

Data-based Transparency and Leadership in Small and Medium-sized Enterprises

Carmen Mayer ¹

Abstract: Based on the increasing usage of Information Systems (IS), the amount of employee-specific data in companies is rising. As this data is more often used for leadership, referred to as data-based leadership, the question about complete transparency and its consequences in companies needs consideration. This work therefore, aims to analyze the amount of gathered employee-specific data, the resulting data-based leadership, and the exercised control and transparency in small and medium enterprises (SME) which have limited experience in using digital leadership approaches. The applied case study provides qualitative insights into these aspects. This case study is based on five selected SMEs from different industries. With my study, I enhance control theory and derive practical recommendations for a sustainable handling of employee-data for leadership.

Keywords: Data-based Transparency, Leadership, Control Theory, SMEs, Information Systems.

1 Introduction

Due to the increasing availability and exploitation of digital technologies in companies, the amount of produced data is growing. This enhances digital innovations and consequently transforms businesses [WH20]. Particularly, the appearance of human resource information systems (HRIS) illustrates the transformation of employee management into a data-driven direction [GH20]. These systems are defined as cross-sectional systems used for workforce planning and performance management [La18].

The increasing transparency that results from data-driven human resource management (HRM) creates a higher level of control and provides insightful learning about the employee from a manager's perspective [Be17]. On the employee level, data-based transparency, meaning transparency that is generated by rising amounts of employee data, favor employee empowerment [MMH15]. However, increased data-based transparency also entails significant risks for managers and employees [Be17]. These include, for instance, a loss of trust and growing pressure on the employee level and, on the management level, problems due to the complexity of data evaluation [MMH15]. It is therefore necessary to balance the opportunities and risks of increased transparency.

Currently, the number of publications in the area of data-based leadership is growing constantly [CBZ19]. Prior contributions investigate people analytics, workforce analytics, talent analytics, HR analytics and HRIS which are mostly used as synonyms [Hu18]. Qualitative works focus mainly on advantages and disadvantages of transparent leadership

¹ Ludwig-Maximilians-Universität München, Fakultät für Betriebswirtschaft, Institut für Wirtschaftsinformatik und Neue Medien, Ludwigstraße 23, 80539 München, carmen.nadine.mayer@gmail.com

without taking into account the size of the analyzed firm and resulting characteristics [VVV19]. Moreover, researchers state that “there is still a lack of theorization about the impact of technology on leadership” [CBZ19]. The focus of this paper is on data-based transparency in small and medium- sized enterprises (SMEs) as they usually have fewer financial resources and less hierarchies than large enterprises [ID19]. Thus, the impact of data on leadership is even harder to estimate for these firms. In this paper, I will therefore address the research gap of the availability and use of data in leadership and the resulting data-based transparency in SMEs. Thus, I pose the following research question:

RQ1: Which data can be used in the context of data-based leadership in SMEs?

RQ2: How are data-based leadership, control and transparency related in SMEs?

To answer these research questions, the concepts of data-based transparency, leadership and control theory are explained in the theoretical background. Based on this theoretical background, a case study research, with ten semi-structured interviews from various sectors, is conducted. These findings are then analyzed and discussed. Finally, the limitations of the work are outlined and implications for theory and practice are provided.

2 Theoretical Foundation

2.1 Information Systems (IS), data-driven Leadership and Transparency

In companies in general, data is created, processed and displayed in different IS. For the aim of this paper, only the IS in which employee-specific data are gathered and evaluated are considered. Hence the following section outlines three operational and one strategic IS. Knowledge Management Systems (KMS) pertain to cross-sectional systems. Their function is the facilitation of access to and storage of tacit and explicit knowledge [AM17]. Besides KMS, Office Management Systems (OMS) are also classified as cross-sectional systems. OMS support individual office work, such as word processing, spreadsheet calculation, email services or direct messaging systems which support communication and collaboration in enterprises [AM17]. The last systems which are allocated in the area of cross-sectional systems are HRIS which are used for workforce planning and development, performance management and human resource development [La18]. Strategic IS, namely Management Information Systems (MIS) are positioned one level above operational IS. MIS supply information to managers and therefore support their data-driven decision-making [HMN15]. Examples of MIS are planning and control systems, cross-functional software and corporate planning systems [Me17]. Overall, if employee data are used for leadership, this is referred to as data-based leadership. Data-based leadership may result in a higher level of transparency which is recently being analyzed more frequently in literature. In a broad sense, synonyms to transparency are openness, freedom of information and clarity [Be17]. According to Hofmann, transparency is generally defined as a "state of more or less clarity of structures and processes [... where] information and communication are the medium [...] with which this

state can be created and maintained" [Ho07]. Further, transparency can be analyzed across and within companies, whereby this paper focusses on the latter. Persons involved in the transparency process are the observed and the observer. The observed are the employees who send information, and the ones who receive and process it. Whereas, the observer is the manager who has access to this information [Be17]. In sum, data-based transparency is an observability of structures and processes by managers and employees that is created with data from HRIS, and that is used for data-based leadership. As transparency can either lead to increased efficiency, empowerment and participation or to privacy concerns and mistrust [Be17], enterprises have to find their optimal degree of transparency by balancing overall transparency and privacy [MMH15].

2.2 Control Theory

Control in companies is defined as any attempt to align the individual behavior of employees with the firm's goals [Wi19]. Control theory is a well-established theory which originates from sociology and is frequently applied in the context of IS to explain situations where control is used in organizations [CW18]. Thus, it combines IS and data-based transparency, as well as leadership in SMEs and serves as a valuable basis for this work. Subsequently, five dimensions of control theory are described.

The first dimension, the *control relationship*, defines the parties involved in the control process, the controlled (the employee) and the controller (the manager) [CW18]. The second dimension examines the *control environment*, which consists of the corporate strategy, the organizational structure, the process characteristics, the corporate culture and the members of the organization [CBG16]. The third dimension, the *control mode* is divided in formal and informal control. For formal control we can further differentiate between behavioral and outcome control. In behavioral control, the controller implements rules and influences the process and the attitude of the controlled through observation [CS03]. Outcome control targets the results rather than the process of a project [CS03]. Informal control can also be divided into two dimensions: self-control and clan control. Self-control occurs if the controlled determine their goals and behavior through formal control mechanisms [CS03]. In contrast, clan control relies on shared norms and values that reduce differences between the controlled and the controller [CS03]. A fourth dimension is referred to as *control style* and can be subdivided in coercive control and enabling control. The coercive style is hierarchical and is exerted unilaterally by the manager, whereas empowering control is collaborative and bidirectional [Wi19]. The fifth dimension is the *degree of control* which can either be relaxed or strict [CW18].

In order to analyze data-based transparency in leadership, the classification of IS serves as a structuring method to cluster different sources of employee data and possible data points. Taking the definition of data-based leadership as a basis, the situation in SMEs can be examined. The concept of control theory with its descriptive dimensions is used to determine the exerted control in SMEs.

3 Method: A Case-Study Approach

In this work an exploratory case study research has been conducted, based on Yin’s ideas [Yi14]. The method of the case study research has been applied in this context because of its possibility to precisely map a current complex social phenomenon in a holistic and real context. Furthermore, the method aims to provide insights into a largely unexplored area where the boundaries between the object of study and the context are not clearly evident. To provide insights into different company sizes, cultures and industries, the multiple case study research approach has been utilized [Yi14]. To ensure quality, the approach follows the guidelines by Yin [Yi14].

3.1 Data collection

Subsequent to the definition of the research design, a semi-structured interview guideline has been formulated. Simultaneously, suitable SMEs have been selected based on the following criteria. The interviewed SMEs have to be classified as an SME under article 267 (2) HGB [Fl17]. According to this article, quantitative characteristics of SMEs are a balance sheet of less than 20 million euros per year, a turnover of less than 40 million euros per year, and fewer than 250 employees on average per year. Furthermore, SMEs have been sampled according to their industry, location in Rhineland-Palatinate and Baden-Württemberg in Germany, and private ownership. Thus, 15 suitable SMEs have been selected and contacted with a standardized e-mail. From all contacted SMEs, 8 responses were received. A total of three pre-tests were carried out. Finally, interviews with 7 SMEs were conducted. The interviews were held between 2020-09-21 and 2020-10-19. In order to gather insights on the management and employee perspective in each SME, one member of the management or head of HR and one employee from a related division was interviewed for one 30-minute telephone or video-call. As with two firms only one interview with the managing director could be arranged, these interviews were not further analyzed due to missing data from an employee. For the analysis, the firm’s websites were also used as sources. The following table 1 shows the final selection of SMEs. To ensure anonymity, the number of employees is listed in increments of fifty, and total assets and sales are rounded up or down.

	Bakery	Furniture	Car Trade	Wholesale	Pharma
Employees	200-250	150-200	100-150	150-200	<50
Balance sheet total (2018) in mio €	10	10	20	10	5
Revenue in mio €	15	20	40	30	30
Industry	Confection- ery and bakery	Office furniture	Car trade sector	Wholesale and retail	Pharma- ceutical industry

Table 1: Overview of the cases

3.2 Data analysis

Subsequent to the data collection, the interviews were transcribed and later coded using the software ATLAS.ti following Miles and Huberman [MH94]. The coding scheme constitutes of 15 keys, which were clustered accosting to the theoretical foundation into corresponding topics (cf. table 2).

Topic	Code
Characteristics of SMEs	Characteristics of SMEs
Information Systems and resulting employee-specific data	Knowledge Management Systems
	Human Resource Information Systems
	Office Management Systems
	Management Information Systems
	Employee-specific data from IS
Utilization of employee-specific data for management	Data-based leadership
Degree of Transparency in the SME	Degree of Transparency
Control Theory	Control Relationship
	Control Environment
	Control Mode
	Control Style
	Degree of Control

Table 2: Coding Scheme

4 Findings

In a first step, the interviewed SMEs are analyzed following the within-case analysis after Yin [Yi14]. Therefore, four main topics are examined, the particularities of the surveyed SME, their data form IS and data-based leadership, control and the degree of transparency.

4.1 Results Within-Case Analysis

Bakery: In the 1991 founded bakery, data that is used for leadership primarily derives from their workforce planning software and enterprise resource planning (ERP) system. In addition, data occurs in MS Word and Excel files which are used for employee performance and knowledge management as well as internal communication. In sum, this firm primarily collects master data about employees and operational company-related employee data. Thus, data-based leadership is sparsely developed.

Their control environment is characterized by structured processes, flat hierarchies and strong bilateral trust between employees and managers. Notably, the manager mentions that the “*assessed openness to share data is 50/50*” (Bmanager). With regard to the control

modes, the behavioral control takes place with dashboards about absences of employees: *“these are just performance things, like the amount of working hours.”* (Bmanager). Moreover, they apply outcome control with performance-based bonuses for managers. Self-control takes place through jointly developed goals in annual meetings, and clan control with in-depth trainings of employees: *“when new staff is employed, they are trained with onboarding modules”* (Bemployee). The control style tends to be authoritarian, and the degree of control is moderate to low in comparison with other researched SMEs. Thus, the observed control is moderate to low.

Overall, the transparency is one-directional as the interviewed employee has no knowledge about it. Further, the potential of bidirectional transparency is not seen by the manager: *“if they had transparency, I do not see the added value”* (Bmanager). The degree of transparency from the manager about the employee is low, and vice versa very low.

Furniture firm: In the furniture firm, founded in 1893, the usage of data for leadership varies largely across its functional areas. The agile departments work with a task management system (TMS), which is used for workforce planning and team performance measurement. Employee-specific data thereby results from task distribution and status. In all other departments, the manager mentioned that MS Excel and Word files are used as HRIS. Further, a time recording software tracks master data about employees. In sum, the manager states that they *“have certain proliferations of software”* (Fmanager). Thus, data-based leadership in agile departments is high, in the other departments it is low to medium.

Their control environment is two-folded with strict hierarchy levels and agile departments. According to the employee, the corporate culture is open in agile organized departments: *“it results from the method [Scrum] that employees are transparent”* (Femployee). In contrast, the culture in non-agile departments is non-transparent. Regarding the control mode, behavioral control takes place through measuring key performance indicators (KPIs). Outcome control occurs through a strong focus on results as *“at the end of the day, what counts is the result”* (Femployee). Self-monitoring in agile teams takes place in their TMS. The control style is empowering in agile divisions and authoritarian in non-agile departments. The degree of control is moderate. In sum, the perceived control is moderate.

When assessing the degree of transparency, it has also a two-sided manner. In hierarchically organized divisions, data-based transparency about the employee is created by the measurement of KPIs as *“there are certain key figures, and we have an IS support therefore”* (Fmanager). However, the extent of transparency about the employee is in comparison low and one-directional. In agile departments transparency between the manager and the employee is bidirectional and high as *“data in the TMS is published even beyond the team.”* (Fmanager). Thus, transparency between the manager and the employee is moderate and vice versa rather low.

Car trade: The family-owned and 1970-founded car trade has implemented a workforce planning software with an integrated HR development tool whose employee-specific data are used for data-based leadership. Besides master data about the employee, accomplished trainings and training propositions are stored. In addition, they use a performance

management system and a MIS in which employee-centric data are evaluated. Overall, data-based leadership is above average, thus medium to high.

The control environment is characterized by flat hierarchies and highly optimized work processes due to the managers personal characteristics: *"I am a process-freak"* (Cmanager). The company pursues a culture of trust with regard to collected data and according to the manager *"(we have) a performance oriented culture"* (Cmanager). The control mode is characterized by behavioral control through established and controlled processes, by outcome control through monthly performance evaluations, and informal self-control through the usage of these evaluations for self-optimization. In addition, the control style tends to be authoritarian and the degree of control through monthly evaluations tends to be strict as *"the KPIs are monitored, we are doing this very intensively"* (Cmanager). Overall, the perceived control is moderate to high.

The degree of transparency can be observed by their workforce development system, in which employee-related evaluations are conducted and accessible to the manager and the employee. However, the interviewed employee mentions that she has *"honestly never asked herself what is basically processed or how is it used"* (Cemployee), in contrast to the manager. Therefore, the overall transparency level between the manager and the employee is medium to high, but between the employee and the manager it is medium.

Wholesale: Founded in 1880, the wholesale uses a HRM, in which modules for workforce development are integrated and master data about the employee is collected. In addition, they implemented an ERP system, which also serves as a KMS, communication and project management system where performance data about the employee is compiled. Therefore, data-based leadership is medium compared to the other analyzed SMEs.

The control environment is characterized by flattening hierarchies and *"[they] have a very open culture [...] because the employees have been with the company for a very long time"* (Wemployee). In addition, a work council ensures security against misuse of data by executives. With regard to the control modes, the boundary between behavioral control and outcome control is blurred, as employee-specific KPIs in the sales department are calculated daily and included in staff appraisals in case of underperformance: *"I can see who my strong sellers are."* (Wmanager). Self-control is partially feasible in their ERP system as *"the employee has an overview of his processes in the ERP system"* (Wemployee) and clan control is implemented by shared norms, values and experience due to the long company affiliation of employees. The overall control style is authoritarian and the level of control rather strict. In sum, the control is moderate to high.

Data-based transparency is achieved by the mutual access and usage of their HRM system and the access to employee-specific KPIs in their ERP system as *"the employee can make an evaluation in the ERP system and can see directly: I have received so many orders in total today"* (Wmanager). These KPIs are also visible for managers and colleagues. Unlike their HRM and ERP system, their internal skill database and workforce planning software is only accessible by the management. Overall, the degree of transparency from the manager to the employee is medium and in reverse low to medium.

Pharma: In the pharmaceutical firm founded in 2011 a TMS is used as a performance management, communication, project planning and KMS for data-based leadership. Gathered data is evaluated at the team level. In addition, the MS Planner serves as a project management and KMS, where employee-specific data are processed. Particularly for the laboratory employee-specific capacity and performance metrics are collected and analyzed. In general, the use of data for leadership is practiced intensively, but with the primary goal of process optimization as *“the data from laboratory evaluation are not used for [performance monitoring] but process improvement”* (Pemployee).

The control environment is characterized by flat organizational structures with agile and cross-functional teams. The corporate culture is transparent *“but the employees also do not know it differently”* (Pmanager). Furthermore, employees stand out due to their high level of personal responsibility. The control mode at P contains all forms of control: behavioral control, which is primarily applied in the laboratory with KPIs for performance. Outcome control takes place in staff appraisals with target agreements in the employment phase. Self-monitoring is ensured by access to all measured KPIs and *“everyone can see what his/ her priorities are”* (Pmanager). Clan control is observed through structured and intensive training of new employees. Thus, the control is moderate.

The degree of transparency is very high, as all analyzed data can be viewed by anyone in the company: *“All our evaluations are public in the company”* (Pemployee) and *“the aspiration of our executives is basically that they say transparency is good and we want transparency”* (Pemployee). Therefore, data-based transparency from both the manager to the employee and the employee to the manager is very high.

4.2 Results cross-case analysis

Data from IS and leadership: Overall, the analyzed companies have implemented numerous different software solutions. Thereby, IS often have several functions, e.g. TMS at the furniture firm. Also, many SMEs are using MS Word and Excel files instead of complex HRIS, e.g. Bakery, Furniture and Pharma. Similar to the heterogeneous IS, the employee-related data also varies greatly across SMEs and their departments. Overall, all SMEs record master data about employees and many use an ERP system where data, such as employee-specific sales figures, are tracked. In agile organized SMEs, data on current tasks and their progress is collected via TMS. Many SMEs also have documents for personnel development. On average, employees listed less IS where their data is gathered than their managers and they do not seem to be fully aware of their data traces. In summary, the five SMEs implemented IS for HRM and leadership, but their intensity of use and their purpose for management differ significantly. For instance, the bakery sparsely uses data from IS for leadership, whereas the pharmaceutical firm and the car trade make more extensive use of them.

Dimensions of control: Similar to the data-based leadership, the extent of control varies greatly. In the bakery, for example, employees are little controlled by their superiors, at the furniture firm, the pharmaceutical firm and the wholesale moderately, and at the car

trade very often. In figure 1 the relationship between data-based leadership and control is illustrated. Thereby a tendency can be observed between a low level of data-based leadership and low level of control and vice versa. One exception is the pharmaceutical firm, where the extent of data-based management is very high, but employee control is only moderate.

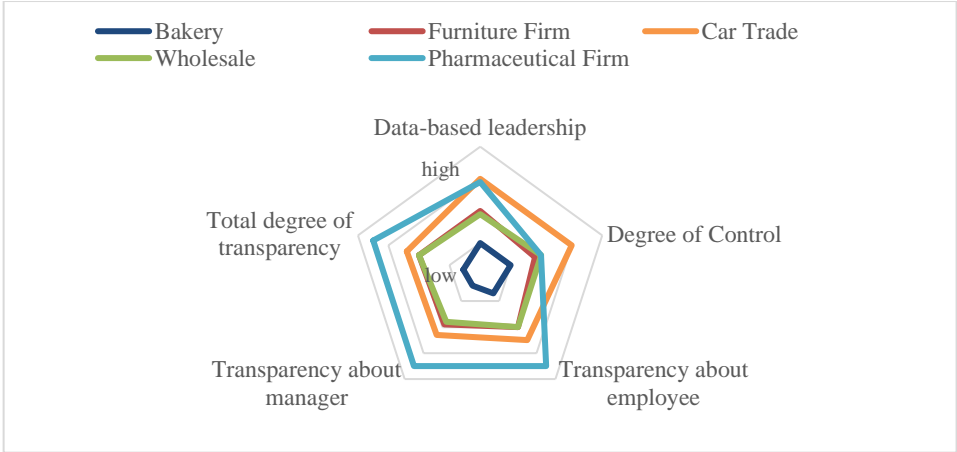


Figure. 1: Results of the cross-case analysis

Degree of transparency: Regarding the transparency between the employee and the manager, with the exception of the pharma firm, data-based transparency of the manager about the employee is always higher than vice versa. Thus, we observe information asymmetries between both stakeholder groups. Moreover, when transparency in general is increased, data-based management is also applied more frequently. With regard to data-based transparency and the degree of control, it can be seen that for the pharmaceutical firm, for instance, the degree of control is moderate, but transparency is very high. For the car trade, control is very pronounced, but transparency is only moderate. Overall, however, there is a tendency that a higher transparency is related to a higher degree of control.

5 Discussion

Addressing RQ 1 on data that can be used in the context of data-based leadership in SMEs, the following section discusses the results from the case-study research and existing literature in this field. Taking a look at prior works, Taylor and Taylor [TT14] also confirm outdated and partially improvised IT infrastructure in SMEs (e.g. Bakery, Furniture, Wholesale). Their listed reasons for this infrastructure, informal information and communication paths, flat hierarchies, scarcity of resources and limited financial capabilities can also be affirmed (e.g. Furniture). Regarding the OMS, the assumption by Lindner et al. [Li19] about the frequent use of e-mail, video conferencing and office

applications can be supported with this study. Overall, in all surveyed SMEs, different IS were implemented to different extents, which is also reflected in the literature. Reasons for this heterogeneity might be diverse industries and differences in the number of employees, turnover and IT expertise. Inevitably, the employee-centric data required for data-based management also varies greatly. This case study research therefore shows that the limited presence of IS restricts the extent of data-based leadership.

In order to discuss RQ2, the following section analyzes the extent of control and transparency in the surveyed SMEs without a strong literal support due to the scarcity of publications in this research field. In sum, the extent of control with its five dimensions varies greatly across the surveyed SMEs. These differences can be explained by diverse leadership styles and corporate cultures. However, it is noticeable that in almost all companies, the transparency of the manager about the employee is significantly higher than vice versa. One reason for this might be the classic understanding of leadership, according to which transparency about the employee is necessary for the purpose of control, but not vice versa. In the agile-structured pharmaceutical firm, a new leadership understanding can be observed where both the manager and employee is transparent in his or her actions. In summary, data-based leadership, control, and transparency is low in all areas at the bakery, moderate at the furniture firm and the wholesale, and moderate to high at the pharmaceutical firm, and the car trade.

6 Conclusion

6.1 Theoretical and Practical Implications

Due to the research gap on the role of data for leadership and transparency in SMEs, this paper aims to provide insights in this field with an explorative case study research. This work holds multiple theoretical contributions. First, I shed light on the very heterogeneous IT landscapes and correspondingly diverse employee-related data from IS. Thus, I deepen the understanding on technical framing conditions in SMEs and their chances for digital leadership approaches. Second, I connect the concepts of data-based management, the extent of control, and the degree of transparency in this study. Thereby, a positive relation between data-based management, the degree of control, and transparency is derived from gathered data. Third, I extend control theory by taking the aspect of company sizes as a crucial framing condition into account. From a practice-oriented point of view, this work can serve as a guideline on how to integrate employee-data in leadership with a special focus on SMEs. Enabling control styles in contrast to coercive, hierarchical ones and offering transparency to employees to establish sustainable novel leadership concepts at these firms can be derived as practical guidelines.

6.2 Limitations and Outlook

Limitations of this research result from the qualitative research design. As no quantitative data was collected, only tendencies and no generalizations can be deduced. Furthermore, the scope of the study is narrow due to its goal to provide insights into a largely unexplored field. But no holistic picture of data-based transparency and its influencing factors can be drawn. Another limitation of the applicability of these results is the restricted insights of the surveyed employees, as in each SME only one has been interviewed. Therefore, I suggest the following research avenue to overcome the mentioned concerns: First, further clarification about accruing data in IS in SMEs for employees as well as managers is needed. Second, the link between characteristics of SMEs and data-based leadership, control, and transparency should be analyzed more deeply, either by conducting case studies with more companies or by investigating the topic with a quantitative research approach.

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7 References

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