

2. Research objective and structure

This thesis is dedicated to the identification of links between using ADM systems, as a more accurate label for current AI applications, and job autonomy in the service sector, as well as the conditions and effects of the existence of these connections. Thereby, this thesis aims at adding significant insight to the current scientific discourse on changing working environments in the German service sector on an empirical basis. The analysis of whether and to what extent various dimensions of job autonomy at the work process level are influenced by using ADM systems is at the core of this objective. The central question of this research is therefore: *What impact does using ADM systems have on the job autonomy of employees in the service sector?* The term “ADM systems” refers to algorithmic decision-making and is the reference primarily applied in this thesis for the generic concept of AI.

While this thesis deals with the influence of ADM systems on workers, the research focus lies not exclusively on possible positive or negative effects on job autonomy but on describing the conditions and environments in which these impacts come to fruition and how to deal with uncertainties that may accompany using these novel technologies. Thus, this thesis seeks to combine and utilize both critical and hopeful stances on ADM and work. However, it understands the potential relationship not as swinging between these two extremes but as the emergence of new uncertainties and complexities of work.

This thesis initially draws on insights from sociology, psychology, and the economics of work. Since this is ultimately a sociological thesis, large parts of the literature and the theoretical framework, as well as the linking of theory, conceptual considerations, and empirics, draw from sociological approaches. Research from psychology is utilized regarding the concept and interpretation of job autonomy, because very early in this work it became apparent that the perception of job autonomy is a deeply subjective one, which must be considered if the effects of ADM on job autonomy are to be grasped with the broadest possible scope of depth. Research from the field of economics is referred to with respect to the intervention depth of ADM systems in work processes, since basic ideas about the effects of ADM on job autonomy are derived from the complementary or substitutive characteristics of technology.

Within such considerations, the service sector often receives only little or partial attention in work and industrial sociology research, especially in the context of integrating technology into work processes. It is only in recent years that a revival of the interplay between digitalization

and service work has been observed in research as part of the transformation of retail and logistics (e.g., Barthel, 2023; Butollo, Engel, et al., 2018; Delfanti, 2021; Gilbert et al., 2021) or the emergence of the platform economy (e.g., Eyert et al., 2020; Gerold et al., 2022; Schreyer & Schrape, 2021). However, it is still astonishing that many (sociological) studies focus only on the manufacturing sector and the transformation of work in industry. Although industry accounts for a considerable share of value creation and employment in Germany, most employees work in the service sector (over 70 %, Table 15), whose working conditions are so heterogeneous that greater knowledge on this topic is desirable. The focus of this thesis is on the research gap in the German¹³ tertiary sector. The empirical analysis of the primary and secondary sectors, as well as self-employed persons¹⁴ is largely omitted. However, the attempt is necessarily made to transfer selected findings, especially from the manufacturing industry, to the service sector.

The heterogeneity of the service sector makes this field of research both exciting and challenging. It brings together a variety of different jobs (object-, person-, or information-related) in a wide range of occupations that encompass a broad spectrum of skill requirements. A high share of interaction work is particularly distinctive, which entails a higher degree of uncertainty and unpredictability of work situations due to the interaction subject (Jungtäubl, 2021, p. 30). As a result, this situation is much more difficult to formalize than, for example, object-related tasks. It requires flexibility and adaptability (Jungtäubl, 2021, p. 30). Therefore, it is essential to explore the extent to which learning ADM applications can also intervene in the complexity of service work and what the consequences are for the job autonomy of employees who already move within the constraints of marketization and subjectification (Senghaas-Knobloch, 2011, p. 30).

Moreover, the service sector's heterogeneity makes purely quantitative research approaches across all sector segments appear superficial

13 The focus on the German service sector is mainly due to accessibility. Due to the growing importance of the service economy in most western industrialized countries, the research results are transferable as the conflicts and challenges are comparable. This applies to the later focus branches of the company case studies (Part III).

14 The self-employed are initially excluded from the analysis because their job autonomy constellation is even more complex than that of dependent employees (e.g., work status, legal conditions, see Pichault and McKeown, 2019). However, selected changes in job autonomy at the work process level are certainly transferable from dependent employees to the self-employed. The alternating use of the terms *workers* or *employees* is thus linguistically acceptable.

and strictly qualitative approaches difficult to apply to the entire sector¹⁵. For this reason, a multi-method approach comprising both semi-quantitative elements and a qualitative approach is applied in this thesis. Therein lies the hope of obtaining as holistic a picture as possible of the autonomy situation of service workers. Within these empirical analyses, job autonomy is consistently addressed from a subject perspective. This is intended to take into account the “role of workers as active appropriators and agents [...] but also their specific action strategies, relevance settings, and work and life orientations”¹⁶ (M. Frey, 2009, p. 15).

Sichler (2006, p.246) proposes a *radically subjective* conception of job autonomy to meet the requirements of self-organization and self-control in service work. Certainly, it is not always possible to distinguish between objectively given and subjectively perceived job autonomy based on secondary literature and empirics. However, the empirical analyses in this thesis always take the subjective perspective as the basis for interpretation – freely reformulated along the lines of Thomas’ Theorem, it is assumed that autonomous work may only be claimed if it is perceived as such by workers.

Part I of this thesis lays the theoretical foundation for all further analyses and essentially reflects the current state of research on job autonomy and ADM. It serves as a conceptual and theoretical anchor point for embedding the following empirical findings in the scientific discourse: Chap. 3 initially deals with the terms AI and ADM. ADM systems refer to both rule-based and learning systems, i.e., they may belong to currently discussed machine learning systems but can also describe simpler digital systems. Thereby, it becomes clear that “AI tools are point solutions” (Agrawal et al., 2018, p. 130), whose scope of application is mostly limited to very specific fields, but also that the performance of learning systems in decision-making situations depends on the interaction of reliable technology and its organizational embedding (Luong et al., 2020, pp. 41–42). This thesis, therefore, does not attempt to formulate a specific ADM definition but rather a categorized embedding of ADM systems according to their depth of intervention in work processes.

Chap. 4 reformulates existing concepts of job autonomy to reflect the multidimensionality of the term and the complexity of modern ser-

15 The service sector is outlined along the definition of the Statistisches Bundesamt (Destatis) (n.d.), which counts 13 sections to the tertiary sector (WZ 2008, Table 14 | Appendix).

16 Own translation of “Rolle der Arbeitenden als aktiv Aneignende und Handelnde [...] aber auch ihre jeweils spezifischen Handlungsstrategien, Relevanzsetzungen sowie Arbeits- und Lebensorientierungen” (M. Frey, 2009, p. 15).

vice work. Peters (2001, p. 20) makes clear that the concept has different meanings and that when autonomy in work is mentioned, often very different things can be implied. Therefore, finding a common understanding of job autonomy appears to be essential. This refers to the understanding of job autonomy as autonomy at work, i.e., the possibility of determining the courses of action in relation to an individual's own work processes.

The resulting set of seven job autonomy dimensions also forms the basis for the semi-quantitative and qualitative analysis in Part II and Part III. The term "job autonomy" is deliberately chosen to point out that the underlying understanding of autonomy in this thesis is always based on the assumption that within a specific employment relationship there are also specific forms of job autonomy for employees. Job autonomy therefore already implies a certain restriction because it deals with the scope for action within a distinct job.

Chap. 5 concludes Part I with an attempt to theoretically embed the interplay between ADM and job autonomy in existing control logics in companies. The central aim of the chapter is to identify possible interpretations for the occurrence of various expressions of job autonomy and the role that the application of technology plays in this context. A central distinction is made between service branches in which employees are granted little job autonomy and those in which employees have many degrees of freedom in the execution of their work. With both ideas, job autonomy fulfills different organizational purposes within the concepts of direct and indirect control mechanisms. As a first result of this thesis, Part I presents a theoretically sound concept and an entanglement of job autonomy and ADM in companies, which serve as a starting point for further quantitative and qualitative analyses.

Part II takes up these theoretical-conceptual findings, attempts to quantify job autonomy in the service sector, and establishes comparability across branches. A detailed description of the objectives of Part II is given in Chap. 6. The measurement of changes in the subjective degrees of job autonomy provides initial indications of the impact of organizational and technical changes or constraints on employees. Using the BIBB/BAuA-ETB, a representative cross-sectional employment survey, job autonomy is mapped within a *Job Autonomy Index*. This is not limited to findings at the branch level but also considers selected socio-economic characteristics of the respondents as well as ADM aspects of work. Part II thus serves to identify service branches with particularly distinctive characteristics of job autonomy and trajectories of change. The selected branches serve as objects for an in-depth analysis outlining the effects of ADM on job autonomy in Part III.

Part III forms the core of the empirical analyses in this thesis and includes two in-depth company case studies from outpatient care and banking services. A detailed description of the objectives of Part III is given in Chap. 11. The empirical basis for these case studies is formed by problem-centered, semi-structured interviews with service employees who use ADM systems in their daily work routines. In addition, interviews with company and employee representatives, as well as the technology provider or IT managers of the companies, are conducted, which provide an overview of the corporate objectives of technology use, its implementation, and its embedding. Concluding expert interviews from related scientific and public fields, such as labor law or AI standardization, complement the sociological perspective on the case study companies and the handling of ADM.

The interview evaluation is carried out along the seven previously defined job autonomy dimensions and follows a qualitative content analysis according to Mayring (2010), consisting of inductive and deductive elements. A company case consists of a branch profile that reveals general employment trends, strain situations, technology use, the description of the company, the ADM system, and specific deployment situations, as well as a presentation of the changed job autonomy settings from the employees' perspective. The case studies are completed with a discussion of technical hurdles as well as the impact and conditions for creating positive job autonomy experiences. A cross-case analysis and the embedding of the case study results in the theoretical framework conclude the empirical work of this thesis.

The final Part IV combines all theoretical, conceptual, and empirical findings and formulates answers to the initial question about the influence of using ADM systems on the job autonomy of employees in the service sector. It attempts to transfer selected findings from the empirical analyses to the service sector to generate possible courses of action and new implications for political, social, and legal actors. Ultimately, the complex relationship between ADM and job autonomy has hardly been analyzed. This thesis aims at adding meaningful findings to the ongoing scientific debate on the short-term evolution and the long-term revolution of job quality by emphasizing the societal significance of the effects that ADM has on job autonomy.