workers capable of rotating effectively, maybe many times per shift, under certain policies.

The importance of developing multi-skilled workers is also emphasized by Vogel et al. (2013), who studied job rotation in a Swedish slaughterhouse subject to new government regulations. They suggest that, to enhance the benefits of job rotation, companies should invest more in multi-skilling and ensure that workers understand the purpose and potential of such practices. To support this, they propose expanding the pool of workstations included in the rotation to an adjacent unit and offering training to volunteers willing to join the rotation program. However, this broader policy may introduce managerial challenges. For example, traditional hierarchies and boundaries between manufacturing units may become less distinct, complicating supervision as multi-skilling becomes more prevalent.

Although widening the scope of daily rotation policies may introduce challenges, this approach aligns with the motivational job characteristics identified by Humphrey et al. (2007) in their meta-analysis on workplace motivation. Work characteristics such as skill variety, task variety, task identity, and specialization can all be influenced by the way rotation is implemented. To better support these motivational factors, organizations may consider increasing the number of workstations included in daily rotation schemes. However, in doing so, an important dimension of work (i.e., autonomy) may also be affected.

One trend observed in Table 6 is that the greater the number of workstations included in the rotation, the less scheduling autonomy is given to workers. Most policies (1, 2, 11, 12, 13, 14, 15) are fully enforced, with no autonomy provided to workers regarding rotation timing. Policies #3, 7, 8, and 9 do not report enough operational details to fully understand how rotation is structured. In contrast, policies #4, 5, and 6 allow for some degree of worker autonomy. Policies #4 and 5 represent the simplest form of rotation, where two workers alternate at a predetermined rate. Interestingly, in these cases, it was the workers themselves who requested the opportunity to rotate at fixed intervals. Policy #6 involves autonomous teams of 6 to 8 workers. Initially, the policy required rotation every two hours. Over time, as workers gained experience, they were allowed to set their own rotation rules. The authors note that convincing supervisors to grant this level of autonomy was challenging and represented a potential barrier to the successful implementation of the policy.

3.1.2. Operational Characteristics of Daily Job Rotation Policies

The results from the various rotation policies also reveal significant variations in how rotation is operationalized in daily operations. As noted by Jeon and Jeong (2016), rotation can be described as either “narrow” or “wide”, depending on the number of tasks included. This distinction is reflected in the number of workstations involved in each policy. For example, policies #4, 5, and 15 represent narrow rotations, where workers alternate between only two workstations at a defined frequency. This limited scope restricts workers’ opportunities to engage in a variety of tasks. In contrast, policies #1, 8, and 9 involve more than ten workstations, qualifying them as wide rotations. These broader policies typically require workers to use a greater range of skills, as they must adapt to a wider variety of tasks.

Policy #	Unit/sector	# of workstations included in rotation	Reported daily implications of workers in the rotation
1	Electric stove main assembly line	11	No implication.
2	Electric stove shell sub-line	3	No implication.
3	Car seats, interior trim, and accessories	NR	Autonomous job rotation. The same autonomous policy applies to all departments with different levels of adherence (0-100%).
4	Cattle slaughtering	2	The rotation is an informal initiative from the workers themselves. Permission was given by management to perform rotation according to their terms.
5	Cattle slaughtering	2	The rotation is an informal initiative from the workers themselves. Permission was given by management to perform rotation according to their terms.
6	New assembly line	From 6 to 8 workers	At the beginning of the implementation, the rotation policy was set to occur every 2 hours. As the workers gained autonomy, they formed teams of 6-8 and became autonomous to fix the rules. It was then observed that a rotation occurs at an average of 1,5h.
7	NR	Approx. 8	The authors reported that rotations are autonomous in the sense that workers could follow the rotation of their choice. No operational details are provided to understand how this is achieved.
8	NR	Approx. 23	The authors reported that rotations are autonomous in the sense that workers could follow the rotation of their choice. No operational details are provided to understand how this is achieved.
9	NR	Approx. 20	The authors reported that rotations are autonomous in the sense that workers could follow the rotation of their choice. No operational details are provided to understand how this is achieved.
10	Simulated cell	4	No implication
11	Poultry slaughterhouse	Between 2 and 9	No implication
12	Beef slaughtering (B)	NR	No implication.
13	Beef and pork slaughtering (B&P)	NR	No implication.
14	Pork slaughtering (P)	NR	No implication.
15	Assembly station of twist-stops	2	No implication.

Table 6. Reported implications of workers in the rotation assignment

Another key operational difference between rotation policies lies in the rotation scheme, that is, the specific path each worker follows during rotation. For example, policy #2 enforces a simpler pattern where each worker moves to the next station (i.e., station $n+1$). This setup keeps them surrounded by the same colleagues throughout the shift, limiting opportunities for interaction and teamwork with other coworkers. At the opposite end, policy #1 is designed so that workers rotate across different stations with varying teammates. This structure increases exposure to new coworkers and may have motivational benefits. Wagner et al. (2017) found a positive relationship between job rotation and collaboration among workers, and a negative relationship with the saliency of fixed interpersonal relationships, suggesting that rotation formalizes and diversifies social interactions. Additionally, Humphrey et al.

(2007) identified social characteristics that influence work outcomes, including feedback from others and social support. Certain rotation schemes may facilitate communication and collaboration, thereby enhancing motivation.

None of the reviewed papers reports how organizations manage the initial assignment of workers at the beginning of a shift, or whether any tracking system is used to ensure fair distribution of work across stations. In narrow rotation policies, such planning may be unnecessary, as all tasks are typically completed within a day. However, in wider rotation schemes (that sometimes involve more than 20 tasks), some form of assignment tracking may be needed to ensure that all workers rotate through enough stations to maintain their skills and balance workload distribution. Some researchers, such as Asensio-Cuesta et al. (2012), have proposed using genetic algorithms to optimize worker-task assignments while minimizing musculoskeletal disorders (MSDs) and fatigue accumulation. Tools like these could support the implementation of job rotation policies. This need for support is reinforced by Vogel et al. (2013), who reported that supervisors experienced an increase in workload following the implementation of task rotation.

Another contextual difference observed among the reviewed papers is the presence or absence of a defined work pace for tasks included in the rotation. Bouillet et al. (2025) report that work pace can significantly affect both productivity and worker health. Unfortunately, many papers do not specify whether tasks are performed at a fixed pace (policies #6, 7, 8, 9, 10, 11, 15). Some provide minimal detail, suggesting that a certain pace is enforced, but do not elaborate further. An interesting example is provided by Vogel et al. (2013). In addition to performing daily rotations on a paced assembly line, workers are transferred every two weeks to separate worktables where they slaughter entire pork carcasses at a different, unpaced rhythm.

Rotation frequency in daily job rotation policies ranges from every 30 minutes to approximately 4 hours. On an 8-hour shift, this translates to anywhere from 1 to 16 rotations per shift. This wide range highlights the operational challenges faced by organizations implementing frequent rotations. Beyond managing risks to workers, such as injuries, fatigue, or boredom, frequent rotations can lead to a loss of production availability due to the time required for workers to move between workstations. This may explain why some studies report that rotations are scheduled alongside breaks during the work shift.

When rotations occur mid-production, accommodations must be made to ensure smooth and safe transitions. In the few papers addressing this issue, Vogel et al. (2013) noted that rotation schedules were designed to balance worker needs while minimizing production flow disruptions. Similarly, De-Anchieta-Messias et al. (2022) reported that workers preferred using a certain number of completed production cycles rather than fixed time intervals to avoid interrupting workflow. Interestingly, the moment of rotation itself may offer additional benefits.

3.2. Reported Usage of Technological Tools Supporting Daily Rotation Policies

According to our findings, very few authors report using technological tools to implement or manage daily rotation policies. The most compelling applications of technology are evident in the studies by Mlekus et al. (2022) and Walczok and Bipp (2024). Both conducted vignette studies involving an Intelligent Assistance System (IAS) designed to support workers during tasks by providing step-by-step instructions and managing rotations. In these studies, participants were informed that the system would indicate when to perform a task rotation within the work cell. However, since rotation was scheduled at a predetermined frequency (every 2 hours and 1 hour, respectively), we argue that the approach does not differ significantly from traditional policies. The predictable timing and shared understanding of the rotation policy among all workers make it very similar to conventional rotation practices not using any technological tool.

Furthermore, these relatively fixed rotation policies appear to be the standard in manufacturing. In fact, all the policies identified in this review, as well as most of the mathematical models and heuristics found during the paper selection process, are designed with fixed rotation intervals, providing stability and predictability for workers (Moussavi et al., 2020a; Polat et al., 2016; Rerkjirattikal et al., 2020; Rinaldi et al., 2020).

Among the ten papers included in this review, only Vogel et al. (2013) reported the use of computerized feedback for meat cutters. Interestingly, feedback was used to mitigate the isolating effects of new mechanical equipment, which had reduced collaboration among workers. However, the study did not provide operational details on how

the feedback was delivered to workers, which limited our understanding of how such systems could be effectively implemented in practice.

3.3. Reported Impacts of Daily Job Rotations on Human Factors

For the purposes of this analysis, the Job and Team Design Model (JTDM), as developed by Morgeson and Humphrey (2008), will serve as the foundational framework. This model, based on a meta-analysis, extends the original Job Characteristics Model (JCM) proposed by Hackman and Oldham (1976) by incorporating additional motivational characteristics for workers. This original model proposed that intrinsic motivation occurs when a worker experiences three psychological states: meaningfulness of work, responsibility for outcomes, and knowledge of the actual results of the work (Hackman & Oldham, 1976; Kuranchie-Mensah & Amponsah-Tawiah, 2016). The JTDM expands on the JCM by identifying three main categories of work characteristics, i.e., the task itself, the social aspects of work, and the broader work context. Table 6 presents key work characteristics associated with each of these three categories within the JTDM.

Task	Social	Contextual
<ul style="list-style-type: none"> • Autonomy • Task variety • Significance • Task identity • Feedback from the job • Job complexity • Information processing • Problem solving • Skill variety • Specialization 	<ul style="list-style-type: none"> • Social support • Feedback from others • Interdependence: <ul style="list-style-type: none"> ◦ Between jobs, roles; ◦ Between teams; ◦ Feedback, goal and rewards 	<ul style="list-style-type: none"> • Physical demands • Work conditions • Ergonomics • Equipment use • Boundary spanning • Organizational support: <ul style="list-style-type: none"> ◦ Reward systems; ◦ Information systems • Virtuality of work • Consequence of failure

Table 6. List of key work characteristics according to the JTDM (Morgeson & Humphrey, 2008)

Since daily job rotation is operationalized differently across organizations, the impact of each policy on these motivational levers will also vary. For example, policy #7 involves rotation within a single production unit, whereas policy #8 schedules rotation across three of four different units. Whether rotation remains within one production unit can influence several dimensions of work design. To facilitate a significant amount of rotation across production units, the facility layout has to be planned strategically to mitigate waste, such as a substantial amount of time loss due to relocation. From a managerial perspective, examining the job design characteristics affected by job rotation and documenting their impacts on human factors may therefore be valuable.

Based on operational distinctions identified in our review, we categorized five distinct daily rotation policies. For instance, the rotation policy described by Mlekus et al. (2022) (policy #10) specifies that the worker rotates to the adjacent workstation every two hours, performing tasks involving control and error correction with both manual and cognitive demands. This policy can therefore be classified as a mixed task rotation, likely to provide greater task variety. In contrast, Aptel et al. (2008) (policy #1) implemented a rotation scheme in which workers alternate between tasks. They also change close work partners with each rotation, which may influence the social dimension of work design in different ways.

With these findings, we identified five categories of daily rotation policies with potentially different implications for job design:

- Rotation between manual tasks only, i.e., lower task variety (policies #2, 4, and 5);
- Rotation between manual and cognitive tasks, i.e., higher task and skill variety (policies #6, 10, 12, 13, and 14);
- Rotation of tasks and colleagues, i.e., greater variation in social support (policy #1);
- Rotation of tasks combined with product changes, i.e., higher task and skill variety (policy #15); and
- Policies with unclear rotation policy due to insufficient detail provided by authors (policies #3, 7, 8, 9, and 11).

Each policy was classified accordingly, and the findings related to job design outcomes, as reported in the selected studies, are illustrated in Figure 2. Predictably, researchers have focused heavily on well-being outcomes, as most human factors identified in the reviewed papers fall under this category. This trend can be explained by the limited number of longitudinal studies in the selected literature. Unlike attitudinal or well-being outcomes, behavioral outcomes typically require longer observation periods and cannot be measured immediately using questionnaires. This observation reinforces the need for more longitudinal research on the impact of daily job rotation in manufacturing environments.

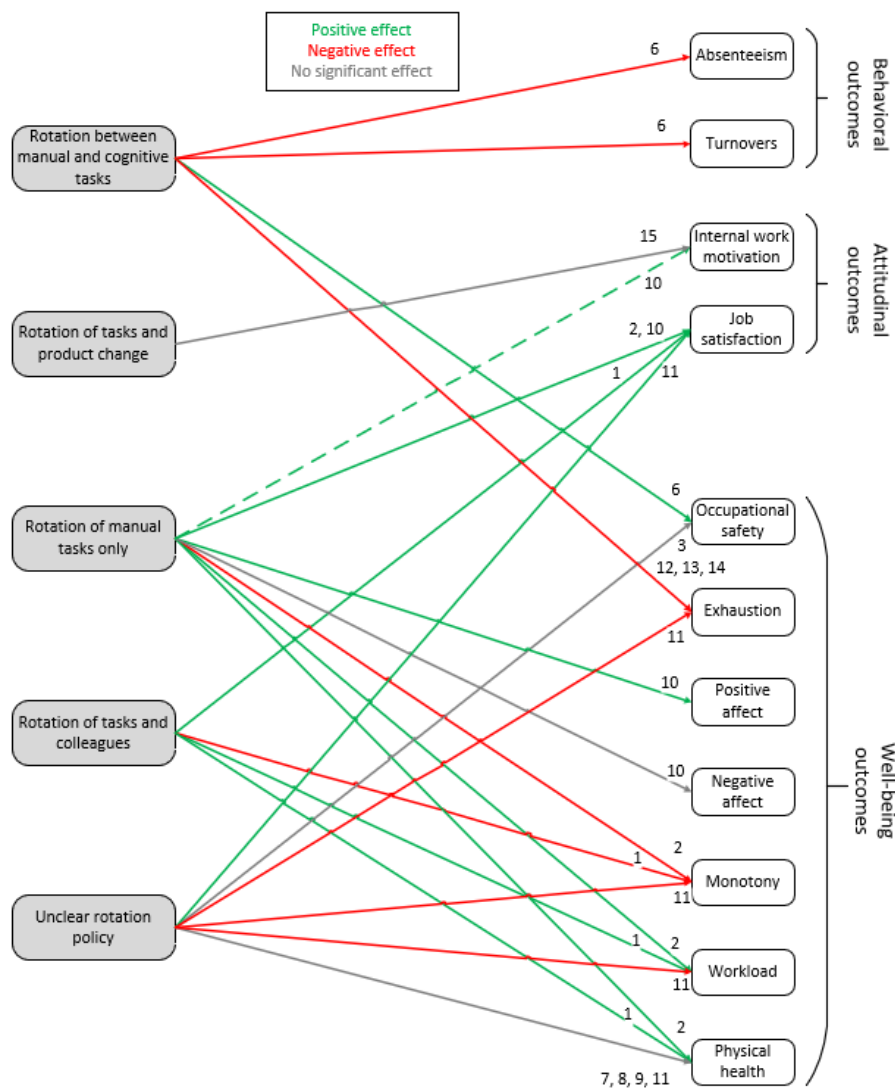


Figure 2. Impact of DJR policy operationalization and their outcomes on human factors

Another predictable finding is the mixed effect of job rotation on physical health and occupational safety. Although studies focusing solely on these aspects were excluded from the review, papers that examined a combination of ergonomic and human-centered factors were retained. Consistent with findings from several literature reviews, the impact of job rotation on MSDs and other occupational injuries remains inconclusive (Padula et al., 2017).

One paper reported a negative effect of daily job rotation on absenteeism and turnover (Guimaraes et al., 2012). This finding is particularly noteworthy, as Morgeson and Humphrey (2008) also reported in their meta-analysis that autonomy in the workplace is associated with lower absenteeism. In policy #6, job rotation was implemented alongside the creation of autonomous teams composed of 6 to 8 workers on a new shoe production line. While absenteeism and turnover are only indirect indicators of motivation, the significant decrease observed over a

3.5-year period suggests that increased autonomy may contribute to higher worker motivation. As Morgeson and Humphrey (2008) emphasized in their JTDM, autonomy is multifaceted, encompassing scheduling, methods, and decision-making autonomy. This raises important questions on how organizations can provide greater autonomy to workers through a structured daily job rotation policy.

Regarding research on daily job rotation using instruments to directly measure intrinsic motivation, the results remain inconclusive. Mlekus et al. (2022) reported inconclusive positive effects of job rotation on intrinsic motivation, while Walczok and Bipp (2024) found no significant effect. Both studies utilized digital assistant systems to support workers in their tasks, suggesting that technology alone does not necessarily enhance motivation in the context of job rotation.

In policy #15, job rotation also involves frequent product changes (i.e., every two hours). While this could be interpreted as contributing to task and skill enlargement, it does not appear to be an effective driver of motivation within daily rotation settings.

Another interesting finding emerges when comparing the impacts of job rotation on monotony and workload. Policies #1 and #2 both reported an increase in perceived workload following implementation. One policy involved rotation between manual tasks only, while the other introduced a rotation scheme that changed coworkers after each rotation cycle. Although both policies succeeded in reducing monotony, this benefit appears to have come at the cost of increased workload for workers. By contrast, policy #11 (Tirioni et al., 2024) reported a reduction in both workload and monotony. Unfortunately, the paper provided insufficient operational details to fully understand the operationalization of the policy responsible for this outcome.

Finally, operationalization decisions regarding daily job rotation influence several job design characteristics identified in the JTDM. Policies involving either a change in product or a change in the production unit may lead to greater task and skill variety. Furthermore, a closer examination of rotation schemes shows that social outcomes may also differ, as close teammates vary depending on specific rotation arrangements. Rotation policies providing workers with greater planning autonomy also appear to yield positive behavioral outcomes, particularly regarding absenteeism and turnover.

Although divergent findings were reported regarding the effects of daily job rotation on workload and motivation, most studies lacked critical operational details on how rotation was implemented and its impact on key job design characteristics. As a result, issuing clear managerial recommendations for organizations seeking to implement daily job rotation policies remains challenging.

3.4. Reported Impacts of Daily Job Rotations on Performance

In this review, we have chosen to address the performance aspect of job rotation separately, as it is not strictly worker-centric but also has managerial implications for the broader production system.

The Job and Team Design Model by Morgeson and Humphrey (2008) classifies performance under behavioral outcomes, covering both quantity and quality of work. While this model could serve as a useful comparison framework, it presents certain limitations when applied to manufacturing contexts. To provide a more comprehensive view of performance in industrial environments, we opted to use the Overall Labor Effectiveness (OLE) framework. OLE, derived from the Overall Equipment Effectiveness (OEE) model, is widely used in manufacturing to monitor performance metrics (Bonci et al., 2022; Vadeboncoeur et al., 2024).

This indicator monitors three key dimensions of a production system: availability, efficiency, and quality. It is summarized by Kronos as “the analysis of the cumulative effect that three workforce factors have on productive output” (Kronos Inc., 2007). In addition to efficiency and quality, it incorporates availability as a critical performance dimension. As previously discussed in the results regarding the operationalization of job rotation policies, the frequency of rotation becomes inherently linked to availability, since each rotation may lead to a temporary interruption in productive activity. During these transitions, workers are not actively contributing to output, which may result in a measurable loss of production time.

Although this aspect is not directly examined in most studies, it may have influenced the common practice of aligning rotations with scheduled breaks, a pattern observed in several policies reviewed (e.g., policies #1, #2, and #10).

Figure 3 presents results related to various facets of performance associated with the implementation of daily job rotation policies. Only three papers reported performance-related outcomes, highlighting a significant gap in the literature regarding the impact of daily job rotations on operational performance. The results available come from both subjective assessments, such as worker self-appraisals, and objective production data. Mlekus et al. (2022) reported inconclusive but slightly positive effects of task rotation on perceived performance. However, the authors provided only a general assessment of performance, without distinguishing between its different components (e.g., availability, quality, or efficiency).

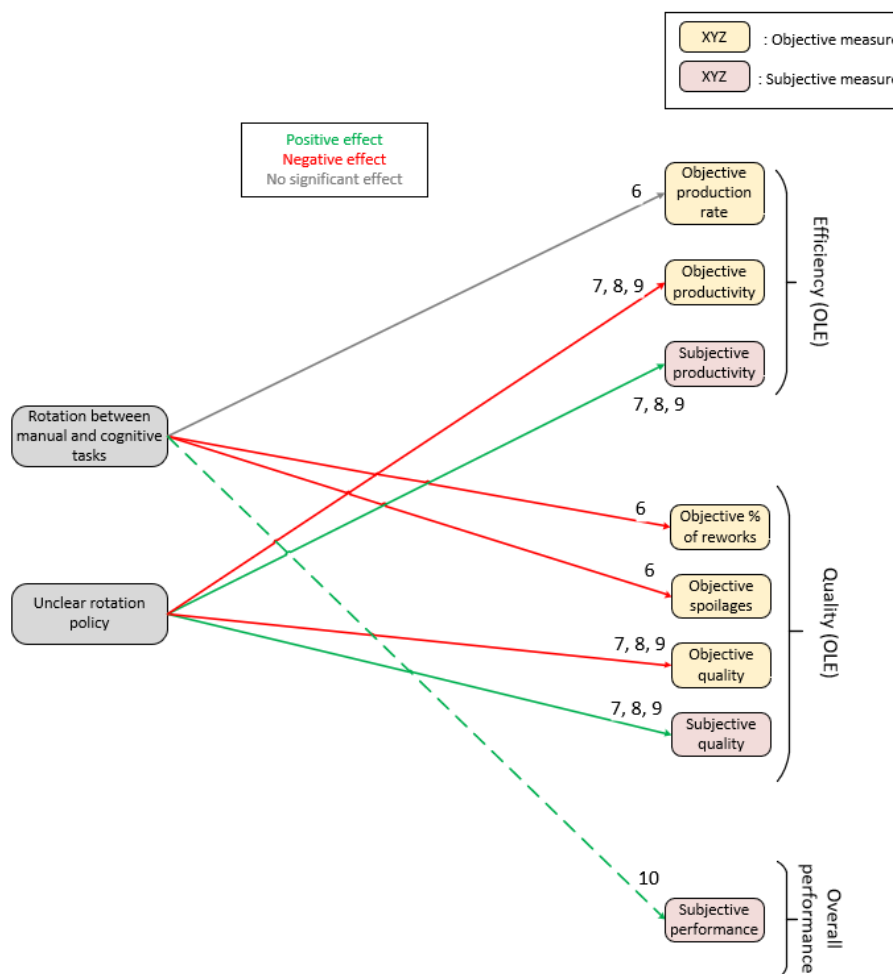


Figure 3. Effects of daily rotations on human performance

Deeper insights were provided by Jeon et al. (2016), who compared subjective appraisals from workers with objective historical production data. While workers generally perceived an improvement in both productivity and quality following job rotation, the objective data suggested the opposite: a decline in both productivity and product quality. These contrasting findings highlight the importance of integrating both subjective and objective perspectives when evaluating the impact of job rotation on performance, as workers tend to have an overoptimistic appraisal of their performance.

Perhaps the most robust evidence on performance came from Guimaraes et al. (2012) whose longitudinal study, conducted over 3.5 years, documented a significant improvement in product quality, as indicated by reductions in

rework and spoilage. However, no notable change was observed in terms of production rate, suggesting that while job rotation may contribute to quality improvements, its effect on productivity may be more limited or context dependent.

4. Discussion

This section will now unveil new perspectives in the understanding of daily job rotation policies in manufacturing. These include an aim at job rotation's implementation, the motivational repercussions of rotation policy's characteristics, future perspectives regarding the use of technology to support job rotation, and a discussion on reported impacts of daily job rotation on human factors and worker's performance.

4.1. Rotation Implementation

This analysis of operationalization of job rotation brought the focus towards the implementation process of such a policy and several challenges that seems important to tackle. The first concern is the need to find an inherent balance between scheduling autonomy and task variety for workers. Our study highlighted the difficulty to provide autonomy for workers especially when the number of workstations is important. This suggest that either a certain trade-off in the design of rotation policies (i.e.: making them narrower), or the usage of technology to support rotation decision might be necessary. Impacts on worker's autonomy will have to be monitored closely given it's critical role in their motivational outcomes (Hackman & Oldham, 1976; Kuranchie-Mensah & Amponsah-Tawiah, 2016).

The training aspect of the workforce has also been identified as a key factor in enabling workers to perform multiple tasks within a single shift. With the growing presence of new technologies in manufacturing, there is an opportunity to explore how these tools can be leveraged to support effective training for a workforce engaged in daily job rotation, with the aim of reducing the workload for supervisors, which is known to be extensive during the implementation process. New responsibilities include managing rotation schemes, creating competence plans, and training workers for their new tasks (Vogel et al., 2013). This increase in workload for the supervisor when daily job rotation is implemented appears to be understudied.

Although mathematical models and heuristics that aim to assist managers in managing rotation are widely available in the literature, they also represent a significant portion of the papers excluded from this review due to the lack of empirical results. They offer limited insight into how these tools are implemented by supervisors in real-world settings. Most of these studies present only computational results or informal feedback from employees. They rarely provide operational knowledge on how supervisors adapt the outputs of these tools to daily disruptions, such as absenteeism or line stoppages. Given the key role that sustainability has in the emergence of Industry 5.0, such questions impacting the resilience of job rotation will have to be addressed.

4.2. Motivational Repercussions of Rotation Policy's Characteristics

The results regarding the operational characteristics of daily job rotation policies revealed some discrepancies that deserve careful examination. The very moment when workers are expected to rotate may offer motivational benefits or downsides, depending on certain choices made regarding the operationalization of policies. Many of these potential motivational outcomes can be explained by the Job and Team Design Model from Morgeson and Humphrey (2008).

For example, the variation in work pace, work environment, and tools used induced by a change of production unit (e.g., policy #9) could make the rotation more salient and meaningful than rotating between adjacent stations at a constant pace (e.g., policies #1 and #2). These embedded rotation structures, which vary not only in tasks but also in rhythm, may help strengthen the motivational aspects of work, as they call for more job design characteristics than a simpler rotation. A simple question arises when designing daily job rotation policy: Does incorporating more job design characteristics into a DJR policy provide better motivational outcomes? More research with an emphasis on the operational characteristics of job rotation is necessary.

Also, the timing and rotation scheme might influence social support for workers. If rotating during breaks does not offer additional benefits, a rotation that occurs in mid-production might require more coordination among workers,

thereby influencing the social characteristics of the JTDM. These DJR policy characteristics must be closely studied, as motivational benefits might arise from this choice. Our current findings suggest that, in most cases, rotation frequency is chosen primarily to minimize production disruptions. However, these specific moments throughout the shift may be underutilized opportunities to enhance motivation and engagement on the shop floor.

The characteristics of the tasks embedded in a rotation policy also deserve more attention from the research community. We can observe significant variations between the types of tasks in each rotation policy, although some authors do not provide sufficient details to comprehend the types of tasks workers are performing. Previous work focusing on non-manufacturing employees has reported that rotation between cognitive and physical tasks might be a viable option for employees when possible (Jahnke et al., 2017). This focus on the type of tasks embedded in rotation warrants more careful examination, given that manual tasks are being gradually automated on the shop floor (Wang et al., 2024).

4.3. Perspectives of Technology to Support Daily Job Rotation

In the research closely studied for this review, we uncover a limited usage of technology to support daily job rotation. Only two papers have studied the use of adaptive assistance systems in job rotation. Nevertheless, the work of Nikolakis et al. (2020) is noteworthy. The authors developed a prototype within a case study designed to support workers in performing multiple tasks under a job rotation scheme. By leveraging user profiles and gamification features, a k-nearest neighbor (KNN) algorithm was used to provide the most relevant set of task instructions for each worker. Although the study presented only preliminary results, it demonstrates the potential of technology to personalize the work experience, even in dynamic environments where daily rotations are implemented. Unfortunately, the impact of such technology on human factors was outside the scope of this study.

Another use of technology in job rotation was discussed in a recent work by Safaiyan and Rastgar (2025), who proposed a dynamic job rotation tool based on biorhythmic analysis and an Artificial Neural Network (ANN) to predict fluctuations in employee performance. The goal is to refine job rotation strategies and support supervisors in making real-time decisions. This approach significantly diverges from the traditional, stable nature of job rotation policies, raising questions about its motivational impact. Increased uncertainty in daily assignments may reduce predictability and, in turn, affect worker engagement and well-being. As noted by Gutierrez-Broncano et al. (2024), uncertain information about future job tasks can increase employee anxiety, negatively impacting employees' well-being. Further empirical research is needed to validate the tangible benefits of dynamic daily rotation policies and to assess their impact on workers' motivation and psychological well-being.

From a practical standpoint, these new job rotation decision tools must be supported by robust IT and systems, such as Human Resources Information Systems (HRIS). These systems typically manage worker competencies through scoring matrices, enabling the creation of person-to-job assignments (Safaiyan & Rastgar, 2025; Sharma & Malodia, 2022). However, our results suggest a low level of integration of such tools in the context of daily rotation policies. For example, Vogel et al. (2013) reported that supervisors took on additional responsibilities to implement daily job rotation. These tasks included managing rotation schemes and developing competence plans. These are activities that would normally fall under the scope of an HRIS.

As mentioned earlier, an opportunity for future research concerns how organizations train their workforce in the context of daily job rotation. This need must be fulfilled even after the implementation process is complete. For example, new employees might be introduced in the rotation and require extensive training. Some authors, such as Jeon and Jeong (2016), noted that workers were required to undergo training and achieve a 100% score on a final test before integrating a rotation schedule. Similarly, Guimaraes et al. (2012) highlighted the importance of workstation proximity as a success factor, as it enabled less experienced workers to observe and learn from nearby colleagues.

While these findings are insightful, we argue that effective rotation training should not depend on uncontrollable contextual factors, such as physical proximity between workstations. Instead, further research is needed to explore how technology can support structured and scalable training programs for rotation-based work environments.

Furthermore, insufficient support for developing multi-skilled workers during the implementation of job rotation policies can lead to inequities within the workforce. This may create a divide between rotating and non-rotating employees. In this context, perceived organizational justice has been identified as a key factor influencing job satisfaction during job rotation (Warman et al., 2022). A low perception of fairness can lead to reduced motivation, lower engagement, and an increased risk of employee turnover. Given the central role that training plays in implementing rotation policies, further research is needed to explore how technological tools can support the multi-skilling of workers and promote a fairer and more inclusive rotation process.

Another research opportunity related to the use of technology in daily job rotation concerns the feedback provided to workers. Since job rotation consists of distinct, discrete events embedded in the production schedule, these transitions can serve as natural moments to deliver feedback on work performance. As discussed earlier, work context, rotation frequency, and rotation schemes may not always be conducive to feedback delivery. However, less frequent rotations, for example, those that coincide with scheduled breaks, may offer more suitable opportunities for meaningful feedback.

Feedback is known to play a central role in motivation, as highlighted in Self-Determination Theory (SDT) by Deci and Ryan (2008), a widely used psychological framework. Similarly, the JTDM identifies feedback from the job as a core motivational factor. Moreover, knowledge of results is presented in the latter as a key mediator influencing work outcomes in the model. These theoretical perspectives suggest that integrating feedback mechanisms into rotation events, potentially supported by technology, could enhance worker motivation and engagement, and thus deserve further investigation.

In summary, recent studies have proposed frameworks to make job rotation decisions more dynamic and adaptive (Safaiyan & Rastgar, 2025). From a motivational perspective, this emerging paradigm deserves close attention, as current job rotation policies often remain predetermined in both their structure and the selection of participating workers. At the same time, other researchers have explored how technology can be used to personalize the work experience, aligning it more closely with workers' needs and preferences (Nikolakis et al., 2020). However, the implementation of such technologies and their integration into daily management practices raises important organizational and human-centered questions. These issues must be addressed in future research to ensure successful and sustainable adoption.

4.4. Reported Impacts of Daily Job Rotations on Human Factors

Our analysis of human factors, coupled with an attempt to classify the type of rotation provided by the reported policies, revealed interesting findings about their impacts on monotony and workload. Workers under policies #1 and #2 both reported an increase in perceived workload following the implementation of job rotation. One policy involved rotation between manual tasks only, while the other introduced a rotation scheme that changed coworkers after each rotation cycle.

These findings highlight a specific challenge for workers who perform multiple rotations within a single shift. To reduce monotony caused by repetitive tasks, managers may be tempted to increase the frequency of task rotation. However, this can create a more demanding work environment, where workers are repeatedly interrupted, required to adapt quickly to new tasks, and often lack the critical feedback or information that would have been provided by a more experienced colleague. Such factors may reduce situational awareness, hinder performance, and ultimately lead to lower motivation and engagement. These hypotheses raise important research questions about the cognitive load experienced by workers performing several rotations in a single shift. A better understanding of these cognitive demands could inform the design of more effective rotation schemes and policies, aligned with the human-centric principles of Industry 5.0.

Our analysis also revealed no significant differences between the five types of rotation reported in this review. Although these results are merely sufficient to generate strong conclusions. In fact, many rotations were classified as unclear given the lack of operational context provided by the authors, which underscore the need to carefully study operational differences between rotation policies, and then, leverage this knowledge to carefully plan experimentations that will encompass these operational differences and help the scientific community to better comprehend why the rotation of employees in manufacturing has divergent outcomes regarding human factors. Achieving this will require a

deeper understanding of how rotation affects workers, supported by studies that use validated psychological instruments and questionnaires to measure more abstract factors such as motivation and engagement. The only consensus on job rotation seems to be its impact on highly subjective factors, such as satisfaction and exhaustion.

4.5. Reported Impacts of Daily Job Rotations on Workers' Performance

Our results show that research on the impact of daily job rotation on worker performance remains incomplete. While papers report a positive subjective perception from workers engaged in daily job rotation, very few objective data are provided to support this claim. Among the limited studies presenting objective performance measures, no definitive conclusions can be drawn from this review. Although some evidence suggests that job rotation may contribute to improved product quality, this does not appear to extend to efficiency, where results are either mixed or inconclusive.

Moreover, labor availability, a critical component of performance in manufacturing, has not been addressed in any of the selected studies, despite its potential to be significantly affected by rotation frequency and schemes. This gap reinforces the need to examine the operational details of daily job rotation policies more thoroughly, as decisions regarding rotation structure, frequency, and depth can directly impact key performance indicators such as worker availability and system throughput.

5. Conclusion

Rooted in the Industry 5.0 paradigm, this review revisits job rotation, a longstanding managerial practice, through a human-centric lens. While the emerging industrial model emphasizes sustainability, resilience, and worker well-being, translating these ambitions into daily managerial practices remains challenging. This review addressed this gap by systematically examining how organizations operationalize daily job rotation and what effects are reported on both workers and performance.

Overall, findings reveal that while daily rotation can alleviate monotony and foster job satisfaction, its influence on intrinsic motivation and perceived workload remains uncertain. Objective evidence supporting performance improvements is limited, despite workers' generally more positive self-assessments. Furthermore, most rotation policies still rely on predetermined, fixed rotation schedules with little technological support or adaptability. Cognitive and psychological mechanisms underlying daily rotation thus remain poorly understood, calling for a more holistic, data-driven, and worker-inclusive approach to policy design.

Beyond these results, this review clarifies what actually defines a daily job rotation policy and what contextual elements may shape workers' experience. The following characteristics should be systematically considered when designing or analyzing job-rotation policies:

Operational characteristics of job rotation policies:

- Scope of rotation (e.g., number of workstations and/or production units involved);
- Rotation scheme (e.g., identical vs. individualized, allowing possible interactions between workers);
- Type and variety of tasks (e.g., manual, cognitive, or hybrid; team or individual tasks);
- Degree of automation within tasks;
- Rotation frequency (e.g., number of rotations per shift);
- Degree of autonomy provided (e.g., in setting frequency, adherence, or task assignment).
- Training program development to ensure workers' proficiency in tasks covered by the job rotation policy; and
- Strategy to cope with workforce contingencies (e.g., vacations, absences, illnesses, etc.).

Contextual factors shaping workers' experience and well-being:

- Variation in work pace;
- Opportunities to work on different products;
- Interdependence between workstations;
- Layout of the cell or production unit (e.g., allowing cooperation or creating isolation between co-workers); and
- Feedback mechanisms provided to workers.

These elements highlight the multidimensional nature of daily job rotation and should guide both managerial practices and future research investigations. These include the development of tools to streamline training and alleviate supervisors' workload, the integration of real-time, data-driven systems to optimize job rotation parameters during the design phase, and the examination of trade-offs between job autonomy and task variety.

Further opportunities lie in identifying contextual factors that influence intrinsic motivation and perceived workload, investigating the behavioral and well-being implications of predictive, AI-driven job rotation systems, exploring the social dynamics fostered by specific rotation schemes, and designing innovative, technology-supported feedback mechanisms to enhance worker experience and performance. In all cases, organizations and researchers must consider how task variety and complexity affect performance, trust, motivation, and perceived autonomy when implementing human-centric production practices (Passalacqua et al. 2024). As such, future research should combine organizational outcomes (e.g., OLE-based performance) with human-centric indicators in a holistic manner. In this regard, the methodological framework proposed by Goujon et al. (2024) may offer a promising foundation for designing structured and realistic experimental protocols. Applying such a framework will enable researchers to objectively evaluate the impacts of new technologies and autonomy models, thereby capturing both the benefits and potential drawbacks of daily job rotation practices as manufacturing organizations progress toward the human-centered ambitions of Industry 5.0.

Finally, other factors included in Morgeson and Humphrey's Job and Team Design Model may prove relevant for future studies. For instance, reward systems could be aligned with participation in job rotation programs, serving as an incentive for workers to engage in job rotation and gain multiple skills. However, as Gagné et al. (2025) have shown, reward systems account for less variance in motivation, well-being, and performance than work design. They conclude that focusing solely on one complex compensation system, rather than on work design, may be a mistake that leads to a motivational gap. Close examination of reward systems and workers' engagement in rotation, especially when rotation is not imposed, is needed.

In addition, employee-related characteristics should be examined in greater depth to help managers establish rotation policies tailored to the specific attributes of their workforce (e.g., age, technical background, skills, physical abilities). For example, Jeon and Jeong (2016) found that more experienced workers tend to prefer less frequent rotations and longer-cycle jobs, thus being less likely to engage in daily job rotation. Some operational characteristics may be best suited to specific demographics and could lead to individual policies. Finally, other factors, such as the presence of a union and applicable collective agreements, may also constrain managers in designing rotation policy characteristics.

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Dominic Vadeboncoeur: Conceptualization, Methodology, Investigation, Data curation, Visualization, Writing – Original Draft, Review, and Editing.

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Data availability

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Use of Artificial Intelligence

The authors used ChatGPT for language editing purposes only. All conceptual and analytical content is the author's original work.

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