



**USING MOBILE DEVICES FOR TIMEKEEPING SYSTEMS IN SMALL BUSINESSES IN
CAPE TOWN**

by

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ABSTRACT

The trend of using mobile devices for timekeeping in South African businesses appears to be novel, and certainly little canvassed in the academic literature. The general potential of using online tools and mobile applications for business is enormous (Columbus, 2015; Sajić et al., 2018), but informed opinion on the use of mobile devices specifically for timekeeping is hard to find (Mohandes, 2017). The purpose of this study is therefore to explore how can small businesses in Cape Town manage timekeeping on employees using mobile devices efficiently and effectively. A case study research methodology within the interpretive paradigm was employed to conduct interviews with owners and manages of small business in Cape Town. On the other hand, qualitative research findings were analysed within literature concepts.

The findings showed that small businesses use three ways of timekeeping: fully automated, manual and mixed method. The findings also showed that mobile devices have great potential to address the weaknesses of current as-is model such as manual mistakes, data accessibility. Mobile devices can improve the process of timekeeping using cloud computing that allows the user to access data anywhere, at any time.

Analysis of the “as is” model revealed the disadvantages of manual timekeeping, such as manual mistakes and inaccuracy in the payroll. This manner of timekeeping is nevertheless understandable, given the small numbers of employees and strong bonds of trust within such companies. The proposed “to be” model displays the advantages of automated timekeeping, such as the ease of accessing data, transparency, and the increased accuracy of business processes, including the payroll. This model makes use of cloud computing and creates an automated data flow within the organisation. Furthermore, the applications once installed does not need any physical development, which makes mobile timekeeping easy to use. Finally, the portability of mobile devices makes the process of collecting time and attendance data possible from anywhere, without stationary terminals.

The study recommends the replacement of clock card terminals with mobile devices. The study also revealed that small businesses need to pay more attention to ICT tools such as cloud computing, Near Field Communication (NFC) and mobile technologies.

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CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

This thesis investigates the phenomenon of using mobile devices for timekeeping purposes. The research presents findings from qualitative study conducted among owners and managers of small businesses in Cape Town. On the other hand, this thesis presents process of qualitative data analysis and interpretation of the findings within context of existing literature concepts.

Chapter One presents the introduction for the study, describes its background and offers an overview of its contents. The chapter starts by establishing the problem statement and explaining the context of the research. The research objectives and research questions are then formulated. Some of the literature supporting key concepts in the study is mentioned, before the chapter ends with a brief description of the research design and methodology.

1.2 BACKGROUND TO THE PROBLEM

All organisations are interested in running their business productively. This involves, variously, finishing all projects timeously, increasing the profitability of the business, obtaining a return on investment, reducing costs, attracting skilled and efficient workers, and providing employees with an adequate work-life balance, while providing high quality products and services. To achieve these goals organisations should be able to predict, control and observe clearly the status of the workforce in the company.

Different organisations have different needs and experience different issues. Since it is not currently known if and how effectively small businesses in Cape Town use mobile devices for timekeeping in respect of their employees, this research explores the state of mobile timekeeping among these organisations.

The trend of using mobile devices for timekeeping in South African businesses appears to be novel, and certainly little canvassed in the academic literature. The general potential of using online tools and mobile applications for business is enormous (Columbus, 2015; Sajić et al., 2018), but informed opinion on the use of mobile devices specifically for timekeeping is hard to find (Mohandes, 2017).

1.3 THE PURPOSE OF THE STUDY

According to the problem statement there is a lack of information and experience about using mobile devices for timekeeping purposes. The purpose of this study is therefore to explore how mobile devices can improve the timekeeping and management of the employees of small businesses in Cape Town, South Africa.

1.4 RATIONALE FOR THE STUDY

To understand the situation regarding timekeeping, this research inquires on how information systems can influence human resource management, particularly through the usage of mobile technologies.

Timekeeping can make a big difference to measuring time worked in project management. By properly tracking employees' time, the company can accumulate data on the actual time being spent on a project, which will help to predict the cost of future projects. The significance timekeeping lies in the fact that, according to McKinsey & Co., large IT projects run an average of 45% over budget and as much as 7% over time (Finch, 2017).

In South Africa, the growth rate of new businesses is decreasing. The rate of creating new jobs is slowing down, although at the same time the National Development Plan is focusing on the small business sector and predicting that 90% of new jobs will be created by small businesses by 2030 (WiGroup Marketing, 2015). On the other hand, the use of mobile devices by small businesses in South Africa is rapidly increasing. There is some statistical information about this (Thulo, 2014):

- 50% of South Africans use tablets or smartphones to communicate with customers, suppliers or colleagues
- More than 40% think that in future, tablets or smartphones will be largely used for accounting or payroll.
- 59% believe that the mobile infrastructure in SA makes it possible to work effectively on mobile devices.

Mobile solutions, according to Sajić et al. (2018), increase efficiency and reduce expenses for all types of businesses, but especially for companies that still rely on time-consuming paper-based solutions. On the contrary, there are a number of articles about increasing productivity and growing or changing business practices by through the use of mobile devices (Writer, 2014, 2016; Kgoseimang, 2015).

Business communities in SA are introducing mobile devices into their work practices at a rapid pace (Johnston, 2014; Schobel et al., 2016; Widdicks et al., 2017). Mobile devices play an

increasingly important role in human life, and the global trend is to shift business information systems onto mobile platforms. The integration of mobile devices, along with their various applications and software, makes it more convenient for employees to collaborate and businesses to communicate with their staff, customers and vendors. Schobel et al. (2016) indicate the potential of mobile devices for collecting data, while Grover (2013) considers the use of Android-based smartphones for automated data collection and reporting from mobile devices. These examples point to the interest of business in these kinds of technologies.

In South Africa, the use of mobile devices for timekeeping is still new and not widely reported. Literature articulate (Kgoseimang, 2015) the possibilities of using online tools and mobile apps for business in general, but they do not concentrate on using mobile devices specifically for timekeeping. Also, there are several products offering possibilities for tracking working activities and the movement of employees (e.g. Cyclope, Itrace, Econz), but information about the practice, experience and statistics pertaining to the use of these products could not be found. Hence it is still not clear how small businesses manage timekeeping in South Africa. Also unknown at present is the potential for using mobile devices for timekeeping by small businesses in Cape Town, the empirical setting of this research.

1.5 OBJECTIVES OF THE STUDY

In terms of the problem identified, this research has the following objectives:

Primary objective:

To explore how small businesses in Cape Town manage timekeeping in respect of their employees, and how mobile devices usage can help them do it more efficiently and effectively.

Secondary objectives:

To accomplish the primary objective of this research, the secondary objectives are as follows:

- a) To explore the value of timekeeping of employees in businesses
- b) To determine the ways in which small businesses in Cape Town manage timekeeping of their employees
- c) To identify the efficacy of using ICT tools for timekeeping of employees.
- d) To conceptualise the efficacy of mobile device-based solutions for timekeeping systems aimed at small business in Cape Town.

1.6 RESEARCH QUESTIONS

The main question in this proposed research is:

How can small businesses in Cape Town manage timekeeping on employees using mobile devices efficiently and effectively?

To answer the main question the following sub-questions were formulated:

- a) How can value of timekeeping be realised in respect of employees at small businesses?
- b) How do small businesses manage the timekeeping of their employees?
- c) How can ICT improve the efficacy of the timekeeping of employees?
- d) How can mobile devices improve the efficacy of the timekeeping of employees?

1.7 CONTRIBUTION TO THE STUDY

This research makes three kinds of contribution: theoretical, methodological and practical.

Theoretical contribution: This lies in locating the research in the existing body of knowledge. Previous studies by Schobel et al. (2016) and Widdicks et al. (2017) attest to the increasing use of mobile devices in everyday life. This is leading to the integration of mobile devices in business processes (Sajić et al., 2018). Mohandes (2017) has demonstrated the feasibility of using mobile devices for a class attendance system while Columbus (2015) shows that mobile technologies are becoming a growth tool for small and medium businesses. However the question of whether mobile devices can be used for business purposes, particularly for timekeeping, had yet to be investigated. This research filled this gap by exploring the state of timekeeping among small businesses in Cape Town, and ways in which mobile devices can improve this situation.

Methodological contribution: This is to be found in the research methodology chosen. In this qualitative research project, the case study method and particularly personal interviews enabled a close examination of the researched phenomenon within its context. Personal interviews provided interaction with owners of small businesses in Cape Town, generating insights into perceptions of the value of timekeeping, timekeeping practice, the role of ICT for timekeeping purposes and opportunities for developing a mobile timekeeping system.

Practical contribution: This inheres in the findings and interpretations. The practical contribution is the proposed set of guidelines for small businesses (and not only in Cape Town) that will help them to manage timekeeping effectively and efficiently.

1.8 OVERVIEW OF LITERATURE

1.8.1 Concepts of working time and attendance

Working time is the period of time that staff members spend at the workplace. Many countries regulate the work week by law, for instance by stipulating minimum daily rest periods, annual holidays, and a maximum number of working hours per week (Department of Labour, 2002, Basic Conditions of Employment Amendment Act No. 11, South Africa; Department of Labour, 2012, Basic guide to working hours, South Africa). The tracking of working time first of all helps

organisations to maintain work discipline. Figure 1.1 presents the principal aspects of labor control (Guseva and Sibikeev 2009, pp. 31–40, 46–47).

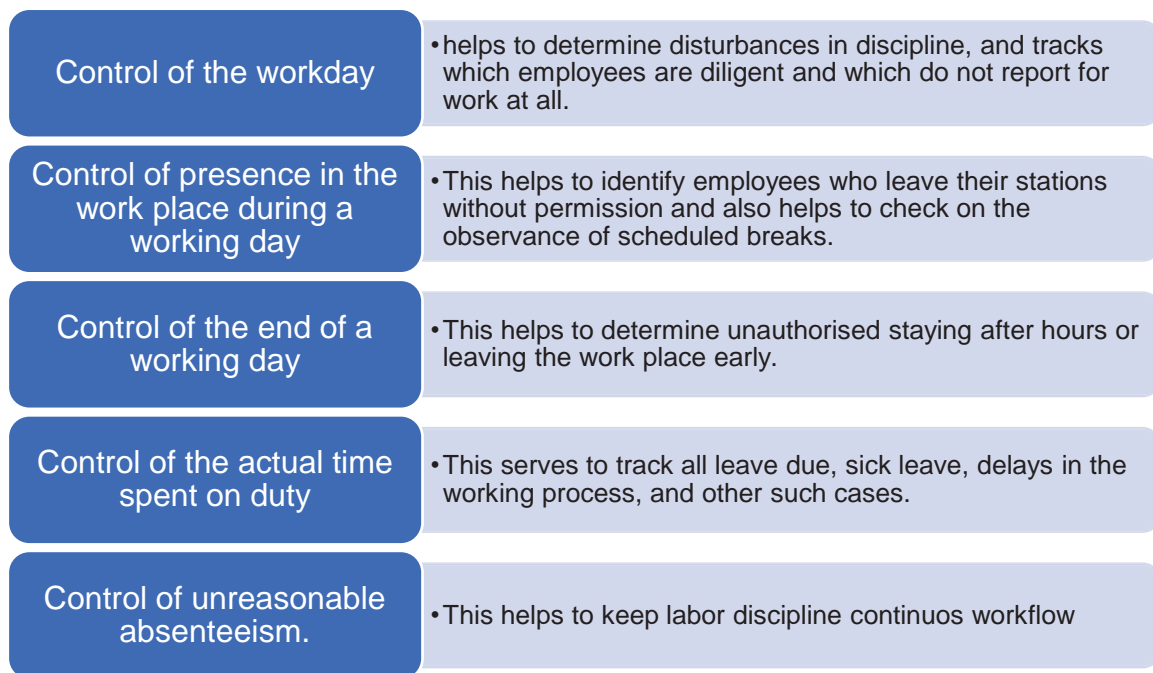


Figure 1.1 Principal aspects of labor control

According to the model outlined above, top management will be equipped to observe the situation in the company clearly. They will be able to receive data, analyse it and define reasonable absenteeism, identify problems in the working processes, and give warnings or bonuses. This control will also help to run payroll systems and avoid irrational expenditure on the analysis of time and attendance data (Rocchio, 2016).

1.8.2 Automation of timekeeping

Timekeeping is an important element in human resources information systems, which include software for recording, automating and reporting all processes in the company pertaining to employees. The value of such a system for organisations is demonstrated by Shaaban and Thandra (2017), who note that an automated timekeeping system can handle all necessary information about an employee and his or her working activity, and use it efficiently for billing purposes.

To provide for the stable operation of timekeeping systems, the following principals of implementation should be observed (Boiko 2010, pp. 51–57):

- a) Equip all entrances, exits and checkpoints with special equipment
- b) Provide every employee with a special identifier (card, badge, fingerprint)

- c) Set up a working schedule, shifts and a workstation for every employee in the company, and establish control points for the system to track working hours
- d) Track all staff movement.

The automated time tracking system will enable:

- i) The keeping of records of work start and end times for all employees, and the reasons for their absence from the workplace
- ii) Composing reports covering the entire company, separate departments or individual employees
- iii) Establishing access levers depending on employee's duties
- iv) Composing appropriate schedule and shifts
- v) Integrating collective data with other information systems existing in the company.

1.8.3 Workforce management systems

In today's litigious environment, the employer should be able to demonstrate fair and consistent management of workers or face costly grievances or legal action. There are many ways in which time tracking systems can be used for this purpose (Tippett et al., 2017).

Compliance and productivity are two primary concerns in managing people that sometimes give rise to conflict. All types of businesses require productivity, and productivity must include compliance. Compliant labour management entails a long list of rules that say what employees may or may not do, and when and where they may work or rest. Government regulations (Department of Labour, 2002, Basic Conditions of Employment Amendment Act No. 11, South Africa) control how employees are paid, their working hours and entitlement to leave. To service both compliance and productivity, it is very important to find a balance between them. This is where correct timekeeping can make a big difference in helping organisations to control and track their workforce, thereby increasing the efficiency of business operations.

Another process where timekeeping can be useful is in controlling the cost of labour. Generating income is important, but producing goods or services inevitably incurs labour expenses. Disselkamp (2013, pp. 13–18) notes the significance of how compensation policy and scheduling practice manifest themselves into compensable activity and cost for the organisation, because the survival and vitality of the organisation depend on a balance between income and expenditure. The operation of workforce management systems along with timekeeping systems aims to manage this balance efficiently.

Labour engagement and alignment with organisational objectives are essential in any successful business strategy. Innovation and growth depend on high levels of service quality,

customer satisfaction and production efficiency. All organisations are interested in a qualified and motivated workforce. As noted by Younger and Smallwood (2016), correct and transparent timekeeping will help to align an organisation with its workforce, keeping good workers in the team and mitigating defalcation before it damages the vitality of the organisation.

Streamlining the reporting and processing of labour activity for payroll purposes are where workforce management systems can make a significant difference. The payroll is the main receiver of time and attendance data. Timekeeping data is sent to the payroll on a direct cycle that obviates errors or missed deadlines. Human resource systems demand time and attendance information to provide for benefits, leave management and compliance information, among other requirements. Accounting needs labour activity information to generate its financial reports and provide information to top management about expenses, profits and investments in human capital (Disselkamp 2013, pp. 15–18).

A system of benefits and leave management should result in labour satisfaction, and labour satisfaction affects the productivity of employees. Human resources systems (benefits plans and compensation policies) exist only on paper until activity happens and the worked time is applied to the policies and programmes. Timekeeping systems are where benefits and compensation manifest themselves as actionable and compensable events. These systems collect, determine, report and track how benefits are earned, granted and paid. In this way a timekeeping system can enhance employees' satisfaction, which (according to Latif et al., 2013) plays a significant role in the performance of the organisation.

Finally, workforce management systems help organisations to improve their culture and develop a model of employees' behaviour when certain processes are operating only in specific ways and no other ways. The most disconcerting demands placed upon a workforce management system stem from problems within the work environment, such as a lack of organisational maturity or poor leadership (Disselkamp 2013, pp. 17–18).

1.8.4 Usage of mobile technologies in business

According to Bezerra et al. (2015), mobile devices play an important role in human life. Mobile technologies are bringing enormous value for consumers, that exceeds the cost of owning a mobile device. Respondents worldwide value benefits of mobile technologies at 11% to 45% of their income. Mobile technologies are becoming a growth engine for small and medium enterprises. Bezerra et al. (2015) report that a Boston consulting group found out that a quarter of the companies that adopted mobile technology to streamline operations doubled the rate of growth of their revenue, and up to eight times the number of jobs were created. Research shows that 82% of leaders in mobile adoption say that “mobile technologies are giving them

greater flexibility and agility”, while 60% claim that “investing in mobile technologies is a top priority for their business” (Columbus, 2015).

Apps and other mobile solutions are replacing manual systems and paperwork, saving hours of work time. Mobile technologies are making a big difference in the workplace. Small businesses can be tracked in real time via mobile phones and network technology, bringing about huge savings of time and money. Mobile technology helps to get rid of paperwork and provides businesses with accurate data (Waugh, 2017). Software can be integrated into the Enterprise Resource Planning (ERP) system that allows an employer to access important data at any time, anywhere.

1.9 DEFINITION OF KEY CONCEPTS

- Time and attendance system: a system used to track and monitor when employees start and finish their work shift. This system helps the employer to monitor and control late starts and early ends to the shift, as well as the time that taken for breaks and absenteeism (Hammond, 2017). In this research term timekeeping uses as part of time and attendance system and indicates the way how time and attendance data has been stored.
- Automation: the creation and application of technology to monitor and control business processes inside of the company (International Society of Automation).
- Small business: an independently owned and operated organisation that is limited in size, number of employees, revenue, annual sales and management structure (Osteryoung & Newman, 1993).
- Mobile device: a computing device that small enough to hold and operate in the hand. These devices have access to the internet and able to connect with other devices via Wi-Fi, Bluetooth or near field communication (NFC). They also integrate cameras, digital media players and global position systems (GPS) (Wikipedia). In this research terms “Mobile device” and “Mobile technology” were used interchangeably.
- Workforce: the total number of employees (usually excluding management) on an employer’s payroll (Business Dictionary).

Location and context of Cape Town have been driven by snowball sampling technique and approachability of research sites.

Qualitative study: is the study that measures and creates new concepts simultaneously with a process of gathering data (Neuman 2014, p. 203).

1.10 OVERVIEW OF RESEARCH METHODOLOGY

1.10.1 Research paradigm

The research was located within the interpretive paradigm as it was essentially aimed at understanding people and their behaviour. Interpretive research typically explores complex

social phenomena with a view to gaining an understanding of them (Antwi & Hamza, 2015). The main purpose of this study was to understand and interpret issues associated with the use of mobile devices for timekeeping systems as experienced by small businesses in Cape Town. The interpretive theoretical framework is usually employed in qualitative research that seeks a deep understanding of a particular phenomenon (Antwi & Hamza, 2015).

1.10.2 Research method

There following types of research approach are distinguished:

- General research (qualitative)
- Quantitative research

According to Cothari (2004, pp. 7–8), methodology is a way of systematically solving research problems, while research method consists of all the techniques used to conduct the research, such as the analysis of documents, questionnaires, personal interviews or group interviews.

Because of the nature of the research problem and questions, this study utilised a qualitative methodology. More specifically, an exploratory case study was carried out on a sample of 20 small businesses in Cape Town. Assessment of the attitudes, opinions and behaviour of the sample population generated non-quantitative results, or results in a form that does not submit to strict quantitative analysis (Cothari 2004, p. 3). In the first part of the study a review of pertinent literature was performed, while in the second part the research results empirically tested the literature review findings.

1.10.3 Research design

Because the interpretive paradigm seeks to generate a deep understanding of a particular phenomenon, and particular lived experience, the basic research design of this study is phenomenological. The case study methodology will include 20 interviews, which is deemed sufficient for this kind of study by a number of authors (e.g. Bryman & Burgess 2002, pp. 4–5; Sauro, 2015).

The case study methodology enabled the close examination of the data within a specific context. The research explored a contemporary, real-time phenomenon through the detailed contextual analysis of a limited number of events or conditions and their interrelationship (Andrade, 2009).

The population of this study comprises owners and managers of small businesses in Cape Town. The research gathers and reports the responses of the sample, acknowledging that these are not necessarily generalisable to the whole population (Antwi & Hamza, 2015).

1.10.4 Sampling method

The case study research design by its nature involves non-probability sampling. An ethical insistence on voluntary participation meant that non-probability snowball sampling was used (Wolf et al. 2016, p. 329–331). The size of the sample falls within the range (up to 20 participants) deemed appropriate for a phenomenological study (Bryman & Burgess 2002, pp. 4–5; Sauro, 2015).

1.10.5 Data collection and analysis

In this study, the research methods are both theoretical (literature analysis) and empirical (interviews). The research therefore includes collecting primary and secondary data (Nicholson & Bennett, 2009).

Secondary data was collected from the review of literature and other relevant documentation (Bryman & Bell 2007, pp. 555–569) and laid underneath interview questions. Primary data was collected from the qualitative interviews and related data received from the researched companies (Bryman & Bell 2007, p. 281). Interviews were conducted with the owners and managers of various types of small business.

The first part of data analysis refers to the editing, coding, and classification of data (Cothari 2004, p. 18). Given the chosen method of research, verbal data was recorded and transferred into written form via Microsoft Word. The transcripts were loaded into Atlas.ti, where analysis assumed a structured form.

Qualitative data analysis typically involves a combination of two general strategies: analytic induction and grounded theory (Bryman & Burgess 2002, pp. 4–5). This research made use of inductive analysis by deploying content analysis techniques to identify patterns, emerging themes and categories.

1.11 OUTLINE OF THE THESIS

- Chapter 1 Introduction: Relevance of the research.
- Chapter 2 Literature review: Analysis of relevant literature about the chosen phenomenon (secondary data), exploring key concepts, observing different points of view.
- Chapter 3 Methodology and design of the research: Sampling and composing a plan for the interviews, interviewing, collecting and analysing the field data.
- Chapter 4 Data analysis and research findings: Analysis of emerged themes, building and establishing the grounded theory.

- Chapter 5 Conclusion and recommendations: Summing up of the research, developing a list of recommendations, and proposing a model for using mobile devices for time tracking systems among small businesses in Cape Town. Answering the research questions.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Problem Statement:

The trend of using mobile devices for timekeeping in South African businesses appears to be novel, and certainly little canvassed in the academic literature. The general potential of using online tools and mobile applications for business is enormous (Columbus, 2015; Sajić et al., 2018), but informed opinion on the use of mobile devices specifically for timekeeping is hard to find (Mohandes, 2017).

Main research question:

How can small businesses in Cape Town manage timekeeping on employees using mobile devices efficiently and effectively?

Research sub-questions:

- How can value of the timekeeping be realised in respect of employees at small businesses?
- How do small businesses manage the timekeeping of their employees?
- How can ICT improve the efficacy of the timekeeping of employees?
- How can mobile devices improve the efficacy of the timekeeping of employees?

The literature review that follows is based on relevant books, scholarly articles, and records of previous research. The review also includes statistical information regarding the phenomenon being explored. However, because information regarding mobile technologies is constantly being updated, to consult only academic sources would not do justice to the topic. Therefore, articles and blogs by qualified experts and specialists will be included in the survey, as their perceptions, conclusions, opinions and interpretations cannot be ignored.

The main purposes of this literature review are to understand and clarify the research problem and identify the relationship of this study to others previously conducted. This will prevent duplication and identify gaps in the body of knowledge that this research might be able to fill. It is highly important to locate this research within the context of the existing research literature.

The literature review of this study will focus on the following subjects:

- the value of timekeeping in respect of employees in businesses
- the ways in which businesses manage the timekeeping of their employees
- the ways in which ICT can improve the efficacy of the timekeeping of employees

- the ways in which mobile devices can improve the efficacy of the timekeeping of employees.

The structure of the literature review, as based on these four principles, is illustrated in Figure 2.1, below.

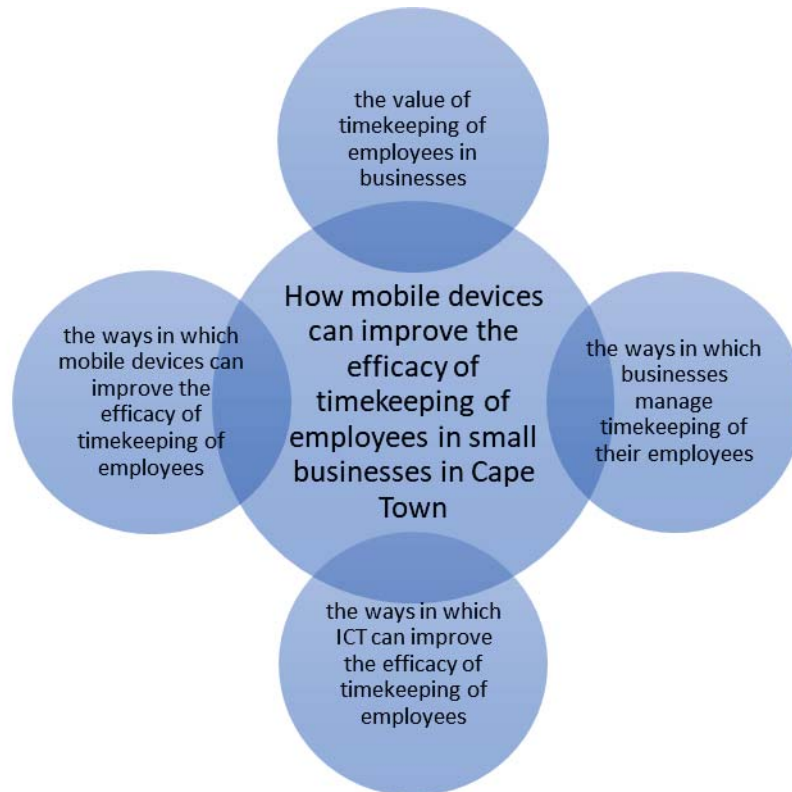


Figure 2.1: A representation of the literature review

2.2 THE VALUE OF TIMEKEEPING IN RESPECT OF EMPLOYEES IN BUSINESSES

The first necessary task is to determine the value of timekeeping with regard to employees in businesses. Every company possesses certain resources, but the efficiency of the company depends largely on its efficacy in managing those resources. Martin (2015) suggests that the main resource of every company is its workforce, the people responsible for all the operations and processes in their work environment. It is therefore very important for an organisation to establish ways of measuring the working capacity of its human resources, as well as to determine how best to manage and increase that capacity (Tripathi, 2011; Disselkamp 2013, pp. 8–9). For these purposes companies make use of timekeeping systems (among other things). Because timekeeping impacts all levels of businesses, it confers benefits on both the employer and the employee.

2.2.1 Benefits of timekeeping for the employer

Generating income is one of the main goals of any successful business. But businesses typically seek potential growth by looking outwards rather than inwards. According to Trujillo

(2013), only 20% of small businesses are ready to invest in improvement of their employees' productivity. Yet this productivity depends in part upon accurate and up to date timekeeping (Williams, 2013; Tippett et al., 2017). The implementation of a timekeeping system can make a big difference and improve the vitality of an organisation. In the next sub-paragraphs the benefits accruing to the employer are itemised separately.

2.2.1.1 Value of timekeeping for payroll systems

The main business expense in the general ledger is the payroll, which is why it is so important to provide accurate information for the payroll system. This is how timekeeping can make a significant difference to the payroll process and financial systems more generally. Ami-Narh et al. (2014) and Shaaban and Thandra (2017) show how timekeeping helps an organisation to prevent fraud, abuse and payroll leakage. Common ways of abusing company funds include rewarding friends, assigning benefits to favourite employees, or from the other side, by withholding rewards and benefits (Disselkamp 2013, p 14). Such practices lead to employee dissatisfaction, decreasing productivity and eventually damaging the reputation and vitality of the company. In the worst case it can lead to the institution of a lawsuit between affected employees and the organisation.

Payroll leakage is the biggest source of overspending that causes loss of productivity. It is defined as "unintended or unexpected spending or lost revenue related to labour activity" (Disselkamp, 2013). On average up to 2,5% of total payroll expense can be attributed to payroll leakage. Leakage commonly occurs through factors like unnecessary overtime and excessive bonus pay, clocking abuses or manipulation of the pay policy. According to the Aberdeen Group (2008), it often happens when a company does not have the appropriate tools to define the total impact of these expenses and to understand their root causes. Accurate timekeeping can provide the data necessary to help organisations solve problems with payroll leakage in the following ways:

- Control expenses and identify weak spots for payroll leakage
- Measure the problem and total overspending
- Provide a deep understanding of the causes of payroll leakage

In sum, timekeeping helps an employer to control labour costs and prevent payroll fraud.

2.2.1.2 Value of timekeeping for labour management and discipline

Labour management is an important element in any attendance system because it is the core of the labour activity control. If scheduled hours are compared with actual hours worked, managers are able to see a complete picture of the company's working activity. Many organisations employ different types of workers, who sometimes have different schedules. A timekeeping system must be able to accommodate such features. In addition, a timekeeping

configuration should be able to distinguish various types of absences and reflect this data in leave management and rewards policy. The aim of timekeeping is equity for employees and transparency in respect of the payroll and the rewards and benefits policy.

One of the most serious issues in labour management is absenteeism. According to Muchinsky (1977) and Iverson et al. (2012), absenteeism is the most common problem among institutions and organisations. Disselkamp (2013, pp. 426–427) and Gangai (2014) identify three types of absence:

- a) Voluntary (scheduled/planned) absence. This category includes leave, paid time off or vacation.
- b) Involuntary (unscheduled/unplanned) absence, such as disability, sick leave, family medical leave etc.
- c) Partial shift absence (involuntary), such as coming late to/early leaving the work shift, long/uncoordinated breaks or personal appointments.

Control of employees' absenteeism plays an important role in the vitality of the company because absenteeism can increase unnecessary expenditure and detract from productivity (Gangai, 2014). The effects and costs of an employee's absenteeism can be classified as direct or indirect. For example, the direct costs from sickness absences are paying out for sick leave, the expense of covering the absence with temporary staff, and the possible loss of productivity. On other hand, the indirect effect of an employee's absenteeism is more difficult to measure. It can include low customer satisfaction and product quality, or a decrease in working discipline. Furthermore, it can cause an interruption of workflow and influence the overall level of output (Leaker, 2008).

Leave management involves dealing not only with voluntary absences but also with the payroll process. That is why a lack of accurate leave control may lead the organisation to overpayment and ineffective use of its workforce.

Timekeeping can solve this problem by concentrating all the information in a single source. Thus when leave is requested, managers have immediate access to all the requisite time and attendance data: the employee's leave balance and paid or unpaid time off, which depend on reviewed time and attendance data.

At the same time, according to Wolf (2015), this solution helps an organisation to streamline the compliance process. When an organisation is required to demonstrate compliance with the law, then it is easier to provide a documented audit trail by having all time and attendance data recorded and stored in one place.

On the one hand, timekeeping has the goal of reducing involuntary and partial shift absences and unnecessary direct/indirect cost. On the other hand, the accurate control of voluntary absences will enable the workforce to be managed more efficiently and effectively.

2.2.1.3 Tax and law compliance

Compliance and productivity are two primary concerns in managing people, and can sometimes come into conflict. All types of businesses require productivity, and productivity includes compliance. Compliant labour management entails a number of important principles. The principles say what employees do, when and where they work or rest. The government regulations (Department of Labour, 2002, Basic Conditions of Employment Amendment Act No. 11, South Africa) control how employees are paid, their working hours and right to leave. It is very important to align compliance with productivity so as to strike a balance between them. This is where timekeeping can make a big difference by helping organisations to control and track their workforce, increasing the efficiency of business operations (Disselkamp 2013, p. 13–14).

The main purpose of timekeeping data in the context of legal compliance is to create data transparency. Tippett et al. (2017) emphasise that information about time and attendance must be recorded and should be available to employees or to any outside expert in case of litigation or an audit. Mclauchlin (2016) also insists that an employer should be able to provide accurate and structured time sheets with working hours, overtime, Sunday hours, public holidays and all breaks and leave taken by employees.

2.2.1.4 Improving productivity

According to the research of the Aberden Group (2008), time and attendance systems play a significant role in laying the foundation for an effective workforce management system. The value of timekeeping is reflected in the improvement of employees' satisfaction, increasing revenue and decreasing labour costs (Ami-Narh et al., 2014). Shaaban and Thandra (2017) add that maintaining a high level of discipline enables a company to improve its productivity.

2.2.2 Benefits of timekeeping for employees

Alongside their value to the employer, timekeeping systems offer significant benefits to employees. Timekeeping can drive meaningful change in an employee's behaviour. As Disselkamp (2013, pp 110–112) notes, the key objective is not just to train people but to engage and encourage them to adopt a new system and behaviour.

Today the profitability of organisations is driven by the principle of investment in people and technology. Analysis of successful organisations reveals a profit chain that builds relations

among profitability, customer loyalty and employee satisfaction (Heskett et al., 2008). The links in the profit chain are portrayed in Figure 2.2, below.



Figure 2.2: Links in profit chain

This figure illustrates how the internal quality of work and employee satisfaction impact on productivity and company's profitability. Corporate culture can assure the internal quality of work by using timekeeping, although initially the introduction of a new corporate culture based on timekeeping principles can be challenging. Organisations oftentimes face misunderstanding and non-acceptance when introducing a new culture. That is why it is very important to train employees and inform them about all benefits they stand to gain. First of all, timekeeping helps control employees' overtime. As Robinson (2005) and Gifford (2017) show, overworked employees are less productive than rested and happy workers. The next step is a transparent payroll and reward policy that provides motivation. According to Bradberry (2016), 70% of employees consider themselves as disengaged at work, and unmotivated workers are 31% less productive. Timekeeping has the power to improve corporate culture by motivating employees, protecting them from cheating via the payroll and enhancing productivity.

Timekeeping can be an effective instrument for gaining an understanding of employees' motivation, time and attendance principles within an organisation. Furthermore, it can serve as an instrument for providing rewards and recognition for employees, which drives motivation, job satisfaction and productivity. In this context, mobile devices add attributes of flexibility and efficiency in corporate policy.

2.2.2.1 Increasing fairness

In today's litigious environment, an employer should be able to demonstrate fair and consistent management of workers or face costly grievances or legal action. Timekeeping can help in this regard (Disselkamp 2013, p. 14). As described above, profitability depends on employees' satisfaction. And satisfaction can be enhanced by showing employees transparency in respect of the payroll, benefits and rewards policy, and leave management.

Timekeeping as a tool of labour management plays an important role in rewards and benefits policy, by helping to monitor how benefits are earned, granted and paid. A benefits plan comes to life inside timekeeping and scheduling systems, where certain principles should be adopted to appropriately capture and report paid time off (Disselkamp 2013 p. 17, pp. 152–155). To set those principles, one must define benefits policy limits, such as the number of hours that can be taken a day, week, month or year; the number of reward hours that can be earned in a week, month or year; and the number of hours that an employee can transfer from one period to the next. The employee will be motivated by his or her understanding of the benefits policy and how those benefits can be used.

Benefits and rewards in the timekeeping system will be based on time worked, shift length, average hours and other relations of time and activity reported in timekeeping records. Principles can also be based on the duration of the employee's contract or period worked in the company (e.g. the benefits policy in the probationary period can be different from that in the permanent contract, and benefits in the first year of a contract can be different from those in the second year). The application of these principles will encourage the employee to feel that their hard work and effort are appreciated (Branham, 2000). Thus, timekeeping can make a big difference via collection devices, scheduling, leave management and analytic systems. All these tools help the company to manage its workforce more efficiently.

2.2.3 Summary of Principle One

By exploring the value of a timekeeping system for employees in businesses, the following main points were established:

- Timekeeping systems help an organisation to reduce labour expenses by producing a more accurate payroll
- Increasing productivity is the result of labour control and more accurate capturing of working time
- Timekeeping prevents low compliance and audit issues by having all structured data in one place
- Increasing employees' satisfaction by demonstrating fair conditions for rewards and benefits impacts profitability

- Timekeeping can deepen understanding of employees' motivation
- The extant body of knowledge suggests that timekeeping systems play a significant role in businesses and can be a strong instrument for improving the vitality and competitiveness of an organisation.

2.3 BUSINESS MANAGEMENT OF TIMEKEEPING OF THEIR EMPLOYEES

The second principle to be researched in this study is to explore the ways in which businesses manage the timekeeping of their employees. This principle starts with a history of timekeeping.

2.3.1 Evolution of labour management and time and attendance systems

The question of productivity and labour management was first discussed by Adam Smith in his book *The wealth of nations* (1776). Smith shows that human resources and education are the main accelerators of work productivity. According to Smith, if each member of an organisation increases individual productivity and personal work satisfaction, this causes improvement in the organisation's vitality and results in growth of overall productivity. In his book Smith (1776) laid the foundation for approaches to labour management, which includes time and attendance management.

The history of time and attendance systems is directly related to the evolution of labour management that started in the middle of 1860s with the Industrial Revolution. At that time the migration of workers from rural areas was causing workforce excess. To increase productivity factories had to find a way to manage their employees efficiently.

At the beginning of the twentieth century the American mechanical engineer Frederic Taylor (1919, pp. 24–25) presented his Theory of Scientific Management. According to this theory, employees should perform their work as efficiently as possible by avoiding any unnecessary movements or actions that threaten to reduce productivity (Mulder, 2015). It was in this context that time and labour discipline became very important, leading to the widespread use of clock cards and time recorders.

In order to maximise profit, companies had concentrated on monitoring raw materials and transport costs. Now with the Theory of Scientific Management, the importance of keeping accurate records of employees' working hours became apparent. But in this era problems arose from the manual practice of timekeeping, because this lent itself to mistakes and therefore unreasonable expenses for companies.

The year 1888 saw the introduction of Willard Bundy's Bundy Key Recorder. Instead of using manual clock cards, this machine was able to stamp the exact time on pre-printed paper tape

when the employee had inserted his designated numbered key. Each employee had his or her individual key and number (Loft, 2007). In the same year another type of time recorder was invented by Dr. Alexander Dey and called Dey's Dial Recorder. This machine was able to print the time next to the employee's number on a sheet inside of the machine when the employee moved the pointer arm around to his number on the dial.

But despite these inventions, the first clock cards for recording and keeping work time were used from 1894. The first clock time card recording machine was invented by Daniel M. Cooper and known as the Rochester recorder. The machine was able to stamp the exact time in/out on the time card. Clock cards had seven lanes for each day of the week and each lane was split into two areas: "IN" and "OUT". This invention made counting hours worked much easier and more accurate (Loft, 2007). The next development in time recorders was related to mass production and the International Business Machines Corporation (IBM). The benefits of using time recorders were obvious, so by the 1920s most factories and offices had replaced handwritten logs by time recording machines. IBM continued researching and developing time card attendance recorders, and eventually fully automated those machines to highlight overtime or late employees directly on the time card. This new method made the task of calculating hours worked even easier and quicker (Making of International Business Machines).

Time recorders and clock cards are still in used today. Computer technology has impacted the principles of time cards and time recorders and now, according to Shaaban and Thandra (2017), a new generation of employees' time tracking solutions is available. These days there is a host of automated time tracking and timekeeping systems. An employee can now scan his/her card/badge into digital readers, or scan his/her fingerprint, and even use iris recognition technology. Computer can find an employee's ID number from the database and keep clock in/out information.

2.3.2 Time cards' functionality

As noted above, the time card is an important part of timekeeping. It is a mechanism that records, calculates, reports and reflects labour activity. This is the point where data enters the system, and is then manipulated, reviewed and moved to outside systems (Disselkamp 2013, pp. 141–145). The purpose of time cards is to show actual hours worked. This depends on many factors, such as inputs from collection devices, employees, managers, schedules, payroll and human resources systems. Also, time cards are based on a company's policy in regard to pay rules, interfaces, system access rule set and other workforce management modules (schedules, leave, attendance). Time cards are the core element of timekeeping,

which is why it is very important to include all necessary information pertaining to the working process. These are the main elements that should be displayed on the time card:

- Name of employee
- ID number (or number assigned by organisation)
- Address
- Position and department
- Schedule (including total daily/weekly hours worked and overtime)
- First day and duration of contract
- Salary information and pay rules (tax number, bank account and all specific deductions and accruals, date of payment)
- Basis on which employee's wages are paid.

The interface of the time card should be adapted to be viewed via computer, smart phone or other handheld device. Time cards help to run a business and make the process of workforce management easier, so that the process of calculating working hours does not need to be constantly controlled anymore. This only need happen in cases where the system imprints a breach of the approved schedule. Then each case should be reviewed by the manager (or authorised staff member), depending on the company's security and privacy policy (Disselkamp 2013, pp 145–149). Usability of time cards as a timekeeping tool make it possible to generate reports throughout an organisation. Having audit reports helps employers defend themselves against any possible grievances about how timekeeping data is handled.

2.3.3 Collection of time and attendance data

The next important part of the timekeeping process is the question of how time data has been captured. This is where the whole process of timekeeping starts, and it is essential to collect the right information at the right time, in the right location and in the right manner to meet the needs of the organisation (Disselkamp 2013, pp 161). On the other hand, it is also the most difficult and expensive part of implementing timekeeping, because at this stage the company needs to decide what kind of equipment will be used for the purpose, where it will be located and what minimum number of time collection points will be used.

Disselkamp (2013, pp. 163–165) divides collection technologies into two categories: fixed location and mobile location. Fixed location devices are normally mounted in places near entrances, work stations, or break areas. They are commonly used by employees who report to work at the same site every day. For these purposes, companies use electronic time clocks. The history of this kind of technology is outlined above in paragraphs 1.1 and 1.2. Today common features of fixed location electronic time clocks include: magnetic stripe badge

scanners, bar code scanners, radio frequency identification (RFID) tags and near field communication (NFC) devices, and biometric inputs.

On the other hand, the market currently offers a wide range of mobile devices for business, including mobile collection devices. This technology is used to receive information from employees who operate in the field, either in a single remote location or multiple locations during the day. Mobile data collection devices can operate via telephony (the traditional land line). This technology includes (Disselkamp 2013, p. 169):

- IVR (interactive voice recognition)
- ANI (automated number identification) that recognises the incoming phone number
- Text/SMS messaging
- MMS (multimedia messaging service).

It is important to point out that the use of the traditional land line is increasingly being replaced by smart phone technologies. Smart phones are playing an increasingly prominent role in people's lives, and business is no exception. Smart phone applications can be programmed to do anything that a PC can do, from simple clock in/out recording to payroll and benefits-related reporting, schedule and leave management, verification, messaging and even billing (Chui et al., 2013). Smart phone technologies include:

- Biometric capabilities (finger scan, facial recognition)
- RFID and near field capabilities
- GPS (enables real-time assessment of schedules and location).

Mobile technologies are also present in tablet computers. Like smart phones, these devices can accommodate the needs of a company's workforce by collecting time and attendance data. They can send information to relational databases by using Wi-Fi or data plan via a cellular network carrier. Also possible is the remote or wireless connection of tablet computers. Specifically, for a mobile workforce that operates in the field, companies use data collection field terminals. These devices are normally battery-powered and communicate back to the host via a charging or communication cradle that sends data to the host software, or through a downloading transaction to a thumb drive to be uploaded to a host computer later.

In this way the future of business is moving towards web-driven solutions, as companies choose to host and consolidate data on open platforms integrated with HR and payroll systems. This trend will be supported by implementing mobile technologies and cloud-based solutions that also enable companies to track and meet key performance indicators and other productivity drivers (Disselkamp 2013, pp. 172–174).

2.3.4 Summary of principle two

Research into the ways in which businesses manage the timekeeping of their employees showed the following:

- The importance of timekeeping was acknowledged a long time ago, and there have been a number of theories (Smith, Taylor) based on time and attendance management
- The practice of timekeeping has a long history, and the process of evolution from manual clocking of in/out time to automated time recording is still ongoing
- Timecards are essential instruments in any time and attendance system
- While there are many different methods of capturing time and attendance data, this remains the cornerstone of accurate time tracking.
- The existing body of knowledge indicates that timekeeping is a constant process that requires careful technical preparation and appropriate tools, infrastructure and policy within an organisation.

2.4 ICT TO IMPROVE THE EFFICACY OF THE TIMEKEEPING OF EMPLOYEES

The third principle to be researched in this study is to identify the ways in which ICT can improve the efficacy of the timekeeping of employees.

In today's corporate world, the trend towards globalisation is the main factor driving the implementation of information and communication technologies (ICT) principles. To improve efficiency and accuracy in business processes organisations are obliged to apply these principles. But mechanisms for capturing accurate time and attendant data can be difficult. Similarly, the processes of ensuring the accurate payment of wages, of controlling rewards and leave can be challenging. However, information and communication technologies are meant to solve these problems and challenges efficiently and effectively. By changing from manual methods of recording time to software and data collection devices, an employer will be able to keep track of working hours, retain time and attendance data, avoid calculation mistakes and improve payroll processing time (Ami-Narh et al., 2014). One of the advantages of ICT tools is the opportunity they provide to automate the workflow of all business operations, including timekeeping and payroll.

2.4.1 "As-is": the current situation

Improvement of business processes starts with building an "as-is" model to characterise the current situation. The importance of information system modelling is highlighted by the fact that, while 10% to 15% of costs are spent on technology, 30% to 40% can be spent on understanding the current process (Lodhi et al., 2010). In Figure 2.3, the "as-is" model of the timekeeping process is presented. This model features a manual approach to timekeeping, exposing its weaknesses to address some process flow by red arrows, such as mistakes made

in the manual process, and the effects of these mistakes. Figure 2.3 reveals that the manual process takes more time and places more responsibility on the employer for timekeeping.

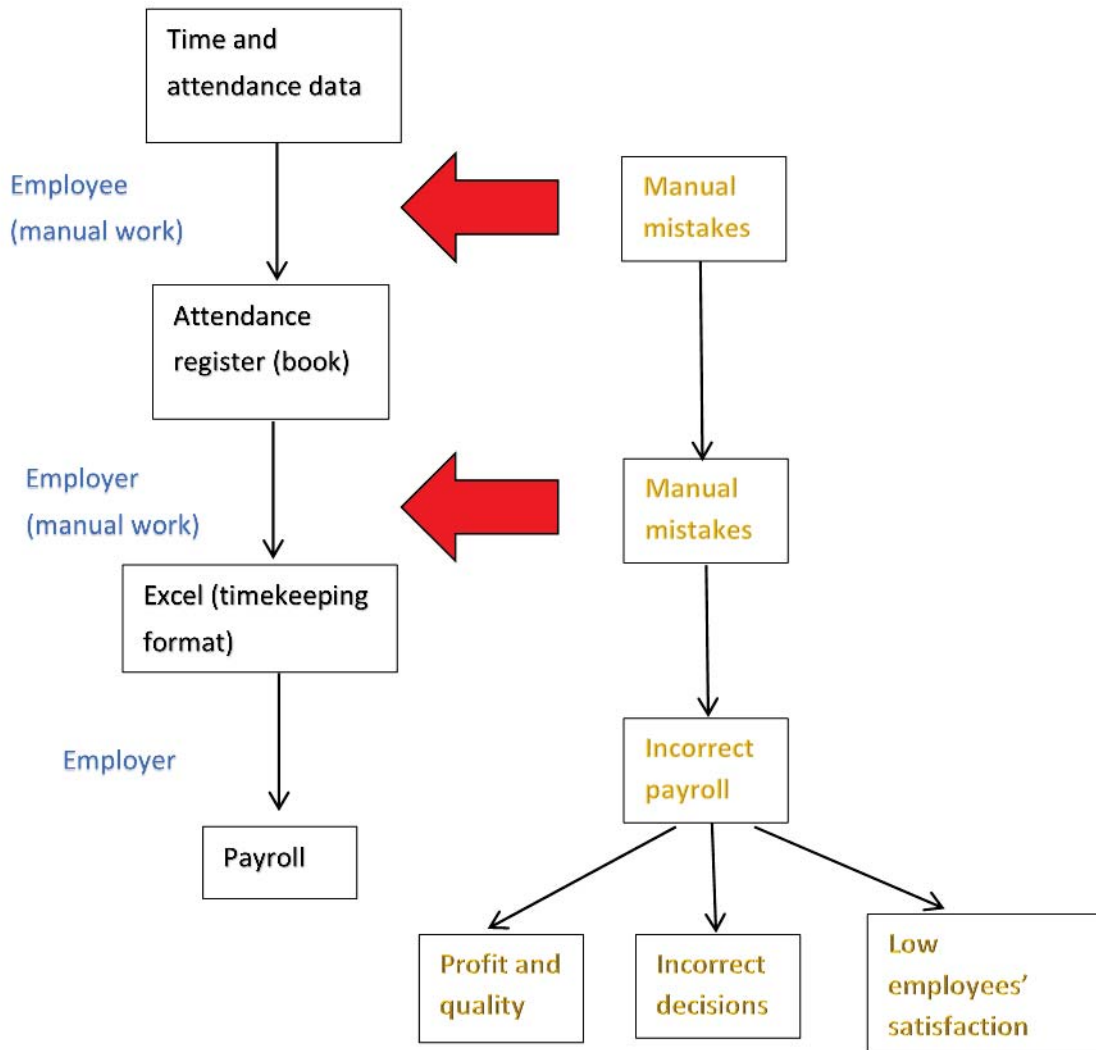


Figure 2.3: As-is model of timekeeping process

This research will therefore explore the current as-is model in detail, and modify it to create the “to-be” model of an automated timekeeping process.

2.4.2 Automated workflow and timekeeping

Implementation of timekeeping and using time cards helps to develop an automated workflow within the company that in its turn helps to improve business performance. This enables the organisation to begin to promote labour-saving processes.

There are many benefits to an automated workflow in the timekeeping system. For example, it increases labour efficiency and productivity by having some work performed automatically by computer, so that employees, including managers, can focus on other duties. An automated workflow allows for work to be monitored in real time and improves the usability of the resultant

information, besides increasing the accuracy of data and schedules. It helps to avoid mistakes in the next steps of data processing and is very important for identifying and reacting to absences and changes in the schedule (Disselkamp 2013, pp. 155–161).

One of the apparent benefits of an automated workflow within timekeeping is cost saving. Generating income is important, but producing goods or services creates labour expenses and the vitality of the organisation depends on a balance between income and expenses. According to Disselkamp (2013, pp. 14–16), an automated workflow can reduce non-productive work time and develop more accurate payroll policy.

Therefore, all the benefits that an automated workflow and timekeeping system bring to the organisation help to align the organisation with its workforce, keep good workers in the team and mitigate defalcation before it damages the vitality of the organisation (Younger & Smallwood, 2016). Furthermore, an automated workflow entails the integration of the timekeeping process within an organisation.

2.4.3 Timekeeping with organisation's structures and systems

The main purpose of timekeeping integration is to share data within the organisation and all its structures (human resources, accounting, etc.). This alignment or synchronisation will affect the vitality of the organisation by reducing manual process errors and improving the overall performance of the system (Shaaban & Thandra, 2017). It enables the transmitting of operational data to help decision making in all business processes. The process of integration is depicted in Figure 2.4. Time and attendance data is provided to each business system. Accounting provides tracking of labour data and receives information about payroll, human resources provides demographic data and receives information about benefits gained and used, the ERP system sends data about planned schedules and collects information regarding actual hours worked. The prosperity of the business depends to a large extent on the accuracy of this integration.

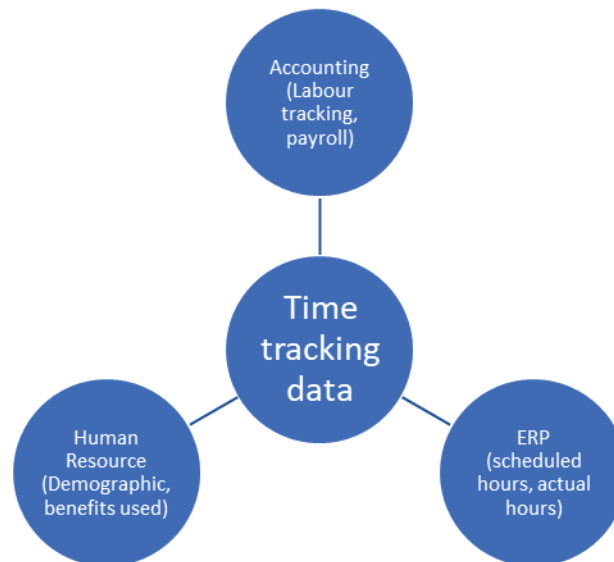


Figure 2.4: Data integration

The core of every company's financial records is the general ledger. All financial transactions come through the general ledger to compose the balance in each account. All business information systems including human resources, payroll and time and attendance provide information for the general ledger. On other hand, the general ledger is used to create revenue statements, analysis, auditing and budgeting. That is why it is so important to keep it based on accurate and relevant data (Ami-Narh et al., 2014). By using information from the general ledger, a company can determine, for example, how effectively managers are running their departments (analysis of overtime). Analysis of this information plays an important role in making financial decisions.

The general ledger is commonly used for budgeting purposes. Therefore, business expenses on the payroll can be predicted by using previous information regarding time and attendance, overtime, and paid time off.

2.4.4 Going green initiative

Another benefit of ICT tools that is, according to Hunter (2011), becoming very important in the modern business community is the green initiatives it supports. Besides producing goods and services, companies should nowadays care about the environment and participate in its protection. An automated workflow will reduce the usage of paper because employees and managers will be able to review and approve documents on the screen rather than in print.

In today's corporate world, globalisation makes people think how modern businesses impact on the environment. Automated timekeeping can solve this problem by reducing turnover and discontinuing the paper chain, thus simplifying processes within the organisation (Hunter, 2011). This initiative can improve employees' morale and reduce wasteful spending.

These are the recognised benefits of implementing automated timekeeping and using digital devices:

- Saving time and money on paperwork
- Saving storage space for printed documents
- Creating a healthier workplace environment and improving employees' morale
- Improving the efficiency of business processes
- Boosting public image through demonstrated social responsibility.

As Capello (2016) observes, ICT can make a big difference in timekeeping by avoiding manual calculations and reducing mistakes, while changing paper outputs to downloadable PDF reports saves storage place and delivery time. Online and cloud-based reports allow remote access that speeds up working processes. On the other hand, implementing ICT tools brings with it certain concerns.

2.4.5 Security concerns

Time and attendance systems deal with employees' personal information, which is why the security of this data is a primary concern for any organisation. Careless handling of workforce data can result in an employer facing financial losses, legal liabilities or even damage to its reputation in the market. Using ICT principles and automated timekeeping brings many benefits but also involves security issues. There is a threat of data being breached, whether it is stored electronically or on paper. But when data is stored in an electronic format, the risk of data breaching is higher, as larger amounts of data can be exposed (Morsy et al., 2010). The most common questions pertaining to security issues are the following (Black, 2009):

- What type of facility will host the data?
- How frequently are data backups performed?
- How secure are the data centres?
- How are passwords stored?
- Where are servers located?

An organisation should determine how its confidential data will be handled and in which format. In line with technology and infrastructure security, the organisation should focus on establishing organisational/administrative systems through policies and procedures. This covers how the data should be collected and handled, and who has access to and the right to correct that data.

To address security concerns the employer should understand its legal responsibility and legal requirements that govern its relationship with and trust of employees. The primary principles involve only using data for the purposes for which it has been collected, and confirming that

the data is correct and complete. At the same time the employer should understand and define what is to be protected. In the context of timekeeping and workforce data, this includes personal information identifying the employee, and sensitive data regarding salaries (Disselkamp 2013, pp. 515–522).

2.4.6 Summary of principle three

Research into the ways in which ICT can improve the efficacy of timekeeping of employees has identified these factors:

- ICT has the capacity to capture time and attendance data more accurately and efficiently
- An automated workflow brings about cost saving and transparency of labour activity, while simplifying access to accurate data in real time
- Timekeeping data is an essential instrument for all business structures (accounting, human resources, ERP) and it can start a process of integration within the organisation
- ICT tools reduce paperwork and paper usage, and thus improve the vitality of the organisation
- There are several security concerns associated with ICT tools that should be examined before implementing automated timekeeping.

In sum, ICT plays a significant role in timekeeping systems and enables organisations to keep business processes up to date.

2.5 MOBILE DEVICES AND THE EFFICACY OF EMPLOYEE TIMEKEEPING

The fourth principle to be researched in this study is to investigate the ways in which mobile devices can improve the efficacy of employee timekeeping. As mobile devices increasingly affect everyday life, and as Bezerra et al. (2015) show, mobile technologies are becoming a primary engine for economic growth.

2.5.1 Impact of mobile technologies in business

According to Bezerra et al. (2015), mobile devices now play an important role in human life. Mobile technologies are bringing enormous value for consumers, that exceeds the cost of owning a mobile device. Respondents worldwide value benefits of mobile technologies at 11% to 45% of their income. To keep their mobile devices, people limit their spending on luxuries. Mobile technologies are becoming a growth engine for small and medium enterprises. A Boston Consulting Group (Bezerra et al., 2015) found that a quarter of the companies that adopted mobile technology to streamline their operations, have doubled their revenue and created up to eight times as many jobs. Research shows that 82% of leaders in mobile adoption say that “mobile technologies are giving them greater flexibility and agility” (Bezerra et al., 2015). Also, 60% of mobile leaders say that “investing in mobile technologies is a top priority for their business” (Columbus, 2015).

Mobile applications are replacing manual systems and paperwork. This trend shows how mobile solutions can reduce hours of regular duty. According to a study by Marcum et al. (2018), the benefits of mobile technologies are making a big difference in the workplace. Small businesses can be tracked in real time via mobile phones and network technology, and it brings them huge savings of time and money.

Mobile technology helps to get rid of paperwork. In the present day, this trend is at the stage where it has showed alternative ways of doing things across almost all aspect of business. Mobile-friendly software provides businesses with their actual data. At the same time, that software can be integrated into the Enterprise Recourse Planning (ERP) system. Using ERP software keeps management informed about business operations, with a live dashboard accessible anywhere and at any time (Waugh, 2017).

Regarding which platform is preferable for mobile apps, Kapoor and Agarwal (2017) point out that the Android ecosystem is more complex for app developers than IOS. This makes Android more appropriate for these purposes.

2.5.2 Using mobile devices for business purposes in South Africa

Business in South Africa is aware of the global trend toward the adoption of mobile technologies. The use of mobile devices by small businesses in South Africa is rapidly increasing. Thulo (2014) provides some statistical information about this:

- 50% of South Africans use tablets or smartphones to communicate with customers, suppliers or colleagues
- More than 40% think that in future, tablets or smartphones will be largely used for accounting or payroll.
- 59% believe that the mobile infrastructure in SA makes it possible to work effectively on mobile devices.

Mobile solutions, according to Thulo (2014), increase the efficiency and reduce expenses for all types of businesses, especially companies that still rely on time-consuming paper-based solutions. The question of increasing productivity and growing or changing business practices by using mobile devices has been thoroughly reviewed by Writer (2014, 2016) and Kgoseimang (2015).

Business communities in SA are incorporating mobile devices into their work practice at a rapid pace. Just as mobile devices are taking over a number of roles in people's lives, the global trend is to switch business information systems onto mobile platforms. The integration of mobile devices along with their various applications and software makes it more convenient

for employees to collaborate and businesses to communicate with their staff, customers and vendors. The mobile technologies involved in business applications comprise various wireless technologies and internet services.

2.5.3 Role of wireless technologies and internet services

2.5.3.1 Near Field Communication (NFC) technology

Developments in information technologies have produced new opportunities for using mobile devices in all aspects of business. One of the features that makes the implementation of mobile devices within an organisation faster and easier is wireless technology (Al-Ofeishat & Rababah, 2012).

Wireless technologies integrate the different spheres of business and services at a rapid pace. These technologies change existing wire-based systems and make connection between devices more convenient and easier for users. Time and attendance systems are no exception. Today, the most respected standard on the market is Near Field Communication (NFC). This standard is growing on the par with other wireless technologies such as Bluetooth, Wi-Fi, WiMax, ZigBee, etc.

Near Field Communication (NFC) is a technology that enables a device to communicate with another at a maximum distance of around 20 cm or less (Curran et al., 2012). NFC includes an initiator and a target. The initiator is responsible for generating a RF (radio frequency) signal and thus initiating a data exchange which is answered by the passive target (Curran et al., 2012). Through this technology users can transfer data between two devices by just bringing them closer to each other. Unlike Bluetooth, this technology is only effective in short distance communication.

One of the main concerns of using NFC technology is the security of this type of communication. Security issues include such threats as eavesdropping, data corruption, data modification and data insertion. Al-Ofeishat and Rababah (2012) recommend solutions to those threats. The best approach to protect against any attack is to establish a secure channel between two NFC devices. Besides that, implementing NFC via a specific key agreement will also help to protect the data from any kind of modification or insertion (Allah, 2011).

2.5.3.2 Using NFC technology for timekeeping purposes

Possibilities for using NFC technology in business processes are multiple: it can be applied everywhere from non-cash payments to identification systems and data exchange (Ghosh et al., 2017). Mohandes (2017), for instance, proposes using NFC technology for attendance management in the classroom.

Implementation of mobile timekeeping starts with equipping the mobile device (smartphone, tablet, etc.) with an NFC reader. This device can be located at the office entrance or taken into the field or wherever work should be done. The device functions as a terminal for receiving time and attendance data. The next step is assigning an NFC key on a card/badge to each employee in the company. The main device collects all the information from the NFC keys and traces clock in/out times. This information is sent via the internet to a database that stores the name, position and schedule of every employee. Each company has its own database, which means that all the data stored can be secured. In this way, top management can monitor the attendance of their employees via mobile app and receive information about late coming or absence in real time. On the other hand, accounting will be able to fill an electronic time sheet without any paperwork. The principle of work for this mobile timekeeping model based on NFC technology is illustrated in Figure 2.5, below.

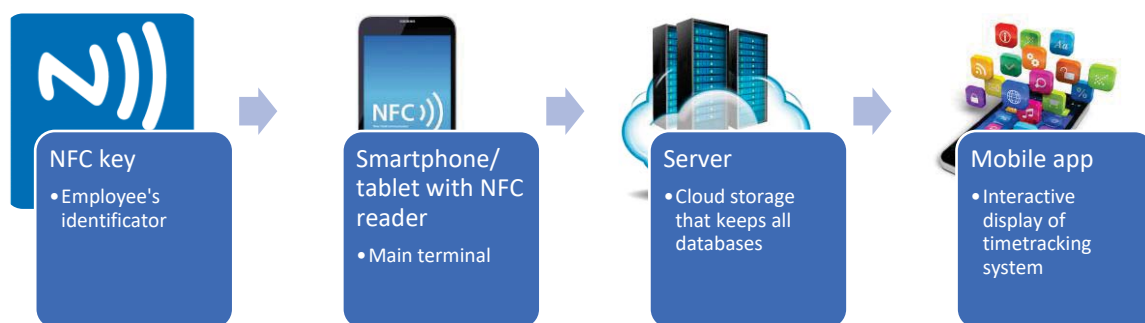


Figure 2.5: Mobile timekeeping model

2.5.3.3 Usability of cloud-based server for mobile timekeeping

Another important trend in mobile information technology that has played a significant role in business information systems in the last ten years is cloud computing. This innovation has established a strong basis for the implementation of mobile-based solutions for business processes. The most common definition of cloud computing is “being able to access files, data, programs and 3rd party services, from a Web-browser via Internet, that are hosted by a 3rd party provider” (Kim, 2009).

As cloud-based solutions become the new trend in industry today, all types of businesses can adapt mobile devices to their environment, with cloud-based servers make it even easier.

There are a number of benefits that businesses gain from this innovation (Janssen & Joha, 2011):

- Organisational (no installation and maintenance, focus on core business, reduce human resource management)
- Political (increased accountability and control, transparent payment)
- Technical (lack of complicated license management and control of updates, back up ensured, reduction of overcapacity of hardware)
- Economic (control and predictability of IT costs, no need for upfront investments).

2.5.4 Mobile resource management and mobile grid computing

Employees constitute the most important resource of every organisation. That is why managers should pay attention to questions regarding receiving and approaching accurate data about labour activity at any time and in any place. Mobile resource management (MRM) aims at providing real-time data for organisations and ensuring transparency by mitigating such problems as low productivity, inflated payrolls, on-premises staffing or over-budget costs (Disselkamp 2013, p. 180).

A central aspect of mobile resource management is mobile grid computing. The grid can be defined as “distributed, high performance computing and data handling infrastructure, that incorporates geographically and organisationally dispersed, heterogeneous resources (computing system, storage system, instruments and other real-time data sources, human collaborators, communication systems) and provides common interfaces for all these resources, using standard, open, general-purpose protocols and interfaces” (Foster, 2006).

The above definition implies the use of small, portable and wireless devices. Mobile grid computing provides access to information, communications and services everywhere, at any time and by any available means (Litke et al., 2014). This constitutes the way in which mobile technologies help to establish the successful monitoring of labour activities.

The most obvious benefit of using mobile resource management systems is cost reduction or ROI, but it could also be a step that pushes an organisation towards maturity. Mobile resource management (MRM) allows an organisation to save money that might have been spent on timekeeping equipment because mobile resource management is technology that can be implemented on already existing personal mobile devices. MRM solutions are therefore cost effective and help the organisation to act more resourcefully by utilising its assets (even mobile and field) to their full potential.

Another important benefit for an organisation, as was noted above, is going paperless. Besides saving money and the environment it also can help to avoid duplicate entries and reduce the possibility of human error. The MRM system can be fully integrated with the payroll system so as to avoid an inaccurate payroll and create enhanced reports with more accurate data. This process of systematic documentation and automation helps to bring administrative costs down (Disselkamp 2013, pp. 181–183).

However, in line with the benefits that MRM systems confer, there are certain issues and challenges associated with implementation. Because MRM means wireless technology, a key issue is coverage to provide for the transmission of data. To overcome this issue, the system should be able to store timekeeping data and send it over the network later when connection has been restored. Another important concern about using MRM is adoption and learning. To maximise the usability of MRM systems, employees should be trained and a corporate culture and policy regarding timing and labour activity should be developed.

Finally, the most difficult challenge of using MRM concerns security and privacy. A mobile resource management system should have levels of access requiring a password or other individual authorisation (Disselkamp 2013, pp. 183–184).

2.5.5 The unified theory of acceptance and use of technology in respect of using mobile devices for time keeping purposes.

The most popular theory in Information systems research is the unified theory of acceptance and use of technology (UTAUT), as Information systems research focuses on the human behaviour, the process and artefact altogether. Therefore, UTAUT was chosen as a theory that underpin this study. According to UTAUT there are four key concepts that determine use behaviour (Venkatesh, 2016):

- Performance expectancy (believe that using technology will help to attain the gains)
- Effort expectancy (how easy the technology will be associated)
- Social influence (importance others to believe that technology has to be used)
- Facilitating conditions (organisational and technical infrastructure that exists to support new technology)

Therefore, clear understanding of benefits, that mobile technologies can bring to timekeeping will increase the intention to use these technologies. Furthermore, simplicity of using mobile technologies for timekeeping purposes will lead to easy acceptance of these technologies. All of this, according to UTAUT will develop behaviour intention, which is not actual use yet. However, only the ability of organisational and technical infrastructure to support new mobile timekeeping system will cause the actual use behaviour.

2.5.6 Summary of principle four

Investigation of the ways in which mobile devices can improve the efficacy of timekeeping shows:

- In business practice worldwide mobile devices have started to play an important role in business processes
- In South Africa business communities are adopting mobile devices in their workplace at a rapid pace, although this trend is still new
- Wireless technologies and internet services can be powerful tools for improving timekeeping systems
- Mobile resource management is an important instrument that helps an organisation to access real-time data anywhere and at any time.
- Unified theory of acceptance and use of technology showed that the higher extrinsic motivation provides the higher possibility that companies will use mobile devices for timekeeping purposes.

In sum, adopting mobile device technology enables organisations to stay in touch with important data and brings simplicity and transparency to business processes.

2.6 SUMMARY OF CHAPTER TWO

The literature review demonstrates the importance of timekeeping for businesses. Studies by Disselkamp (2013), Aberdeen Group (2008) and Trujillo (2013) explore how timekeeping helps to improve labour efficacy and reduce labour expenses, while increasing employees' satisfaction and therefore productivity and profitability. In these studies practices of timekeeping and how businesses manage timekeeping of their employees are examined. The principles of time data collection and the functionality of timecards were also investigated. The work of Disselkamp (2013), Ami-Narh et al. (2014) and Capello (2016) indicates that modern Information and Communication Technologies are playing a meaningful role in improving the effectiveness and efficiency of timekeeping systems. In this study the importance of keeping data and business processes up to date was established, and the relevance of using mobile devices for timekeeping purposes was examined. Studies by Thulo (2014), Columbus (2015) and Waugh (2017) show how mobile devices can improve the efficacy of business processes within an organisation.

In South Africa, the trend of using mobile devices for timekeeping purposes is still under-researched. Articles by Writer (2014, 2016) and Kgoseimang (2015) explore the possibilities of using online tools and mobile apps for business in general, but they do not concentrate on using mobile devices specifically for timekeeping. While there are several products that facilitate the tracking of working activities and the movement of employees (e.g. Cyclope,

ltrace, Econz), no information or statistics about the use of these products could be found. Hence it is still not clear how small businesses manage the timekeeping of their employees in South Africa. Also, still unknown at present are the potential and possibilities of using mobile devices for timekeeping purposes, and in which circumstances they might work successfully for small businesses in Cape Town.

CHAPTER THREE

METHODOLOGY AND DESIGN OF THE RESEARCH

3.1 INTRODUCTION

This chapter identifies the philosophical principles underlying the research paradigm, and offers systematic description of the research strategy, methods and empirical techniques applied in the study. The scope and delimitations of the research design are established, and the place of this study in the context of existing research is defined.

The philosophical assumptions of this research are consonant with the interpretive paradigm, focusing on human interpretations and meanings. The research is a case study of 20 organisations representing small businesses in Cape Town. The field work was conducted on site during the period August 2018 to October 2018. Semi-structured interviews, supported by an interview guide, comprised the main data collection tool in this research.

This chapter is made up of three sections. The first section covers the relevance of the interpretive approach in the context of Business Information Systems research. The second part deals with research method and strategy, while the third describes the research design and discusses reasons for selecting organisations and data sources, modes of data collection and analysis. It also offers a brief summary of the theoretical framework used to understand the problem.

3.2 INTERPRETIVE RESEARCH PARADIGM

Any research project rests upon certain philosophical assumptions about the constitution of the research and methods that are appropriate to generate knowledge of the phenomenon being researched. These philosophical assumptions manifest themselves in a research paradigm.

Orlikowski and Baroudi (1991), Walsham (1995) and Kumar (2011, p. 33) note that there are two main research paradigms: positivist and interpretive. These two approaches diverge on the basis of whether the methodology of the research is borrowed from the physical sciences. The positivist paradigm is based on the physical sciences. It gives rise to research method called quantitative, and issues from an objectivist research philosophy. The other approach is the interpretive paradigm, which lends itself to qualitative research method, assuming a subjectivist research philosophy (Kumar 2011, p. 33).

Andrade (2009) explains that an interpretive approach in research proposes that reality is the product of people's subjective experiences of the external world and is therefore socially

constructed. Consequently, in the interpretive paradigm there are no correct or incorrect theories, just more or less interesting points of view (Walsham 1993, p. 6). On the other hand, the positivist approach maintains that reality is objective and independent of human experience. The Information Systems research community has been debating ways of applying these two methodological assumptions and assessing their relevance in this context (Orlikowski & Baroudi, 1991). Despite the prevalence of the positivist approach in Information Systems research (96,8%), Chen and Hirschheim (2004) maintain that the attention the interpretive approach brings to people as they interact with the world around them should see the approach more widely accepted in Information Systems research.

The fact that there are social issues arising from computer-based information systems has led to the adoption of empirical approaches that focus on human interpretation and meanings. The interpretive research approach is aimed at understanding how human and social interactions impact the research phenomenon as perceived from the participants' perspective (Chen & Hirschheim, 2004). This approach can make meaningful contributions to the theory and practice of Information Systems. Furthermore, Walsham (1995) claims that it brings about a deeper understanding of the research phenomenon and all causal relationships within it. According to Walsham (1993, p. 5), the interpretive approach declares that all knowledge is subjective because it is constructed by (interaction between) human beings.

Situated within the interpretive paradigm, this study assumes a subjective research philosophy insofar as it aims to understand people's experience from the inside. The interpretive paradigm lends itself to qualitative research that leads to a deeper understanding of a particular phenomenon. The main purpose of this research is thus to understand and interpret the issues, experiences and opportunities pertaining to the use of mobile devices for timekeeping purposes among small businesses in Cape Town. The benefit of the interpretive approach in this research lies in its potential to increase our understanding of critical, social and organisational issues that arise alongside the adoption of Information and Communication Technologies within organisations.

According to Walsham (2006), the main research tool in the interpretive research paradigm is the formal interview, which does not presume direct involvement in action in the field. Walsham (2006) describes involvement as a spectrum between, on the one side, a "neutral" observer who is not aligned with any particular group of people, and on the other, an active researcher who is trying to make a meaningful contribution to the research. The advantages of this close involvement are a thorough understanding of the subjects' behaviour, the issues they face and data. Another benefit that the interpretive approach brings to the research is the opportunity to ask questions as to "Why" and "How".

Interpretive forms of research focus on the context of Information Systems, and aim to understand how information systems impact on that context, or how such systems are affected by their context (Walsham 1993, pp. 4–5). Therefore, this study understands the impact of mobile technologies for timekeeping.

As a methodology, interpretive research uses the context within which the information systems are embedded. More accurately, it probes the various reactions that occur in the minds of the people who are involved with these systems. According to Walsham (1993, p. 5), interpretive methodology examines their interpretations of the research phenomenon, their shared and contested sense of the reality, while creating an opportunity to understand the complicity of information systems in the making of meaning. This research is therefore aimed, on the one hand, at understanding information systems within a business context, and particularly within employees' timekeeping systems. On the other hand, it is aimed at understanding business information systems from the perspective of mobile technologies.

To ensure the value of the interpretive approach, Klein and Myers (1999) stress the following fundamental hermeneutic principles:

- 1) The principle of the hermeneutic circle proposes that all human knowledge is created by iteration between consideration of the study of the individual parts and studying the entirety.
- 2) The principle of contextualisation claims to understand the background against which the currently investigated problem has emerged.
- 3) The principle of interaction between the researchers and the subjects is a vehicle of the research data in the social context.
- 4) The principle of abstraction and generalisation relates to principles one and two, and manifests itself in theoretical, general concepts of understanding human and social actions.
- 5) The principle of dialogical reasoning advises one to consider the possible divergences between theoretical ideas and actual findings (based on collected data).
- 6) The principle of multiple interpretations advises one to consider the differences among the participants' interpretations, as it is normal to express multiple points of view within the same research phenomenon.
- 7) The principle of suspicion advises one to consider possible "biases" and systematic "distortions" in participants' narratives.

In every piece of research, all these principles are related to each other. One starts with defining the relevant context (principle 2), then proceeds to the creation of data (principle 3). Thereafter, principle 4 is associated with which theories and concepts will be used. Finally, when it comes to the collection and analysis of data, principles 5, 6, and 7 will be invoked.

Klein and Myers (1999) thus adjudge recognition of these seven principles as a powerful instrument for enhancing the value and cogency of the research.

Principle 1 is a fundamental principle of any interpretive research. The principle of contextualisation is related to the problem statement. Chapter One of this study describes the introduction and background to the research problem, noting how mobile solutions have entered timekeeping processes in small businesses within the last 10 years. Principle 3 is related to the research questions and subjects. The research questions arise from the subjects researched, but serve to guide the process of data collection by forming a basis for the interview questions. Chapter One presents the main and sub-questions which have to be answered by interaction between the researchers and subjects. Principle 4 relates to the use of theory in IS research to determine the theoretical framework. In this thesis Chapter 2 presents a literature review. This chapter seeks to create the general theoretical framework regarding mobile technologies within the context of timekeeping, to test the subject empirically in Cape Town. Principle 5 is related to this Chapter 3, where the methodology and case study strategy selected for this research are described and explained. The principle of dialogical reasoning led to the choice of the case study strategy and personal interviews method for this research. Principles 6 and 7 relate to analysis of the data in Chapter 4, where the findings of this research are presented. Multiple interpretation and suspicion helped this research to understand the entire picture regarding the use of mobile devices for timekeeping purposes among small businesses in Cape Town.

3.3 CASE STUDY RESEARCH METHOD

Cothari (2004, pp. 7–8) argues that there is a difference between research method and research methodology: methodology is a way of systematically solving research problems, while research method is a strategy comprising all the techniques used to conduct the research, such as the analysis of documents, questionnaires, personal interviews or group interviews.

According to the nature of the established research problem, questions and paradigm, this study utilises qualitative methodology. It employs an explanatory case study strategy to investigate the sample of small businesses in Cape Town. A case study deals with the subjective assessment of attitudes, opinions and behaviour, producing data either in a non-quantitative form or in forms which cannot be subjected to strict quantitative analysis (Cothari 2004, p. 3).

The case study strategy is one of the common ways of doing qualitative research in various fields from psychology to economics, and contributes to the body of knowledge through

individual organisational, social and political facts. This strategy is useful when the questions “Why” and “How” are being asked, as well as if there is a lack of control over events. Case study as a research strategy involves examining the current state of a phenomenon within its real-life context. This strategy is mainly in use when the phenomenon and its context are clearly distinguishable. Yin (2003, pp. 1–13) argues that the advantage of the case study strategy is the opportunity to preserve intact the holistic and significant features of real-life events, for example organisational and administrative processes. The nature of the case study allows researchers to collect the data by utilising secondary sources or interviewing participants remotely.

The case study strategy includes specific techniques and approaches for collecting and analysing data that are guided by the chosen theoretical assumptions and propositions. Furthermore, the strategy can encompass multiple sources of evidence that extend the number of variables of interest in the research phenomenon (Yin 2003, pp. 13–14). Some writers argue that there are three types of case study, depending on the nature of the research: intrinsic, instrumental and collective (Stake, 1995; Denzin & Lincoln 2003, pp. 136–138). On the other hand, Yin (2003, pp. 3–5) distinguishes three types of case study which depend on the purpose of the research and the type of research question: exploratory, descriptive and explanatory. The classification and characteristics of case studies are illustrated in Table 3.1, below.

Table 3.1: Classification and characteristics of case studies

No	Criteria	Type of case study
1	Nature of research	<p>1.1 Intrinsic</p> <p>This case study is interested in understanding one particular case and does not have the goal of understanding some abstract overall phenomenon in order to build a theory.</p>
		<p>1.2 Instrumental</p> <p>This case study pursues an extended interest and aims to explore a particular case in order to draw a generalisation or provide deep understanding of the issues.</p>
		<p>1.3 Collective</p> <p>This case study covers different cases of intrinsic interest, and seeks to examine a phenomenon, a population or general conditions.</p>

2	Aims of the research/ Research question	2.1 Exploratory (“What” question) Theories/research question are followed up by data collection and analysis
		2.2 Descriptive (“What”/“Who”/“Where” questions) Data collection is driven by the theory/research question
		2.3 Explanatory (“How”/“Why” questions) Case study searches for cause/effect relationships and looks for theories to explain the phenomenon.

Given the nature of this study, it was appropriate to use the instrumental case study strategy. The instrumental strategy provides an opportunity to explore a contemporary, real-time phenomenon through detailed contextual analysis of a limited number of events or conditions and their relationship. On the other hand, the main research question – “How can mobile devices improve the efficacy of the timekeeping of employees in small businesses in Cape Town?” – makes this also an exploratory case study.

According to Walsham (2006), interest in qualitative research techniques (particularly the case study strategy) in the information systems (IS) field has increased over the years. As the IS field is characterised by constant technological innovation, case study methodology is becoming a meaningful tool to capture the knowledge of practitioners and develop theories from it. This trend can be explained as a shift of interest from technological issues to organisational and managerial aspects. Benbasat et al. (1987) argue that the case study strategy can help to establish a causal chain of success or failure for information systems. Case study strategy is aimed at creating a theoretical framework to serve as the basis for studying IS and its implementation within an organisation (Walsham, 1995).

Nevertheless, case study as a research method has been criticised for non-repeatability and a lack of statistical generalisability (Walsham 1993, p. 14). Walsham (1995) considers this to be a critical issue. Furthermore, the data collected can be open to various interpretations that can lead to bias on the part of the researcher. However, despite a number of concerns with data analysis and statistical generalisation, Walsham (1993, pp. 14–15) considers that because of its interpretive nature, the representativeness of a case is not the main criterion of research validity: rather, this derives the plausibility and cogency of the logical reflection on and conclusions drawn from the case studied. Thus statistical generalisability is to be distinguished from analytical generalisability, which is the kind arising from case study research.

Because of the nature of this research and the research questions on which it is based, it is believed that the case study method is an appropriate research strategy. Using surveys aimed to determine how mobile devices can improve the efficacy of timekeeping might also have been attempted, but this approach might not have shown in detail the unique experience of different organisations. There might also have been an issue with finding the required number of respondents. The case study strategy was chosen by virtue of its advantages in enabling a deeper understanding of the researched phenomenon – the current situation of timekeeping systems in the context of small businesses in Cape Town.

3.4 RESEARCH DESIGN

3.4.1 Sampling and selection of case study sites

Different organisations have different needs and experience different issues. As described in Chapter 1, the purpose of this research is to explore the status of timekeeping among small businesses in Cape Town, as it is currently not known if and how effectively companies use mobile technologies for timekeeping for their employees. “Small businesses” fall within the category of the SME, defined by the National Business Amendment Act of South Africa (2003) “a separate and distinct entity including cooperative enterprises and non-governmental organisations managed by one owner or more, including its branches or subsidiaries if any is predominantly carried out in any sector or sub-sector of the economy mentioned in the schedule of size standards and can be classified as a SME by satisfying the criteria mentioned in the schedule of size standards (South Africa, 2003; Olawale & Garwe, 2010).

This study defines the characteristics and the value of timekeeping for small businesses, while investigating how these entities are currently managing the timekeeping of their employees. The research also identifies the role of modern ICT in timekeeping. This involves a detailed study of factors that influence the adoption of mobile technologies within business processes, based – in this instance – on a sample of small businesses in Cape Town.

A case study research design by its nature involves non-probability sampling; also, in accordance with ethical considerations, participation must be voluntary. Therefore, non-probability sampling resulted in interviews with willing participants, with the interviews structured in such a way as to gain maximum data about the phenomenon under investigation (Wolf et al. 2016, pp. 329–331). There were 20 interviews with representatives of various organisations which suit the criteria of small businesses. This number of interviews is, according to Bryman and Burgess (2002, pp. 4–5) and Sauro (2015), deemed sufficient for this kind of study. The number of interviews was also monitored by the saturated sampling technique. Interviews were conducted until there was nothing but repetition in the answers of the participants (Mark, 2010).

In this research the main criterion defining a small business is the total full-time equivalent of paid employees. According to the National Small Business Amendment Act, No 26 of 2003 (South Africa, 2003), a small business is an organisation with no more than (the equivalent of) 50 full-time paid employees. The field of small business does not play an important role in this research. Research sampling was conducted among different types of small businesses, so that the researcher could investigate sector-independent issues. Selection of the sites was based on data accessibility, which according to Anderson (2014) is one of the main issues in research.

3.4.2 Data sources

The choice of instruments for data collection was guided by the paradigm and methods adopted. In this study, the research methods chosen are theoretical (literature) and empirical (interviews) analysis. Therefore, the process of research includes both collecting primary data and using secondary data (Nicholson & Bennett, 2009). Primary data was collected from owners/directors/ managers of small businesses in Cape Town, selected from a variety of fields since the main criterion for selection was the number of employees and not the business's area of specialisation.

The number of small, medium-sized and microenterprises in South Africa is growing, and today there are more than 5.6 million SMMEs. Despite on the lack of reliable data, according to the Small Enterprise Development Agency (SEDA) of these 5.6 million, about 3.3 million are survivalist businesses, 1.7 million are microenterprises and 554 000 are small enterprises (Odendaal, 2017). On the other hand, according to statistical information from the Bureau for Economic Research (2016,) there are 230 324 thousand SMEs in the Western Cape, with a total count of SMEs in South Africa amounting to 2 251 821. The percentages of these SMEs by economic sector is illustrated in Figure 3.1. As the figure illustrates, most SMEs are in the trade and accommodation field, then community, constructions, finance & business services and manufacturing. The 20 small businesses for interviewing in this study were therefore chosen from these sectors of the economy.

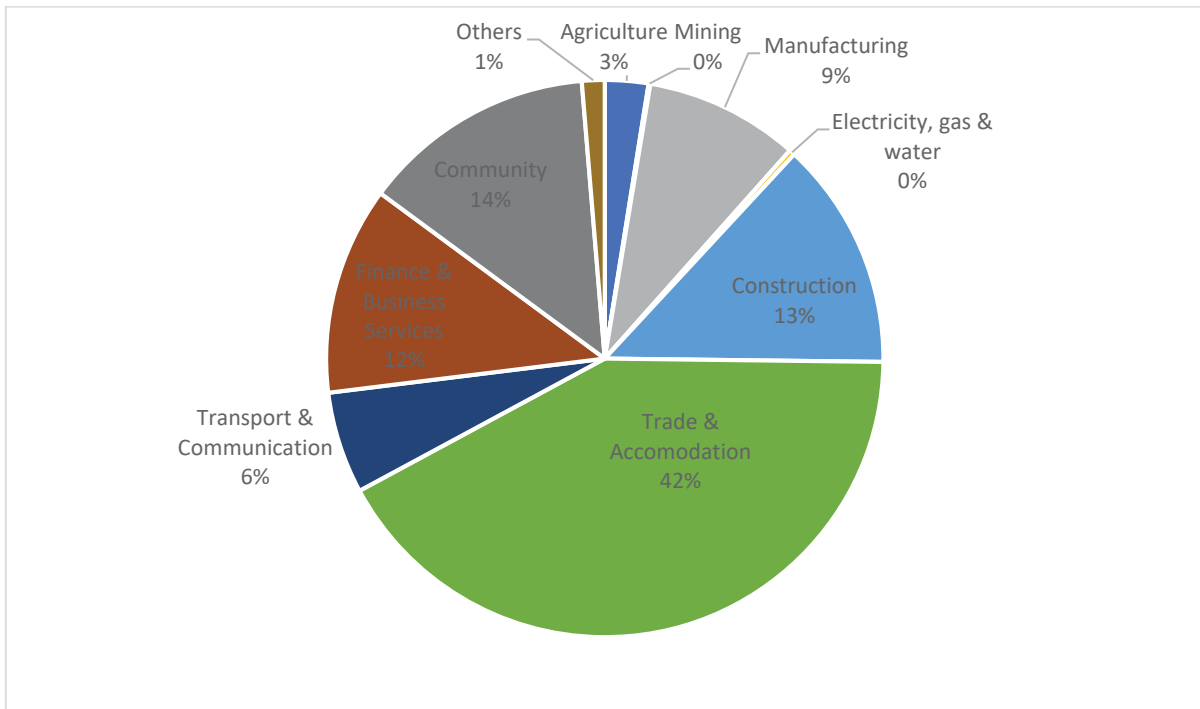


Figure 3.1: SMEs by economic sector

Furthermore, statistics provided by Trade and Industrial Policy Strategies (2017) indicate that established that 8.4% of the total number of small businesses in South Africa are located in Cape Town. Private formal employers and self-employed people are mostly located in metro areas, specifically in Johannesburg and Cape Town (Ndlovu & Makgetla, 2017). Therefore, it was calculated that about 189 153 small businesses are located in Cape Town, which is 82% of all the SMEs in the Western Cape. The population of SMEs in the Western Cape and Cape Town is presented in Table 3.2, below.

Table 3.2: Population of SMEs in Western Cape and Cape Town

Economic Sector	Number of SMEs	
	Western Cape	Cape Town
Agriculture	5 807	4 769
Mining	225	185
Manufacturing	20 606	16 923
Electricity, gas & water	763	626
Construction	30 608	25 136
Trade & Accommodation	96 603	79 335
Transport & Communication	13 617	11 183
Finance & Business Services	27 792	22 826
Community	31 260	25 672
Others	3 043	2 499
Total	230 324	189 153

The selection of data sites for this qualitative research was based on non-probability sampling such as purposive and snowball sampling. These techniques are effective for research of this kind as they provide easier access to research data and opportunities to conduct in-depth

interviews (Suri, 2011). In this research, representatives of three small businesses were initially interviewed, with the selection of further interview sites based on their references. This snowball sampling involves social networking and enabled the researcher to identify and reach data sites more quickly and effectively (Noy, 2008). The snowballing technique helps to solve problems with gaining access to sites, which according to Creswell (2007, p. 123) is a challenge in any research.

Secondary data was collected from relevant academic literature and other available related documentation (Bryman & Bell 2007, pp. 555–569). Secondary data helped provide essential information for preparing the interviews, and also helped the researcher to understand and interpret particular answers. On the other hand, the findings of the secondary data were empirically tested in the interviews.

3.4.3 Data collection and analysis

3.4.3.1 Primary data collection

The data collection tool used in this research was semi-structured face-to-face interviews aimed at answering the main research question. The structure of the interviews entailed consistent enclosing of the research sub-questions.

According to the interpretive paradigm, the nature of information systems is socially constructed, a notion that lends itself to the adoption of approaches that mainly concentrate on human interpretation and meaning, and aim at acquiring a deeper understanding of the researched phenomenon in its real-life context (Walsham 1993, pp. 4–5). This research utilises subjective knowledge and the meanings held by people, which means that the interviews are not aimed at reporting facts but the interpretation of these by the people interviewed. There is no strict distinction between the data collection process and data analysis, as the results of data analysis can help to drive future data collection.

In this case study a total of 20 interviews were conducted with the owners of small businesses or with managers involved in the management of human resources in their respective companies. The respondents were selected from various types of small business, and according to the relevance to them of the conceptual questions. All the interviews were conducted in English, recorded and transcribed into Microsoft Word, together with all notes taken during the interviews. The information received from these interviews was subjective and can be described as rich qualitative data.

3.4.3.2 Primary data analysis

The first part of data analysis involves editing, coding, and classifying the data (Cothari 2004, p.18). An analysis of the interview transcripts was performed through repeated re-reading of them. This helped the researcher to reach a deeper understanding of each participant's point of view and gain insight into contextual factors that influence the adoption of mobile technologies for timekeeping. The research then made use of qualitative data analysis with the help of the software Atlas.ti. This computer program is a strong research tool that provides professional analysis of text documents, enabling the identification of patterns and the development of a full picture of the researched phenomenon.

Primary data analysis started with coding. For these purpose three coding techniques were in use: open coding, axial coding, selective coding.

Open coding

A code is defined as a label allocated to a meaningful piece of text. The first step of analysis was open coding within each theme (DeCuir-Gunby et al., 2011). The process of coding included the iterative reading of narratives to understand how themes and patterns were spread in the documents and how they could be coded. For these purposes open coding was used. Open coding entails the naming of patterns identified, closely exploring them, examining similarities and differences, comparing them within all the narratives as well as naming the phenomena they reflect. The purpose of this process is to gain insight by breaking data down analytically, and thereby to explain the phenomena reflected in the data (Corbin & Strauss, 1990).

Axial coding

The next step in the qualitative analysis was axial coding. This process revealed how categories were linked to their sub-categories, and these relationships were checked throughout the data (Corbin & Strauss, 1990). Furthermore, themes that were similar in different narratives were highlighted and copied to a new document. As this research made use of qualitative data analysis and Atlas.ti research software, axial coding was achieved via an open code co-occurrence table. All open codes were displayed on the table in such a way that relationships among them could be identified. This tool of Atlas.ti is similar to finding correlations between variables in quantitative analysis. Along with an open code co-occurrence table, this qualitative analysis made use of the Query tool in Atlas.ti. This tool aimed at a deeper understanding of relations between categories. Questions that were asked through the query tool were based on the research sub-questions.

Selective coding

The final stage of qualitative analysis was selective coding. This process entailed combination of all the categories around core themes (Corbin & Strauss, 1990). At this stage the large number of themes identified was reduced to a smaller manageable set of four main themes. These themes were directly related to the four research sub-questions as formulated in Chapter 1. Selective coding included the creation of families of themes, sub-families, and sub-categories inside of sub-families. As a result of these three stages of coding, a very large number of narratives, opinions and attitudes had been ordered. From this manageable set of data, core themes emerged. The core themes represented the central phenomenon under study and led to the main research question being answered.

The usual approach to qualitative data analysis involves the combination of two main general strategies: analytic induction and grounded theory (Bryman & Burgess, 2002:4–5). This research made use of inductive analytics by deploying Content Analysis techniques to identify patterns and emerging categories in each case study. This case study includes 20 different sites, which made it essential to search for patterns common to all sites. Creswell (2007:163) has proposed cross-case synthetic analysis, which is particularly suitable for multiple sites in case study research. Separate word documents were created by Atlas.ti to present the data from different sites. The example of the word document presented on the figure 3.2. Those document shows all the similarities and differences among individual cases. The research was in this way provided with a strong body of evidence from the different individual cases.

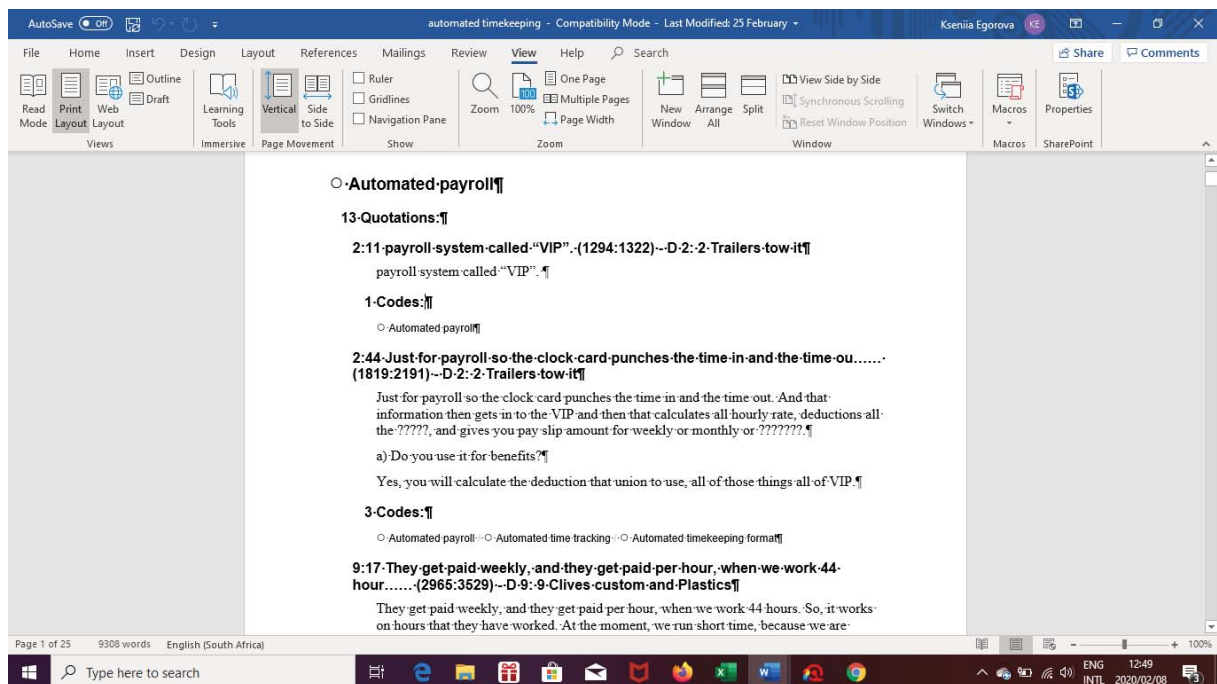


Figure 3.2: Example of cross-case synthetic analysis from Atlas.ti

3.4.3.3 Validation and verification of collected data

Validation in qualitative research aims to assess the accuracy of the findings (Creswell, 2007:206). In this research the collected data was validated via prolonged engagement, including building trust with the participants and learning their business processes. On the other hand, the data was validated via triangulation, in terms of which different data sites, sources and theories provided corroborating evidence (Creswell 2007, pp. 206–207). Primary data was verified by secondary data, and by data collected from different sites. The data collected data was verified in another sense by presenting the interview participants with the outcomes of the research. Reliability in the research was served by obtaining good quality recordings and accurately transcribing them into Word.

3.4.3.4 Secondary data collection

Secondary data was collected from academic literature such as previous studies and research published in relevant books and journal articles. In addition, because of the nature of the research, using only academic literature would have been insufficient as information regarding mobile technologies is constantly updating. Therefore, web publications and blogs by qualified experts and specialists were surveyed, and secondary data was collected from their perceptions, conclusions, opinions and interpretations. Secondary data was found and identified by using key words arising from the research sub-questions.

3.4.3.5 Secondary data analysis

Secondary data analysis consists of the collecting, reviewing and further interpretation of an existing dataset. Secondary data as presented Chapter 2 (literature review) was based on the research questions. It is very important to evaluate the secondary dataset to ensure the appropriateness of the research topic. For this purpose, a reflective approach was used (Johnston, 2014).

3.5 ETHICAL CONSIDERATIONS

To make the research ethically acceptable to all concerned, the following principles were embraced (Behi & Nolan, 1995):

- a) Anonymity and confidentiality. This involves using only relevant information about the research subject and avoiding private and personal information (for example, full name, income).
- b) Informed consent. Every respondent was informed about the purpose of the research and his/her rights to receive a report when the research is finished.
- c) Voluntary participation. Every participant has the right to choose if they want to participate in the research and what kind of information they are prepared to divulge to the researcher.

3.6 SUMMARY OF CHAPTER THREE

This chapter presented the main philosophical and theoretical assumptions and propositions that arise from the chosen research methodology in the business information systems field. The chapter includes details of the research design of the study. A brief outline of decisions made as described in this chapter is presented in Table 3.3.

Table 3.3: Summary of chapter three

No	Criteria	Decision
1	Epistemological and ontological assumptions	Interpretive
2	Research strategy	Instrumental exploratory case study
3	Research tool	Semi-structured personal (face-to-face) interviews
4	Sampling	20 small business in Cape Town (not more than 50 full-time equivalent of paid employees)
5	Timeline	June – September 2018
6	Subject	Opportunity for the impact of mobile devices for timekeeping purposes.

CHAPTER FOUR

DATA ANALYSIS AND RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter presents the analysis of the data collected, including all the essential steps in the process of analysis, such as generating themes, coding and interpretation (Ryan & Bernard, 2003). The method of data collection was described in Chapter 3. Data was analysed in generated themes and categories, which are described separately.

4.1.1 Problem statement revisited

The trend of using mobile devices for timekeeping in South African businesses appears to be novel, and certainly little canvassed in the academic literature. The general potential of using online tools and mobile applications for business is enormous (Columbus, 2015; Sajić et al., 2018), but informed opinion on the use of mobile devices specifically for timekeeping is hard to find (Mohandes, 2017).

4.1.2 Main research question revisited

How can small businesses in Cape Town manage timekeeping on employees using mobile devices efficiently and effectively?

To answer the main question the following sub-questions were formulated:

- a) How can value of timekeeping be realised in respect of employees at small businesses?
- b) How do small businesses manage the timekeeping of their employees?
- c) How can ICT improve the efficacy of the timekeeping of employees?
- d) How can mobile devices improve the efficacy of the timekeeping of employees?

4.1.3 Research methodology adopted

This qualitative study utilised an explanatory case study strategy on a sample of small businesses in Cape Town via assessment of subjective attitudes, opinions and behaviour. Non-probability “snowball” and purposive sampling techniques were used to identify participants. Twenty interviews were conducted with representatives of different small businesses in Cape Town, and their responses were analysed via qualitative data analysis and research software Atlas.ti. This number of interviews was reached through saturation sampling, which ceases when data sources add only repetition and no new information. This chapter presents discussion of the findings and results of the analysis.

4.2 GENERATING THEMES AND CONCEPT FORMATION

After all interviews were transcribed in Word format, the transcripts were re-read to gain a full understanding of each narrative. This process focused on searching for similarities and

dissimilarities, patterns and relationships among the collected data. These patterns and relationships form the basis of the main themes emerging in the process of analysis (Berg, 2001:103). The analysis of qualitative data involves the connection of the collected data with concepts and general knowledge (Neuman 2014, p. 477). This process helps to enhance understanding and expand the body of knowledge, as qualitative research normally uses themes and concepts to represent generalisation (Neuman 2014, p. 480).

Establishing themes in qualitative data can be a difficult process as there are many approaches to expression of theme. To identify a theme the researchers recommend asking the question: What is this expression an example of? (Ryan & Bernard, 2003). In this research the created themes concerned the benefits of employees' working time, methods of timekeeping, knowledge and use of ICT tools, and mobile timekeeping systems. The process of creating themes is helping to answer the sub-questions and main question in this research. After themes were named, sub-themes were developed. This process involves the coding of qualitative data so as to reduce raw information to conceptual categories and develop themes and concepts. Normally themes are associated with the research questions, but the process of coding and creating themes often leads to new questions (Neuman 2014, p. 480). New questions that were raised by the emerging themes are:

- a) What are the possible challenges for implementing timekeeping systems?
- b) What are the main concerns about timekeeping systems, and how can they be resolved?

These questions reflect the stage of implementing the complete system and can form the basis for future research. Another important aspect of creating themes is that the process of reading and establishing patterns from responses of one participant helped make sense of what came from another participant. On the other hand, it was very important to notice how one opinion fell under a created theme, while another showed divergence from the theme. The process of generating themes includes coding, which helps to order and classify the material.

4.3 CODING

At this stage, 150 codes were created, which after revision were reduced to 124. Codes were highlighted in different colours and named according to the concept or subject displayed. It helped to infer theoretical meaning from the data, a process called conceptualising and understanding data (Mello, 2002). To avoid the clutter of unnecessary codes and categories it was essential to give the same name to the same phenomena though all the narratives. The name of each code and theme was logically chosen to make sense to the researcher and the reader. The codes were subsequently grouped according to the subject that they were reflecting. Through this process 15 groups were established:

1. Benefits of tracking employees' working time
2. Automated timekeeping
3. Manual timekeeping
4. Fingerprint pros and cons
5. Resistance
6. Business processes in the organisation
7. Additional information that it would have helped to capture
8. Knowledge and use of ICT tools
9. Cell phone platform
10. Use of cell phone at work
11. Mobile timekeeping system
12. Accuracy of payroll
13. Challenges for implementing timekeeping system
14. Concerns
15. Existing issues

4.4 CORE THEMES

From the participants' narratives the following four core themes were distinguished:

1. Benefits of tracking employees' working time
2. Method of timekeeping in the organisation
3. Knowledge and use of ICT tools
4. Mobile timekeeping system.

Table 4.1 presents the core themes of the narratives, as well as the sub-themes and sub-categories. Within analysis it is often difficult to separate one theme and category from another, with the result that in some samples description of one theme can refer to another theme. As the experience of the participants cannot be fitted into any standard frame, the overlapping of themes was inevitable. In the paragraphs that follow, however, each theme will be viewed and discussed separately.

Table 4.1: Core themes, sub-themes and categories of the narratives

THEME 1	THEME 2	THEME 3	THEME 4
Benefits of tracking employees' working time	Method of timekeeping in organisation	Knowledge and use of ICT tools	Mobile timekeeping system
Sub-theme 1 Benefits for employer: <ul style="list-style-type: none"> • Discipline • Quick notification • Auditing and transparency • Flexibility • Benefits for HR • Individual tasks • Invoicing • Monitoring progress • Responsibility • Shift managing • Storing the documents • Tracking time on the road • Access time and attendance data • Avoid cheating • Make life easier • Control benefits 	Automated timekeeping	Cloud computing and NFC: <ul style="list-style-type: none"> • Familiar • Not familiar 	Factors for implementing mobile timekeeping
Sub-theme 2 Benefits for employee: <ul style="list-style-type: none"> • Fairness • Calculating salary • Accuracy • Flexibility 	Manual timekeeping	Use of cell phone at work: <ul style="list-style-type: none"> • Cell phone platform 	Potential for timekeeping system
	Payroll	Business processes	Challenges and concerns
	Do not track working time		

4.4.1 Theme 1: Benefits of tracking employees' working time

This theme reflects the first research sub-question: "what is the value of the timekeeping of employees in businesses?" Participants expressed their opinions about time tracking and timekeeping based on their beliefs and experience.

In the process of analysis two sub-themes were distinguished: benefits for employer and benefits for employee (cf. Disselkamp 2013, pp. 8–24).

4.4.1.1 Sub-theme 1: Benefits for employer

According to the participants' responses, the most valuable aspects of timekeeping are its contribution to the calculation of salaries (in other words, managing the payroll) and maintaining working discipline within the organisation. This supports Williams's (2013) argument that accurate, up-to-date timekeeping can improve the efficiency of a business. On the other hand, the participants also noted that timekeeping helps to keep up levels of productivity and profitability. As a previous study by the Aberdeen Group (2008) showed, correct time and attendance data improves "best-in-class performance". There was another finding not previously recorded in the literature: as Interviewee K pointed out, it offers a more convenient way to access time and attendance data.

the manager can check on the guys are clocking in and out (Interview K).

Regarding "calculating salary", participants noted that the most important role of timekeeping is to know that everyone has arrived and left on time. This helps to calculate hours that have been worked, as indicated by Interviewees A and E below:

From financial point of view, you could then pay them per hours they worked rather than just to pay them for a whole day (Interview E).

We can keep the track of the time, so we know how much to pay them in the end of the week or the month (Interview A).

This finding reinforces the argument of Ami-Narh et al. (2014) and Shaaban and Thandra (2017) that a timekeeping system makes a significant difference to the payroll process.

Category "benefits in calculating salary" leads to emerging sub-category "benefits for individual tasks". This finding has not been observed in the literature. Participants noted that with timekeeping it is easier to check time spent on each job and thereby calculate the labour cost of each individual job. This will impact the billing process, rendering it more accurate and reasonable, as illustrated by Interviewee Q, below:

Regards to payroll as well, you can see, that we are paying them for what they are doing, and for the time that they spent on the job, basically (Interview Q).

Furthermore, the value of timekeeping manifests itself in "tracking time on the road" and "monitoring the progress". Individual tasks are important, especially with mobile staff members or if there is a lack of supervision all the time, for example, with drivers. This assumption is illustrated by Interviewee B:

This has got the real benefit for managing people busy with individual tasks, and definitely tracking a driver (Interview B).

Regarding “monitoring the progress” and “tracking time on the road” respondents also noted the convenience of access to time and attendance data, as illustrated by Interviewee B and J, below:

If you signed people jobs and if you could check up on them in real time (Interview B).

Like of the things like you have asked about improvement, a good thing would be like some if the software if can be connected to your phone. Because let's say I'm in Durban and things like that every other weekend. So, when I go like on holiday and if I can look on the machines and look who is clocking in and out (Interview J).

This refers to the increasing interest of employers in tracking the time of employees like drivers (Wang et al., 2016).

The benefit of access to time and attendance data also reflects a new way of storing documents, cloud storage, and using cloud platforms for business. This aspect will be treated as the third theme that emerged in this analysis: knowledge and use of ICT tools. Interviewee T noted that:

Everything can be scanned and kept on the cloud. So, there is all new to me, I don't have to worry about having all record room somewhere (Interview T).

Further examination of “access to time and attendance data” revealed that it can refer to quick notification if any of the staff members is absent. Participants noted that it is very useful, especially in businesses where shift management is involved. As one of the advantages, Interviewee P noted that now everybody has a cell phone with them all the time:

So, what I'm actually looking for is for the system to be able to send me an e-mail the minute when somebody is late or hasn't come to work. If the senior manager doesn't come to work or he is late, then I get an e-mail, or the SMS sent to me. If junior manager is absent, that e-mail or SMS goes to the senior manager, not to me. And then if any of the stuff – then it goes to a junior manager. So, that is a lot easier because that information comes to me I don't go and look for the staff. That is a one thing that was a big help (Interview P).

Although this finding has not been explored in the literature, this study shows demand for this feature of a timekeeping system.

With the categories of value merging and overlapping with each other, the category “benefit in calculating salary” entails the next category, “benefit for productivity and profitability”. This finding is reflected in Trujillo's (2013) contention that a timekeeping system leads to a more productive and efficient workplace. Here participants noted that correctly captured and calculated time and attendance data improves the productivity of the working process and increases the profit of the organisation in general. It is illustrated by Interviewees L, E and F, below:

You know, you are here to work, to be aid for amounts of time and effort that you put in. And if you are taking advantage and coming late every single day, or leaving early every single day, you are stealing from the company theoretically, because you are taking money for time that you haven't worked for (Interview L).

If you could monitor how much they worked you can obviously increase your production (Interview E).

So, they can work every minute that I pay them. So, I could earn money (Interview F).

“Benefit for productivity and profitability” points to another important aspect of the working process – discipline. Drawing on Iverson et al. (2012), it can be argued that employee absenteeism is a significant issue in many organisations. Almost all the participants noted that timekeeping helps to keep discipline within an organisation in line with rules and regulations, as illustrated by Interviewees A, G and N, below:

To see if they are punctual or they are not bunking, making habitually coming late (Interview A).

To monitor them. To make sure they arrived on time and they go on lunch on time and then come back on time (Interview G).

They know have to be here at 7-30 or 8 o'clock and leave at 17. And don't think that now 4 o'clock they can pack up and do, so it is like all discipline if you know what I mean (Interview N).

Keeping up the level of discipline also enhances fairness in an organisation, which means that the benefits of a timekeeping systems accrues to employees as well. This is the second sub-theme.

Disselkamp's (2013, pp. 152–155) idea that a timekeeping system can improve the rewards policy in an organisation is not reflected in the responses of the representatives of small businesses in Cape Town. This can be explained by the fact that small businesses do not have a reward policy as such, but tend to be lenient to loyal employees. This noted by Interviewee E as follows:

Well the rewards there is the fact that assuming that they have worked according to my specifications then they get 2 hours off on Friday, times 2 hours about 4 people. And on Saturday we don't work but they are getting paid for it (interview E).

However, respondents noted that they use time and attendance data for deductions, as is illustrated by Interviewee P, below:

For us we actually use it [timekeeping system] to deduct money off their wages, so it will add up every day and when you do the payroll we actually go through it and we actually deduct the amount of money from them (Interview P).

4.4.1.2 Sub-theme 2: Benefits for employee

Regarding the value of timekeeping for employee, participants noted that when data is captured correctly, this improve fairness for employees. As Tippett et al. (2017) maintain, each organisation needs to provide transparency and compliance with legal requirements. When time and attendance data is structured, presented in detail, and accessible to all employees at any time, the result is an equitable system for each employee. This concern is reflected in the response of Interviewee L, below:

Some people are very good with managing their own time, and some people aren't. And why must one person work perfect hours while somebody else can get away with almost working an hour less every single day, it is not fair. It is not fair on all the employees, and again, stealing from the boss (Interview L).

Timekeeping is important for the relationship between employee and employer, as it both introduces transparency and protects the employer if any report is required for audit purposes.

This is noted by Interviewee N, below:

Just to be more professional and you know, if somebody have to come in and ask me questions how, it will be more accurate, you know what I mean (Interview N).

4.4.1.3 Summary of theme one (1)

This theme described the value of timekeeping in respect of employees. All the participants noted the important role of timekeeping, whether they had it in their organisation or not. They were all familiar with timekeeping and gave their opinions based either on previous experience or on their current needs. Some respondents advised that they had been seriously thinking about timekeeping and were now at the stage of researching. Results regarding timekeeping within organisations will be presented in the next paragraph. The findings of the research, generally speaking, confirmed the arguments of the Aberdeen Group (2008), Disselkamp (2013), and Tippett et al. (2017) about the value of timekeeping for businesses.

Analysis of the flow of thought in participants' statements makes it difficult to separate each benefit from the others, as they tend to be in various causal relationships with each other. The scheme of relations between categories in the first theme is presented diagrammatically in Figure 4.1, below. Where orange lines indicate primary circular relations between categories, yellow lines are secondary relations that define the category "benefits for calculating salary". Dotted lines are possible connections, of potential value in developing a timekeeping system.

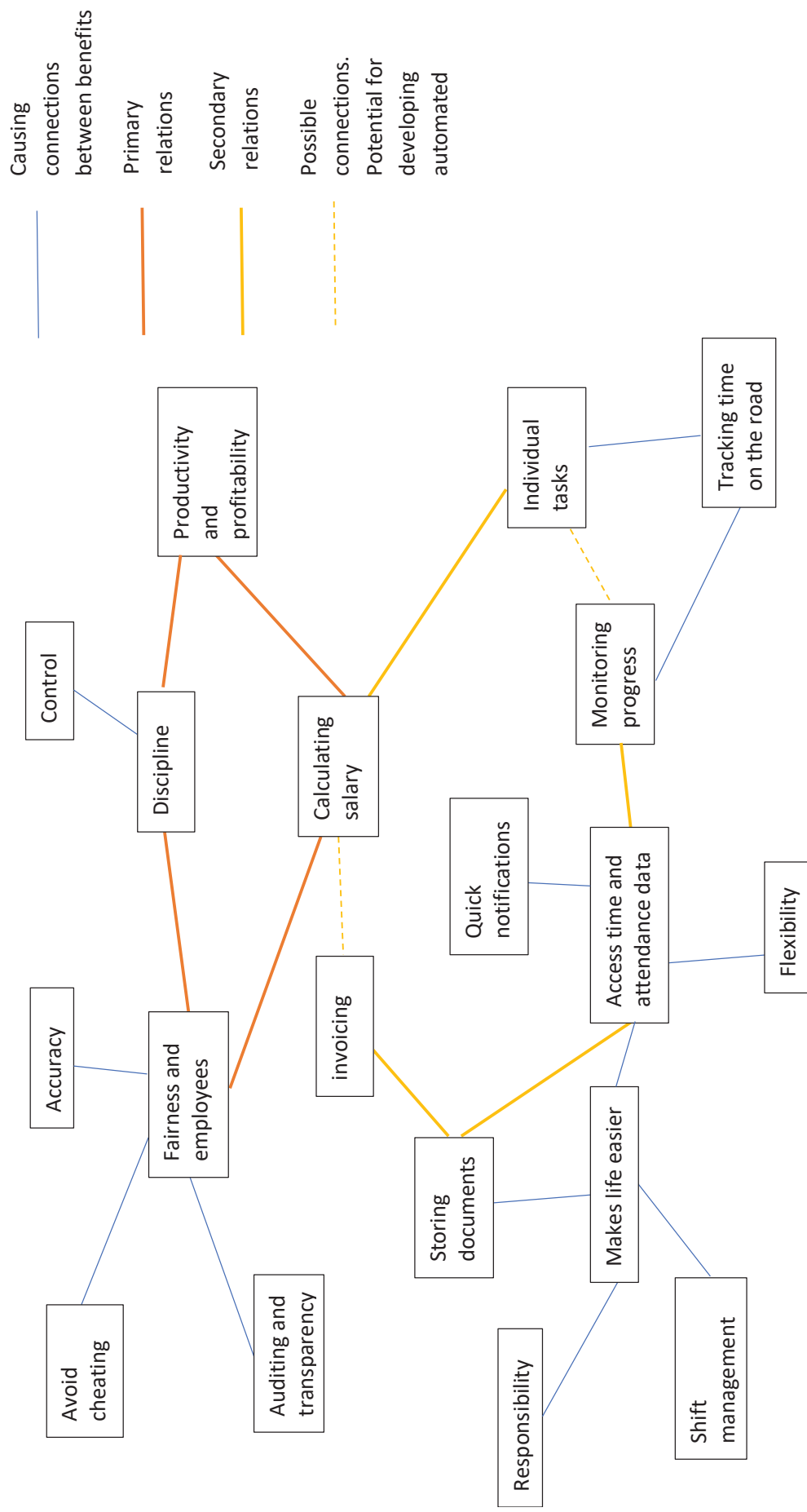


Figure 4.1: Relations between categories in the first theme

4.4.2 Theme 2: Method of timekeeping in organization

This theme refers to the research sub-question: how do businesses manage the timekeeping of their employees? Participants were asked about timekeeping and time tracking in their organisations and associated issues. This theme is thus about the experience of using any timekeeping system, as well as about the potential for further development of that system. The theme embraces possible resistance to a timekeeping system, as well as factors affecting its successful implementation.

The main focus of this theme is on how time and attendance data have been collected, and how this data is used thereafter. Data collection, according to Disselkamp (2013, pp. 161), is the most important stage of timekeeping in an organisation. Participants mentioned three ways of keeping track of their employees' working time. Based on this information, four sub-themes were established: manual timekeeping, automated timekeeping, payroll and lack of timekeeping in the organisation.

4.4.2.1 Sub-theme 1: Manual timekeeping

Despite the insistence of Disselkamp (2013), Mclauchlin (2016) and Tippett et al. (2017) on the necessity of automated timekeeping, most of the companies noted that they still kept track of employees' time manually. Employees record the time when they arrive at work and the time they leave in a book/attendance register or on a board. This is reflected in the responses of Interviewees A, C and L below:

We do it manually in the book calling attendance registrar. They sign in when they come, and they sign out when they leave (Interview A).

We do it manually. We have timesheets. So, the time that we recorded manually. We write time in/time out, the manager signs and the employee also sign to confirm that what the manager wrote. The reason why is because there is an option for signature, for employee to sign and for a manager to sign. And they also have access to the copy. They know exactly according to their hourly rate and the hours would be also calculated for themselves" (Interview C).

"Some people like it manually because it is something physical, you know, you check the piece of paper, where someday actually took their hand and then wrote something down and actually sign it" (Interview L).

Research findings in support of manual timekeeping are not available. Studies by Disselkamp (2013), Trujillo (2013), Mclauchlin (2016) and Tippett et al. (2017) extol the advantages of automated timekeeping, but in this instance the participants drew attention to the advantages of manual timekeeping for their businesses. This can be explained in terms of its being an established, everyday routine that seems to be convenient for the business. One of the advantages that participants noted with the current timekeeping process is that there is a lack of complaints from employees. Each employee enters the time himself and verifies it with his signature. Another advantage that participants noted that it is convenient for the purposes of

quick notification. The manager can see immediately who is absent by a manual check and does not have to wait for a report from a time tracking system, as is illustrated by interviewee P below:

And the reason why we'll still do it manually is... when somebody is late for work, for example, the supervisor needs to be aware of it immediately and they can take disciplinary action immediately also. If they just rely on the clock in system then they will wait for a next week and then only when you tell them that somebody was late they only know, they realised that somebody wasn't there (Interview P).

One of the principal advantages of manual timekeeping is its evident reliability. Even with automated time keeping, respondents still preferred to keep manual records as back up (Black, 2009). Concerns are indicated by Interviewees A and C below:

It is safe. Books don't crash like computes. Like last computer crashed, so we lost all our information (Interview A).

Both ways the manual and digital work. Because with a digital for example if our system crash. So, if you keep only digital data that mean you will not have any data for paying the staff. It did happen before. If we have manual and digital at least you have got a backup. (Interview C).

On the other hand, with manual timekeeping the organisation representatives noted that they faced certain issues, such as discipline. This finding supports Mclauchlin's (2016) argument that automated timekeeping can solve such problems. Because when it is the manager's responsibility to check that everyone is on time, it is difficult for him or her to keep an eye on everyone, and there is a strong possibility of missing someone when the manager is busy with his own duties. This is illustrated by Interviewees L and P:

I don't like that personally, because it can be lined up. I can walk in any time... I've been here since 6 o'clock in the morning, you know nobody here at that time to watch me. You know the problem with that is that somebody needs then track it, you know, if it is manually written (Interview L)

I try and check now it, but I haven't ... I just sometimes I notice that somebody is not here for a long while, then I know. Sometimes manually you can forget to mark somebody (Interview P).

Furthermore, participants noted that with manual timekeeping there is always the possibility of making a mistake. The human factor plays an important role in business processes, as illustrated by Interviewee C below:

Sometimes there is a problem you think you saw 8 when it 6, or you think you saw 6 when it is 8 (Interview C).

One of the criteria studied in this theme is "accuracy of payroll". Participants using manual timekeeping noted that the accuracy of the payroll and profitability were in general acceptable but could be higher. This finding regarding mistakes and the accuracy of payroll endorses Mclauchlin's (2016) view that "small mistakes" in timekeeping can bring about "big losses" in the payroll. This noted by Interviewee E, below:

I would say if I would have had to pay them for the work that they have done it is not very accurate at all (Interview E).

However, the main reason for manual timekeeping appears to be the small number of employees in the respondents' companies. As Loft (2007) observes, automated timekeeping systems are widely in use in large organisations. This situation is explored in the next section on automated timekeeping.

4.4.2.2 Sub-theme 2: Automated timekeeping

Some companies advised that they ran an automated timekeeping system in their organisation or had done so before. They described their experience and expressed their opinions about this process. One of the ways of automated timekeeping is to use cards and a clock card machine. For example, company "Trailers tow it" uses the clock card machine Simplex, as noted by Interviewee B, below:

It is very basic machine, as long as the people remember to clock in and to clock out. But this only gives you information as hours worked in and out. There are no stations that were at places they went to, anything like that (Interview B).

From the interview it was noted that in general the company does not experience any problematic issues with this machine, which confirms the findings of Disselkamp (2013, pp. 155–161) and Mclauchlin (2016) concerning the advantages of automated timekeeping systems. On the other hand, Interviewee 2 noted that the disadvantage of this machine is that it records only time in and time out, with no further tracking during the day. There is also the problem with an automated system like this of employees forgetting to clock in or out. In such cases, misunderstanding between employee and manager can ensue, which makes it highly important to have experienced and trained management.

Some participants reported that they had a special app for timekeeping, but are still using a manual method along with it. This is intended to deal with employees clocking in too early, before starting their shift, and clocking out late, as indicated by Interviewee C, below:

We do have that app on our point of sale where you can clock in and clock out with a fingerprint. [...] And other thing you see employees they are clocking in just when they are walking in to the shop. So, they are clocking in early. And then when they are leaving they are clocking out last. So, they are putting more time for themselves (Interview C).

This issue has not been reported in the literature and is therefore a new finding of this research. To solve this problem and have manual back-up in case the system crashes, they still use the system in which the employee and the manager sign time in/out together. System crash is another important concern in automated timekeeping, as some companies expressed their personal experience of this problem. This concern was noted in the literature review (Black, 2009).

Another concern that respondents noted was how to make timekeeping conform with the law. Especially when Unions are involved, the employer is not allowed to pay for less than an 8 hour shift. This concern illustrated by Interviewee E, below:

Yeah you see the problem is in this country it doesn't really matter you still have to pay them. So, if he is here for 8 hours and it doesn't matter that he doesn't work for 8 hours you still have to pay him for 8 hours because that what Union asks. [...] I think specifically to this business and specifically the way how Unions work now there would be an issue to make it legal and for the unions to accept that is how it should work or how we can improve it (Interview E).

This finding is thus explained by the requirements of the South African Department of Labour.

The next important concern that respondents voiced was the high price of an automated timekeeping system. Especially when there is only a small complement of staff members, it is not rational to invest in this kind of system – as was pointed out by Interviewee H:

If had a system I would do so. It just broke a while...a few years ago. And I have just enquired about price and it was something ridiculous. For what I need I'm not going to spend money. But for all those years that I had a clock machine, we used to have it, and that is obviously the best way. But I'm not going to spend that kind of money. [...] It is not worth for 5 guys. [...] And I think it was about 8000 rand or something. Same thing with cards (Interview H).

Light can be shed on this research finding by Loft (2007), who notes that automated timekeeping systems are highly popular in big organisations.

Analysis of the interviews showed that some companies are at the stage where they are thinking about timekeeping and researching this topic. The reason for this is generally the delays and lost productivity caused by frequent misconduct stemming from a lack of timekeeping. This threat to businesses has been described by Iverson et al. (2012) and Gangai (2014). That is why companies are strongly committed to improving the working process, as noted by Interviewees G and I, below:

Thought about it, yes. Haven't done anything yet, but yes, I have looked into it. [...] In a way, like late coming, 5-10 min late. It is very difficult to keep track on everyone. So, that is why we have looked into it. And maybe you go on lunch and they come back in hour and a half instead of the hour. So, keeping track of it can be difficult (Interview G).

I actually have been thinking about it. Because there is one guy that comes late. Every morning he is like 2 min past, 1 min past. I actually wanted to get a clock where you can actually see. I was actually thinking of buying that machine (Interview I).

Another important possibility that needs to be examined in this theme is the use of fingerprint recognition, because one of the issues associated with automated timekeeping is so-called “buddy clocking”. This threat has been described by Ami-Narh et al. (2014), who found that

74% of the companies in their study experienced issues with the payroll because of “buddy clocking”. That is why Ami-Narh et al. (2014) recommend fingerprint recognition as the technology for timekeeping purposes. However, certain problems with the fingerprint system were noted in the interviews. The most common problem is when the scanner does not read fingerprints because of specific work conditions. This issue was mentioned by Interviewees K and T:

We had finger before, but we've had too much hassles with a fingerprint. The problem was in the way with registering... Difficult to scan it... Yeah, because they are working at the back with glue and everything (Interview K).

I've got whole system here, but like I said some of them, their fingers, the fingerprint don't register, because they like polished them already, it doesn't want to register who it is. One or two of them like ... try again, try again (Interview T).

In these cases, companies are changing to a card system or, in the case of very small organisations, returning to a manual system.

4.4.2.3 Sub-theme 3: Payroll

Analysis tools in Atlas.ti show that there is causal relationship between having an automated timekeeping system and an automated payroll. In all cases where companies had an automated timekeeping system, it was linked to the payroll. This research finding is in line with Shaaban and Thandra's (2017) contention that time and attendance data can be transferred to a payroll system automatically. Participants noted their satisfaction with the accuracy of the payroll, as illustrated by Interviewee J:

It is very accurate because that machine monitor till the minute, second and everything (Interview J).

On the other hand, participants noted that running an automated payroll necessitated special training and monitoring, as such a system can involve a complicated and pricey program. The system that companies use is called VIP, as noted by Interviewee B:

It is complicated system. So, someone has to be trained how to use it and it is expensive, you have to pay license fee on it. But it is linked to your accounting system. So, it works well for what it is (Interview B).

This is why some small businesses still prefer to run the payroll manually, just like their timekeeping. For these purposes they generally use Microsoft Excel. As pointed out by Tippett et al. (2017), timesheets are important for labour control.

Not all companies that have an automated payroll have automated timekeeping. In these cases, time and attendance data either does not feed into the payroll, but is used mostly for general monitoring and discipline, or the data for the payroll master is loaded from Microsoft Excel, where it has been written manually. This way of managing the payroll was described by Interviewees H and Q:

If they come late it all works with a tea and all stuff like that, yeah, they help me out other ways. Or if I need something to be done then we just balance (Interview H).

We then, basically put it in to Excel, and then we load it to our payroll master (Interview Q).

These companies normally base the payroll on the standard work week (40 or 44 hours) or use a salary-based payroll. Most of the companies that use a salary-based payroll system noted that they do not track employees' working time and do not think that it is necessary. This phenomenon is explored in the next paragraph.

4.4.2.4 Sub-theme 4: Lack of any timekeeping

Respondents provided a few main reasons for not having a timekeeping system in their organisation. First, it is because of the small number of employees, as noted by Loft (2007). Participants referred to their past experience of a timekeeping system, and all noted that it worked well, but with a large number of employees, for example 20 and more. This was explained by Interviewees D and S:

It the past we had 27-28 staff members. And then I'd definitely say it worthwhile us having a timekeeping system. But as we are at the moment with 7 members as I said 3 are starting early, 2 later and 2 are part time, it is not really that necessary (Interview D).

We have had in the past. We had another glass company, where we had 45 employees. And we had a clock card system. As you can see now with only two I don't need set up like that anymore. It did work, because it kept people in line (Interview S).

Secondly, respondents thought it unnecessary to track employees' working time because they had a salary-based payroll. Participants noted that legally, if the company does not have an hourly-based payroll, they were not allowed to deduct from an employee's salary. Also, respondents referred to the loyalty of their staff members and felt that a timekeeping system could destroy the healthy work environment. They noted that "as long as work gets done", they were happy. This approach illustrated by Interviewees D and L:

And most of my staff have been with me... the shortest one has been with me for 5 years and the longest is about 9 years. And I have got one staff member that has been with me for 22 years. So, we don't really monitor them because it is trust relationship (Interview D).

you know, if it is small company like us, if you are start tracking every minute that somebody is working, it can very quickly destroy morale. Make somebody feel like they have been policed. If you have got a company of 300 staff, then you need to have strict control over fingerprint system, you know, swiping clock in/clock out system. Because everybody knows it is big operation. But in the small company like this, you know, if you are targeting one person all the time, it can very quickly change the whole business environment and the relationship that you have within the business environment (Interview L).

Furthermore, participants considered that an automated timekeeping system would increase the manager's responsibilities and decrease general flexibility. This assumption has been disproved by Trujillo (2013). Respondents also noted that with deducted break times and peak hours when all employees had to be at work, it would be difficult to monitor working hours. This concern was formulated by Interviewee M as follows:

But like I said I have to be flexible, because I don't say: guys, you are going to take a lunch break I'm going to close shop. We are busy from 8 till 17. So, I don't want any employee to feel uncomfortable, I don't want to put more pressure than necessary and uncomfortable with a system like that. Because then if I adopt the system like that, they could be, they could hold me more responsible for them, you know, you need a tea time, you need a lunch time (Interview M).

In these cases, companies use improvised means, such as writing down records of late coming, or writing notes on the calendar, or running a manual attendance register without capturing times.

4.4.2.5 Summary of theme two

This theme described the way in which companies manage timekeeping in respect of their employees. Analysis of the interviews according to mode of time tracking, timekeeping format and payroll, reveals four types of management practice. The complexity of relations within this theme shows that companies adapt timekeeping in different ways, depending on their needs. Relations among the various sub-themes are illustrated in Figure 4.2, below. Analysis of the interviews showed that is difficult to classify the ways in which companies manage timekeeping, because each company has a different approach to collecting, keeping and using time and attendance data. However, based on principles emerging from the second theme, it is possible to present guidelines for distinguishing among these ways.

The first is to have everything automated (green lines in Figure 4.2): from capturing time via fingerprint, clock card or special app, to automated payroll linked to the timekeeping system. According to Disselkamp (2013), Trujillo (2013) and Tippett et al. (2017), this is the best way. But while respondents agreed that automated timekeeping was the best way to run this process, based on their needs and the number of their employees, some still preferred to do it manually. The second way (yellow lines in Figure 4.2) is to have everything manual: to use an attendance register or book to sign time in/out, then calculate salaries on the basis of this information using Microsoft Excel. Tippett et al. (2017) confirm the importance of timesheets for timekeeping, but respondents are not ready to make this process automatic. The third way (blue lines in Figure 4.2) is to have a manual way of capturing time and attendance data, and then transfer it to an automated payroll system. And finally, the last way (orange lines in Figure 4.2) is not to track time at all and either to use a special system to calculate a salary-based payroll or outsource the management of the payroll process.

Although each way has its own advantages and disadvantages, almost all the participants noted the importance of a timekeeping system. How ICT can improve timekeeping will be considered in the next section.

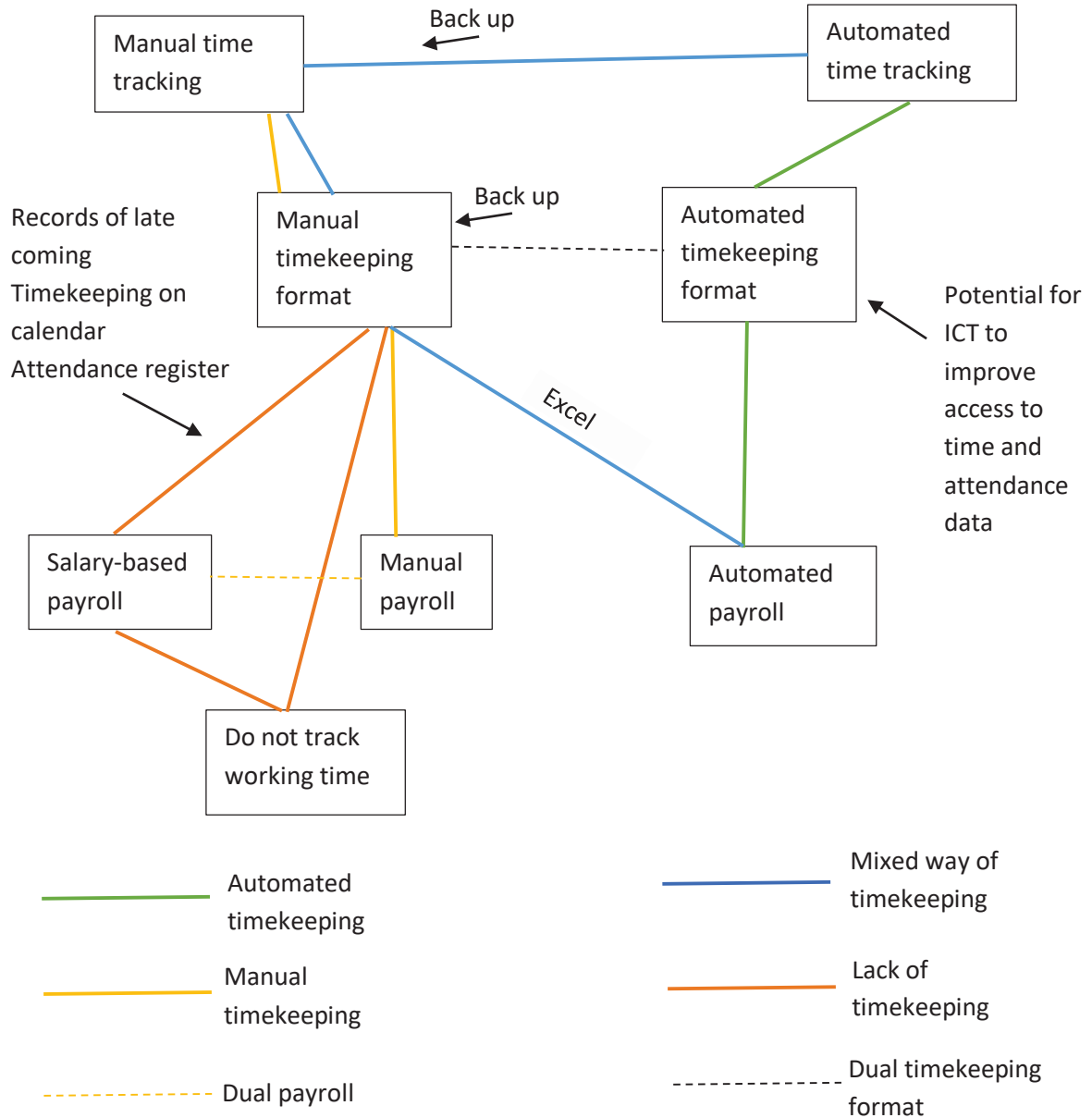


Figure 4.2: Relations between the sub-themes in Theme two

4.4.3 Theme 3: Knowledge of ICT tools

This theme reflects the research sub-question: how can ICT improve the efficacy of the timekeeping of employees? According to Disselkamp (2013, pp. 14–16) and Parida et al. (2016), ICT creates an automated workflow in an organisation, which improves the efficacy and accuracy of its business processes. Participants were asked how familiar they were with ICT tools, and whether or not they used them in their business. The main categories in this

theme are cloud computing, near field communication technology (NFC) and use of the cell phone for business purposes.

Respondents' knowledge and use of ICT tools were aligned with existing issues and the way their business processes were currently operating, by using the code co-occurrence explorer in Atlas.ti. Participants thus expressed their experience and ideas about what they would like to improve with ICT tools.

4.4.3.1 Sub-theme 1: Cloud computing and NFC

Almost all participants claimed to be familiar with cloud computing as it is a very popular trend. The companies that were using cloud computing reported no issues or challenges with it. One of the benefits of using cloud-based storage is easy access to any data or document (Janssen & Joha, 2011). This benefit was noted by Interviewee T:

Everything can be scanned and kept on the cloud. So, there is all new to me, I don't have to worry about having all record room somewhere (Interview T).

On the other hand, not every company is ready to use cloud computing, and participants expressed some concerns about this platform. The biggest concern is the safety of cloud-based storage. This concern was recognised by Black (2009) and Morsy et al. (2010), who noted that security fears constituted the main obstacle to the implementation of cloud-based storage. Companies are afraid to keep their and their clients' important data in the cloud. This issue was illustrated by Interviewees A, E and Q:

I don't think it is safe to have your data out there, your employees' data and personal information out there in the cloud on another server (Interview A).

Because it is very specific business, that there are not many people doing this type of business. So, last thing that we need is all our information spread all over and somebody gets hold of it that it becomes a problem (Interview E).

I'm not too happy with that, because I don't feel it is secure platform. I know other people all like it because of its accessibility, but as far as storing my important data I prefer to keep it on the computer (Interview Q).

Furthermore, participants felt that the limited amount of data they had to store did not require the use of cloud-based storage. Participants also noted the challenge of changing their current way of storing data. These concerns are indicated by Interviewees J and L:

Because most of the things are figures and thing, so it is manual. So, it is just kept on spread sheet, because when guys come through we have to show them manually. So, it is easier to keep it manually, because it doesn't get lost. Only in the cloud very important documents like all our licences and things we upload with a cloud (Interview J).

Like I said my boss is old school. I think our head office will use things like that. Our systems here that would probably back up to the cloud up in Johannesburg. But as far as physical system is here, there is not much in terms of cloud, cloud usage (Interview L).

However, if most of the respondents were familiar with cloud computing, whether they used it or not, the situation regarding knowledge of NFC technology was different. Only five respondents claimed to be familiar with this technology. But their knowledge was still limited, based on news they had seen or heard, and not backed up with real experience. Only one company, “Chickin Thyme”, actually used NFC technology for credit card payments, where customers tapped their credit cards. Interviewee B’s response was typical:

Yes, I had it on the old phone. I have never used it. I did not know that it was on it. I do not know if it’s even on this phone. I know it is there and you can I suppose transfer data within a certain range to phone that enabled for it (Interview B).

Digital payment, according to Ghosh et al. (2017), is the most popular way of using NFC technology in business. The use of this technology for timekeeping purposes was not found in the field. Knowledge of NFC technology is related to how participants use their cell phones. This subject is described in the next paragraph.

4.4.3.2 Sub-theme 2: Use of cell phone at work

Examination of the use of cell phones for business purposes started with defining the platform that runs on the cell phone. Analysis showed that most of respondents have Android on their cell phones, with only 30% using the platform IOS. Kapoor and Agarwal (2017) have shown that the Android system is more complex for app developing compared to IOS, which makes the former platform more interesting for developers.

Most of the respondents noted that they used cell phones very often for business purposes. Thulo (2014) has noted that South African business are becoming more aware of mobile technologies. Interviewees A, J and T (see below) noted that they used their cell phones particularly for business communication, e-mails, communication with customers, quotations, credit card payments and invoicing.

I have got WhatsApp group. So, we send specials, give quotations (interview A).

Every day like, every time, like every hour. Because e-mails, everything is on the phone (Interview J).

This accounting company, how they get their invoices, you see, all beyond it is receipt bank. You’ll take a photo of your invoice and it submit it, and it’ll see who supplier is and what the amount is, and it can book it to Zero, which is accounting software program that we are use. It also online, so you can do bookkeeping and invoice anywhere (Interview T).

Despite all the advantages of mobile technologies, analysis showed that there were concerns about using mobile devices for working purposes. Some respondents noted that it was not professional to be on the phone at one’s place of work. This concern was voiced by Interviewee M:

I try to not use it too often, because we have walk ins, you know, it is not professional if you are on your phone, even if it is with a customer and another customer standing in front of you and needs to be helped, or the phone is ringing (Interview M).

Another challenge to the cell phone as a work device is concern about its safety. There is also the concern that it will decrease productivity, as indicated by Interviewee A, below:

Mobile devices are not allowed at our working place because it affects productivity. So, they are not allowed to have their mobile devices while they are at work. It is also unsafe at the environment we are in. We are working with fuel, petrol, it is not allowed to have sparks and mobile devices around” (Interview A).

However, analysis of interview data showed that ICT tools such as mobile technologies and cloud computing can make a significant impact on business processes. This aspect is described in the next paragraph.

4.4.3.3 Sub-theme 3: ICT tools and business processes

Aligning issues in timekeeping that were identified with ICT tools, allows us to identify ways in which ICT can improve the timekeeping process. Firstly, respondents noted the lack of life monitoring and the provision of more flexible access to data. As Disselkamp (2013, pp. 155–161) suggests, an automated workflow brings transparency to labour activity and the simplicity of access to accurate data in real time. The research findings demonstrate that mobile devices and cloud computing make this possible. As respondents noted, everybody has a cell phone now and the usage of cell phones at work is high. This helps to avoid using a computer all the time, as some respondents noted that it is an issue to log in if you need to check something. According to Interviewee P:

I have worked on a system before where you log into the app, or you log into the computer, after a while it becomes... you get tired of doing it (Interview P).

On the other hand, Kim (2009) demonstrates that cloud computing improves the process of accessing time and attendance data. Respondents noted that they cannot be at their place of work all the time, and that it is difficult to manage the timekeeping of employees from a distance. This issue is illustrated by Interviewee J:

Good thing would be like some if the software if can be connected to your phone. Because let's say I'm in Durban and things like that every other weekend. So, when I go like on holiday and if I can look on the machines and look who is clocking in and out (Interview J).

Furthermore, participants noted the advantage of quick notification, as in some cases it is essential to be aware if somebody is absent immediately. Mobile devices can solve this problem as the employer can be notified via SMS or e-mail and can read it immediately from the cell phone.

Another significant improvement that ICT can make is to the monitoring of employees who work in the field or on the road. As respondents noted, right now there was no monitoring other than trackers in the vehicles. Mobile devices remove timekeeping from stationary terminals and make the working process more flexible. This can improve methods of keeping track of mobile employees (Disselkamp 2013, p. 161), as is implied by Interviewee Q, below:

Everything needs to be live, so basically if you have that live feed as far as timekeeping (Interview Q).

As was noticed before, ICT can improve business processes in terms of the way of storing documents (Kim, 2009). Cloud computing can prevent computer crash and keep all important data in a safe place, as noted by Interviewee T:

Everything can be scanned and kept on the cloud. So, there is all new to me, I don't have to worry about having all record room somewhere (Interview T).

4.4.3.4 Summary of theme three (3)

This theme covered whether respondents were familiar with ICT tools and possible ways of improving business processes by using those tools. The analysis showed that awareness of ICT tools is quite high, but because of a lack of experience, companies do not use them in all capacities. Analysis also indicated some doubt about the use of the cell phone at work. On the one hand, it is very convenient and companies make extensive use of it, as Thulo (2014) found. On the other hand, it was thought that cell phone usage raised concerns about professionalism and could be a problem with employees.

Finally, regarding NFC technology, analysis reveals a very low level of knowledge and an absolute lack of experience. The technology is therefore underestimated, and more training needs to be done for businesses to accept NFC technology and implement it successfully. Analysis of this theme showed that the complex approach of ICT tools can improve the process of timekeeping, but it is essential for the employer to be more aware of these technologies.

4.4.4 Theme 4: Mobile timekeeping

This theme refers to the sub-question: how can mobile devices improve the efficacy of the timekeeping of employees? In this theme respondents gave their thoughts about using mobile devices for a timekeeping system. They noted the positive side of it, as well as some challenges. This research aims at portraying the present state of timekeeping, as well as pointing to the potential of using mobile devices for timekeeping indicating in what circumstances this will work successfully for small businesses in Cape Town.

This theme combines the findings from the previous three themes and aims at improving business processes via the use of mobile devices. Three sub-themes were established in this

theme: the potential for mobile timekeeping, factors affecting the implementation of mobile timekeeping, and possible challenges.

4.4.4.1 Sub-theme 1: Potential for mobile timekeeping

Analysis of the interviews suggested the potential that lies in developing an automated timekeeping system using mobile devices. The trend of using mobile technologies for business purposes among small business is increasing (Thulo, 2014), and there is no doubt that mobile technologies have the power to improve the process of timekeeping. The ways in which this can happen are presented in Table 4.2, below.

Table 4.2: The ways in which mobile devices can help address issues associated with timekeeping

No	Experienced issue	How mobile devices can help
1	Issue with discipline	A mobile device can assume the role of a terminal in a timekeeping system, so that the system becomes more flexible and employees can be tracked even in the field.
2	Issue to keep track of everyone	Mobile timekeeping will make it the employee's responsibility to clock in/out on time, otherwise it will affect his salary.
3	Issue to check time spent on the job	In the field the employee can tap in/out on the mobile terminal every time he starts and finishes a job.
4	Issue with monitoring hours	Mobile devices allow easy access to time and attendance data, even in real time.
5	Issue to transfer data	Mobile devices enable the correct capture of data and avoid mistakes with calculating and transferring data.
6	Issue with writing mistakes	Mobile devices can reduce writing mistakes via using an automated system to capture time and attendance data.
7	Issue with price	A mobile timekeeping system can help to avoid expenses associated with setting up special time tracking terminals. There is no physical development as the timekeeping app can be installed on any mobile device.
8	Issue with training	Mobile devices are highly popular in everyday life, so everyone knows how to use cell phone.
9	Issue with fingerprint	NFC technology via the use of tags or badges will help to solve the problem when a scanner is not able to read a fingerprint.
10	Issue with taking breaks	Mobile devices can help organise timekeeping process more flexibly, so the employee can scan his card anywhere when he needs to go for a break.

Furthermore, participants were positive about using mobile devices for timekeeping purposes. Interviewee L noted that:

It is quite nice. It is economical, purely for financial reasons, and you don't have to pay for a special terminal that doesn't have to connect to computer. It is economical in terms of something physical have to be developed as well. You don't have to build the machine, it doesn't draw any extra power, you know as long as your cell phone is at work and charged. It is very clever (Interview L).

On the other hand, participants noted the simplicity of this way of running a timekeeping system. Especially if the price for this kind of system is acceptable, then it can be the best solution, as Interviewee D suggested:

I think I you have a good system that you can use of your phone, I think that would be perfect, because everybody knows how to use the phone, there is not much training. Everybody has access to the phone. And it becomes so part of our lives, we do everything with it. So, if you can, for example if I have a meeting. In the morning when my staff come to work, then I have a meeting with them and I have phone and they can come and tap, I think that would be perfect. I think mobile is the way to go (Interview D).

Another important benefit of mobile devices that participants noted is their independence from a stationary power source, as noted by Interviewee G.

If the power goes out your cell phone works (Interview G).

Factors for implementing mobile timekeeping systems are presented in the next section.

4.4.4.2 Sub-theme 2: Factors for implementing mobile timekeeping

Respondents mentioned several factors affecting the implementation of mobile devices in a timekeeping system. The main concern that respondents noted is the price of timekeeping systems. Because the companies that were explored in this research are small businesses, they do not have a large number of employees. The question is whether the system is absolutely necessary or not. Participants noted that the best solution would be if the price was reasonable, as illustrated by Interviewee H, below:

But obviously it would be the answer for me. Because then I'm not going to have expensive whole clock machine. Yes of course I would look at it. I just need to learn more about it. I mean everybody have got phone, yes for sure I would looked at it (Interview H).

Another important factor that participants noted is that if and when the number of their employees increased, they would look for "something more structured and what gives more information" (Interview H). The main reservation about timekeeping systems was expressed by companies that do not have large numbers of employees, and therefore see no necessity for organised timekeeping. As Loft (2007) points out, timekeeping systems are more suitable for large organisations.

Finally, participants declared that they would be interested in mobile timekeeping if it added value in terms of online checking, easy access, usability and tracking time in the field. Mobile devices can solve these problems completely.

4.4.4.3 Sub-theme 3: Possible challenges

Despite the usability and advantages of mobile devices, respondents noted some concerns and challenges that could impact the introduction of mobile timekeeping. The first concern is to have your mobile device all the time, given that it could be lost, stolen or broken. This refers as well to the availability of the main device: for example, “if your cell phone goes flat” (Interview G). In such a case, the company should have backup in the form of a spare device kept in the office.

Secondly, as was noted under theme 3, above, it can be a challenge to integrate a personal device into the working process. Respondents thought it not professional or capable of causing misunderstanding, especially if employees are not allowed to use their cell phones at work. This concern echoes the findings of Moltz (2013) and Blake (2019), that the use of cell phones at work is a big problem for small business owners, as it affects productivity.

On the other hand, respondents showed concern over the price of smartphones, as for timekeeping purposes it is not enough to have just a normal cell phone, as illustrated by Interviewee B:

In South Africa everyone is having computable phone would be an issue
(Interview B).

Regarding NFC technology for timekeeping purposes, the respondents were of the view that NFC cannot compete with fingerprint recognition. Because NFC technology is not very popular in modern life, respondents were concerned that this technology might be old and did not solve the “buddy clocking” problem, a potential problem for any organisation (Ami-Narh et al., 2014).

Another challenge that participants anticipated was how to manage break time. Some companies have a break policy and designated tea time, while other companies are guided by flexibility. So, in the latter case it might be difficult to align the timekeeping process with non-designated break time.

The last important challenge is employees’ willingness to adapt, especially if the company did not have a timekeeping system before. Participants noted that the “idea is very interesting” but what could be problematic is whether employees would be prepared to accept and learn it. It could take some time and training for employees to adapt to the new system, as illustrated by Interviewee T below:

Maybe for them [employees] it would be a challenge, yeah, some of them don't even have cell phones, you know, or they have got very old things, no smartphones. But for me I love messing and playing with technologies
(Interview T).

4.4.4.4 Summary of theme four (4)

This theme described how mobile devices can improve timekeeping in an organisation. Analysis of issues experienced and concerns expressed showed that the opportunity existed to improve timekeeping processes via mobile devices. In general participants agreed with using mobile technologies in the work process and saw a lot of benefits in it. This supports Thulo's (2014) contention that in South Africa business communities are adapting to mobile devices in their workplace at a rapid pace. On the other hand, respondents expressed reservations about certain challenges, which need to be closely examined and can become the basis for future research.

Furthermore, the analysis showed that there is potential in developing timekeeping systems using mobile devices. But an important factor in this development is price, as small businesses are not prepared to pay a lot for timekeeping. On the other hand, small businesses want the system to have wide usability, including online tracking, tracking in the field and accessing data anywhere.

4.5 SUMMARY OF CHAPTER FOUR

In summary, this chapter presented an analysis of the data collected and an interpretation of the findings. The analysis was performed via Atlas.ti and included three coding techniques: open coding, axial coding and selective coding. In the process of analysis four themes were generated. These themes comprised participants' expression of:

- a) The benefits of tracking employees' working time, which were based on their experience and aligned to current methods of timekeeping.
- b) The method of timekeeping in their organisation, which included the features of collecting data, storing data, and ways of using and distributing it. In this theme issues and challenges were noted as well.
- c) Their knowledge and use of ICT tools, where participants described how familiar they were with cloud computing and NFC technology, as well as how these tools can improve timekeeping and solve issues emerging from the previous theme.
- d) Views on mobile timekeeping, where participants voiced their opinions about using mobile devices for timekeeping purposes, factors influencing this and possible challenges. In this theme issues and concerns from previous themes we examined, and different ways in which mobile devices could improve things were proposed.

All the themes and sub-themes that emerged from the analysis were discussed and supported by quotations from interviews. Repetition of and relation between the themes and sub-themes was noticed in different interviews: for example, the issue of managing breaks and the issue of discipline were noticed in the companies which either do not track employees' working time

or do it manually. On the other hand, querying of the necessity of timekeeping was noted mostly in the companies with a smaller number of employees. Each participant's narrative in this study reflected their personal experience.

The research findings are compared to the as-is model (Chapter 1), which is then modified into the to-be model. The processual flow that helps to build new to-be model is illustrated in Figure 4.3, below.

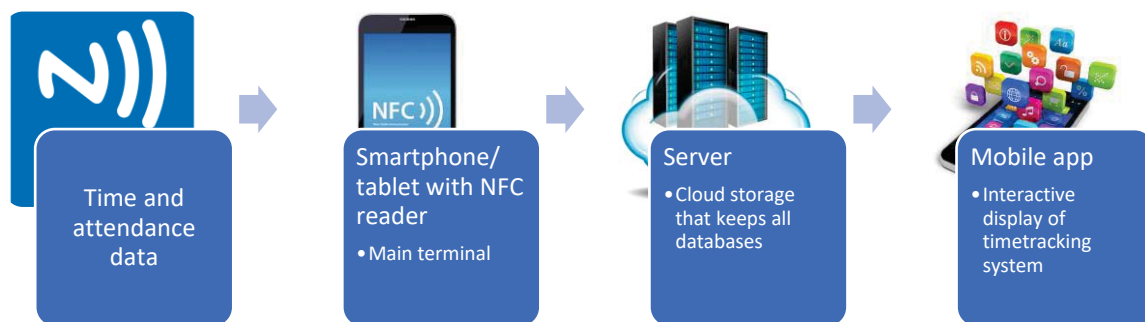


Figure 4.3: Processual flow of to-be model

The model to-be proposes a fully automated timekeeping process, where time and attendance data is transferred by automated flow without any manipulation from employer or employee. This approach avoids manual mistakes and improves the quality of the data used for making decisions and managing the organisation. The new to-be model is presented at the Figure 4.4. At the figure 4.4 red colour indicates process flow of old as-is model and the green colour indicates changes and presents new to-be model.

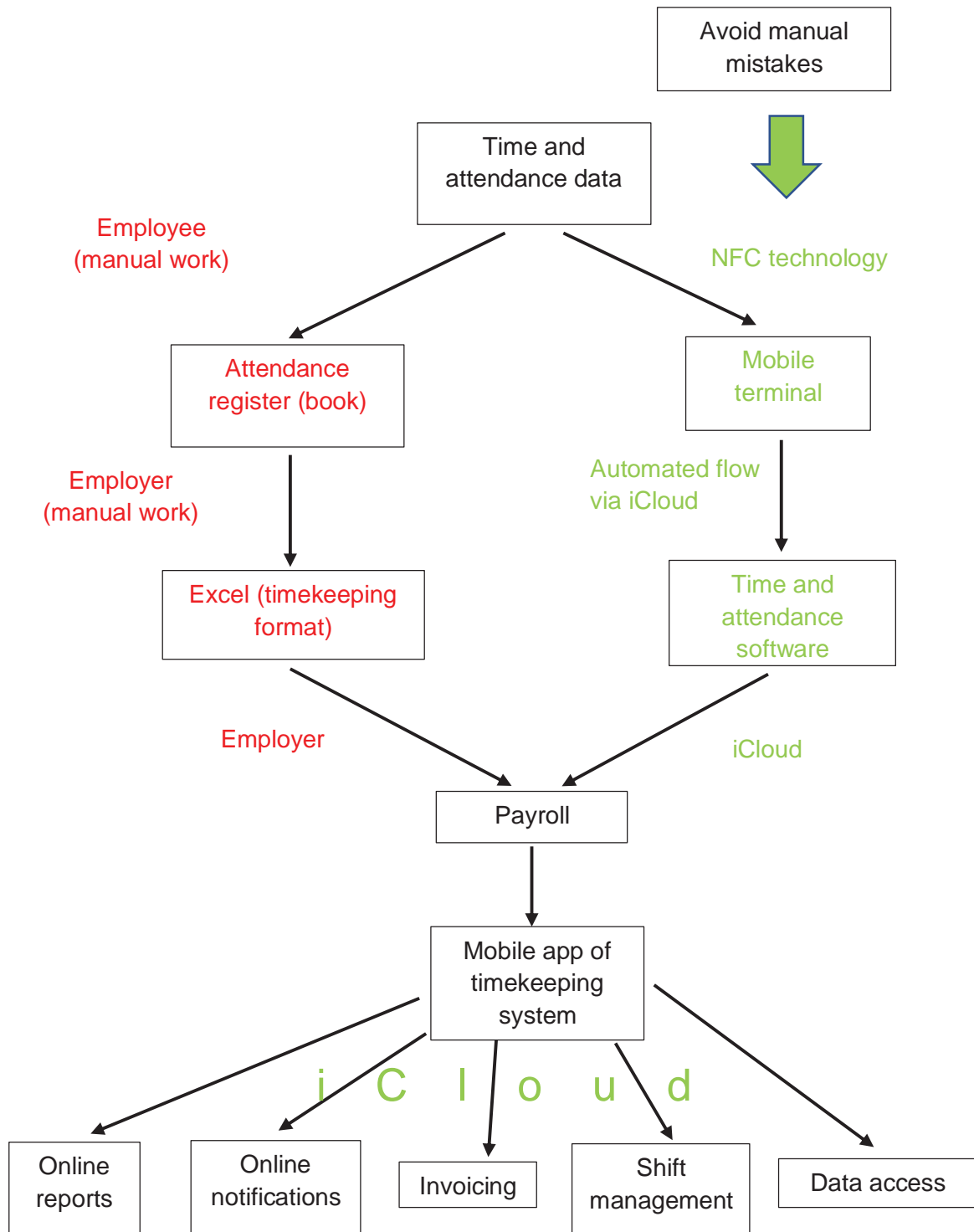


Figure 4.4.: Model to-be of timekeeping system

The themes generated were related to the research questions. The main research question and sub-questions of this study are answered directly in Chapter 5.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the conclusions and recommendations arising from this study. The chapter begins with a summary of each preceding chapter in the study. It recapitulates the research aim, objectives and questions; the literature survey; the chosen methodology and research design; as well as the analysis of the data gathered and the findings that emerged from this analysis. The interpreted findings are presented in relation to each research question. The contribution to knowledge of the research, its limitations and the opportunities for future research that it suggests, are also presented in this chapter. The chapter concludes with a list of recommendations.

5.2 OVERVIEW OF THE RESEARCH

5.2.1 Overview of Chapter One

The motivation for this research arose from the paucity of information about timekeeping among small businesses in Cape Town, and the virtual absence of information about using mobile devices for this purpose. Smartphone devices are being introduced into people's everyday life at a rapid pace (Widdicks et al., 2017). Studies by Schobel et al. (2016) and Grover (2013) indicate that mobile devices have promising potential in the way of collecting data.

The trend of using mobile devices for timekeeping in South African businesses appears to be novel, and certainly little canvassed in the academic literature. The general potential of using online tools and mobile applications for business is enormous (Columbus, 2015; Sajić et al., 2018), but informed opinion on the use of mobile devices specifically for timekeeping is hard to find (Mohandes, 2017).

The main research question is: how can small businesses in Cape Town manage timekeeping on employees using mobile devices efficiently and effectively?

To answer the main research question, the following sub-questions arose:

- How can value of the timekeeping be realised in respect of employees at small businesses?
- How do small businesses manage the timekeeping of their employees?
- How can ICT improve the efficacy of the timekeeping of employees?
- How can mobile devices improve the efficacy of the timekeeping of employees?

5.2.2 Overview of Chapter Two

Chapter 2 presented review of literature relevant the phenomenon under investigation. Studies by Disselkamp (2013, pp. 8–24), Ami-Narh et al. (2014), and Shaaban and Thandra (2017) show that timekeeping adds value for both the employer and the employee, by controlling labour expenses, creating accuracy in the payroll and providing tax and law compliance.

Disselkamp (2013, p. 161) indicates that a crucial part of any timekeeping system is the manner in which data is captured. Developing mobile technologies and implementing them in workplace (Marcum et al., 2018) points to a new approach towards collecting time and attendance data (Mohandes, 2017).

ICT tools show that captured data can be integrated other business systems, such as the payroll or human resources (Disselkamp 2013, pp. 14–15). This provides automated workflow that reduces manual errors, increases productively and improves the accuracy of the payroll (Ami-Narh et.al, 2014). Columbus (2015) claims that investment in mobile technologies should be a top priority for small businesses, and South African small businesses are adopting mobile technologies at a rapid rate (Thulo, 2014). This study explores the opportunities for using mobile devices specifically for timekeeping purposes among small businesses in Cape Town.

5.2.3 Overview of Chapter Three

Chapter 3 presented the research design and methodology of the study. The study fell within the interpretive paradigm (Walsham, 1995), and used an exploratory, instrumental case study approach (Yin, 2003:3–5). The case study included 20 interviews with representatives of various types of small business, endowing it with a measure of generalisability, but only within the Cape Town area. The non-probability sampling techniques of purposive and snowball sampling were used (Wolf et al. 2016, pp. 329–331). The number of interviews was chosen from saturated sampling (Mark, 2010).

The principal research tool was the semi-structured face-to-face interview. Primary data was collected from owners and managers of small businesses and analysed via qualitative data analysis and Atlas.ti research software. Data validation was achieved via corroboration with secondary data and other interviews (Creswell 2007, pp. 206–207).

Secondary data was collected from academic literature, articles and blogs by qualified experts and specialists. The secondary data was reviewed and furnished a basis for the interview questions.

5.2.4 Overview of Chapter Four

In Chapter 4 presented an analysis of the data collected and the findings arising from this. Data analysis began with transcribing the interviews into Microsoft Word and loading them in Atlas.ti. The interviews were then reviewed and re-read to discover and describe emerging patterns and interrelations. These patterns were coded and formed the basis of the themes that were generated (Berg, 2001, pp. 103).

The research analysis used three coding techniques (Corbin & Strauss, 1990):

1. Open coding
2. Axial coding
3. Selective coding –

which enabled the generation of four main themes:

- Benefits of tracking employees' working time
- Method of timekeeping in the organisation
- Knowledge and use of ICT tools
- Mobile timekeeping systems.

These themes were aligned with the research sub-questions. The themes, supported by quotations from the participants, were described in Chapter 4. The next section explains how the research sub-questions were answered through analysis of the generated themes.

5.3 RESEARCH OBJECTIVES REVISITED

The primary objective of this research was to explore how small businesses in Cape Town manage timekeeping in respect of their employees, and how mobile devices usage can help them do it more efficiently and effectively.

To accomplish the primary objective, the following secondary objectives were identified:

- To explore the value of the timekeeping of employees in businesses
- To determine the ways in which small businesses in Cape Town manage timekeeping of their employees
- To identify the efficacy of using ICT tools for timekeeping of employees
- To conceptualise the efficacy of mobile device-based solutions for timekeeping systems aimed at small business in Cape Town.

5.3.1 The value of the timekeeping of employees in business

In this section the findings were based on the participants' experience of timekeeping systems. The value of timekeeping in respect of employees can be divided into value for the employer and value for the employee (Disselkamp 2013, pp. 8–24).

Value for the employer lies in maintaining discipline. As Shaaban and Thandra (2017) argue, a timekeeping system affects the productivity and profitability of the company. Participants noted that a timekeeping system worked efficiently when they had to manage a large number of employees. The study also supported the contention of Ami-Narh et al. (2014) that a timekeeping system can reduce labour costs via capturing time and attendance data correctly. The participants noted that their payroll was not entirely accurate with regard to time spent on the job, latecoming and taking too many breaks.

Disselkamp's (2013, pp. 13–14) argument that timekeeping system can improve law and tax compliance was endorsed by this research. The participants noted that structured timekeeping prevent complaints and queries from employees. At the same time, as suggested by Disselkamp (2013, pp. 14), an increase in fairness for employees was also observed, as organisations noted that they devoted considerable attention to making sure that employees were aware of the work time captured for them. For these purposes some organisations still used a manual system that required employees to sign in and out.

The study actually revealed more value accruing to employees from timekeeping than has been reported in the literature. This points to the need for an automated timekeeping system. Participants noted that automated timekeeping would allow them to monitor work progress and individual tasks, as well as simplify the way in which attendance data can be accessed. However, Disselkamp's (2013, pp. 152–155) observations about the reward policy potential of timekeeping did not find corroboration among small businesses in Cape Town. Participants did not use time and attendance data for reward. Most companies did not have a reward policy, but still expected loyalty from their employees. On the other hand, some employers noted that they used time and attendance data for deductions and punishment for coming late.

5.3.2 The ways businesses manage the timekeeping of their employees

In this section the findings derived from respondents' descriptions of how they manage timekeeping in their organisations. According to Disselkamp (2013, pp. 161), collecting time and attendance data is an essential part of timekeeping. The research findings revealed that companies had three ways of collecting that data. The first is to do it automatically, using a timekeeping system. The participants' remarks support the arguments of Trujillo (2013), Shaaban and Thandra (2017) and Tippet et al. (2017), that automated is the best way of timekeeping. It can reduce mistakes and log more accurate time and attendance information, which can be used as needed by the company. The second way is to collect time and attendance data manually. The respondents maintained that this was appropriate for small staff complements. This finding is the corollary of Loft's observation (2007) that automated timekeeping is highly popular in large organisations.

Some companies prefer to use both these ways of timekeeping, because they are concerned that running an automated system is not secure enough. This finding supports Black's (2009) contention that security in an automated system is a major concern for organisations.

This research made other findings not encountered in the literature. Respondents noted that the advantage of a manual method of collecting time and attendance data is that they can be aware when an employee is late immediately and take immediate action. But on the other hand, analysis showed that companies with manual timekeeping are concerned about the accuracy of their payroll. This finding echoes that of Ami-Narh et al. (2014), who note that automated timekeeping can improve the accuracy of the payroll in an organisation.

The third path that organisations take is to not track their employees' working time at all. Respondents explained this by pointing out that they had a salary-based payroll, and saw no need for timekeeping as they were happy with productivity.

According to Ami-Narh et al. (2014) and Shaaban and Thandra (2017), another important aspect of timekeeping is how organisations use the captured time and attendance data. The payroll is the main consumer of time and attendance data. Respondents also compared automated ways of running the payroll with manual ones, when salaries are calculated via Microsoft Excel. Overall, analysis of the interviews showed that is difficult to classify the ways in which companies manage timekeeping, because each company has a different approach to collecting, keeping and using time and attendance data.

5.3.3 The ways in which ICT can improve the efficacy of timekeeping of employees

In this section, issues experienced in the companies surveyed were aligned with ICT tools and knowledge of these tools among owners and managers of small businesses in Cape Town. Research findings showed that companies typically lack easy access to time and attendance data, have problems with storing documents and with how they have to log in to the computer all the time. According to Disselkamp (2013, pp. 155–161), ICT tools can improve this process via cloud computing (Kim, 2009), which can increase transparency and access to important data anywhere and at any time. Developing cloud computing in an organisation would influence it in the direction of using mobile devices for business purposes. The research findings indicated that employers are familiar with cloud computing. However, security concerns inhibit its implementation (Kim, 2009). The research findings also confirmed that contention of Thulo (2014) that mobile devices are now playing important role in business, particularly in business communication: e-mails, communications with customers, quotations, credit card payments and invoicing.

Furthermore, the research findings showed that business owners mostly have Android-based devices. Kapoor and Agarwal (2017) note that the Android ecosystem is more complex and therefore more appropriate for app development. On the other hand, there was little knowledge or experience of NFC technology. This technology has been underestimated and more training needs to be done to encourage the successful implementation of NFC technology. The research findings showed that the complexity of ICT tools can improve the process of timekeeping, but it is essential for the employer to be more familiar with these technologies.

5.3.4 The ways in which mobile devices can improve the efficacy of timekeeping for employers

This section describes how mobile devices can improve the efficacy of the timekeeping of employees for employers. The literature reviewed provides little information regarding the use of mobile devices for timekeeping purposes. Therefore, this research finding, presented in Table 5.1, below, is based largely on the comments and opinions of the participants.

Table 5.1: The ways in which mobile devices can improve issues with timekeeping.

No	Experienced issue	How mobile devices can improve the situation
1	Issue with discipline	Mobile device can assume the role of terminal in the timekeeping system, so the system becomes more flexible and employees can be tracked even in the field.
2	Issue: to keep track of everyone	Mobile timekeeping will make it the employee's responsibility to clock in/out on time, otherwise it will affect his salary.
3	Issue: to check time spent on the job	In the field employee can tap in/out with manager's mobile terminal every time s/he starts and finishes a job.
4	Issue with monitoring hours	Mobile devices allow easy access to any time and attendance data, even in the real time.
5	Issue with transferring data	Mobile devices capture data correctly and avoid mistakes with calculating and transferring the data.
6	Issue with writing mistakes	Mobile devices can reduce writing errors via using an automated system to capture time and attendance data.
7	Issue with price	A mobile timekeeping system can help to avoid the expense of establishing special time tracking terminals. There is no physical development as a timekeeping app can be installed on any mobile device.
8	Issue with training	Mobile devices are highly popular in everyday life, so everyone knows how to use cell phone.

9	Issue with fingerprints	NFC technology using tags or badges will help to solve the problem when the scanner is not able to read fingerprints.
10	Issue with taking breaks	Mobile devices can help organise the timekeeping process in a more flexible way, so that an employee can scan his or her card anywhere when s/he needs to go for a break.

The study also revealed possible challenges in integrating mobile devices with timekeeping. A first concern is the vulnerability of a mobile device, as it can be lost, stolen, forgotten at home or not available for another reason (for example, not charged). The next important concern is associated with the conversion of a personal device into a work device: it may seem unprofessional and can cause misunderstanding. Moltz (2013) and Blake (2019) report that the use of a cell phone at work can affect productivity. The price of smartphones is another issue, as a “normal” cell phone is insufficient for timekeeping purposes.

The research findings showed that using NFC technology might not solve the buddy-clocking problem, which according to Ami-Narh et al. (2014) and Tippett et al. (2017) is crucial in many organisations. A last concern is associated with changing the corporate culture in the organisation, which involves training staff and adapting to a new system. In sum, the research findings showed that there is definite potential for developing mobile timekeeping systems, although price remains a significant factor as small businesses cannot countenance high expenditure on timekeeping. They are nevertheless attracted by the flexible usability of such a system, for example, for online tracking, tracking in the field and accessing data anywhere.

5.4 RESEARCH CONTRIBUTION

This research makes three kinds of contribution: theoretical, methodological and practical.

Theoretical contribution: This lies in locating the research in the existing body of knowledge. Previous studies by Schobel et al. (2016) and Widdicks et al. (2017) attest to the increasing use of mobile devices in everyday life. This is leading to the integration of mobile devices in business processes (Sajić et al., 2018). Mohandes (2017) has demonstrated the feasibility of using mobile devices for a class attendance system while Columbus (2015) shows that mobile technologies are becoming a growth tool for small and medium businesses. However the question of whether mobile devices can be used for business purposes, particularly for timekeeping, had yet to be investigated. This research filled this gap by exploring the state of timekeeping among small businesses in Cape Town, and ways in which mobile devices can improve this situation.

Methodological contribution: This is to be found in the research methodology chosen. In this qualitative research project, the case study method and particularly personal interviews enabled a close examination of the researched phenomenon within its context. Personal interviews provided interaction with owners of small businesses in Cape Town, generating insights into perceptions of the value of timekeeping, timekeeping practice, the role of ICT for timekeeping purposes and opportunities for developing a mobile timekeeping system.

Practical contribution: This inheres in the findings and interpretations. The practical contribution is the proposed set of guidelines for small businesses (and not only in Cape Town) that will help them to manage timekeeping effectively and efficiently.

5.5 CONCLUSION AND RECOMMENDATIONS

The aim of the research was to explore how small business in Cape Town manage the timekeeping of their employees and how mobile devices can make this more efficient. The conclusions drawn from the research findings are therefore the following:

- a) Small businesses in Cape Town use three ways of managing timekeeping. The first is fully automated, from collecting data to the payroll, via a clock machine. The second is manual timekeeping, through the use of an attendance register/book. These companies also manage the payroll manually, using MS Excel. The third way is mixed method, where companies capture time and attendance data manually but transfer it to an automated payroll system.
- b) Mobile devices have strong potential to improve the process of timekeeping through the use of cloud computing that permits access to data anywhere and at any time. Furthermore, the fact that installing the app does not require any physical development makes mobile timekeeping easy to use. And finally, the portability of mobile devices makes the process of collecting time and attendance data possible anywhere, without depending on stationary terminals. There is definite potential for mobile timekeeping adoption among small businesses in Cape Town.

Analysis of the existing “as-is” model indicated the disadvantages of manual timekeeping. Therefore, to improve this process, the model “to-be” has been proposed. This model, illustrated in Figure 5.1, would replace all manual operations, such as writing time in the book and transferring this data to Excel. Model to-be proposes an automated flow of time and attendance data from the moment of capture to managing the payroll and the organisation in general.

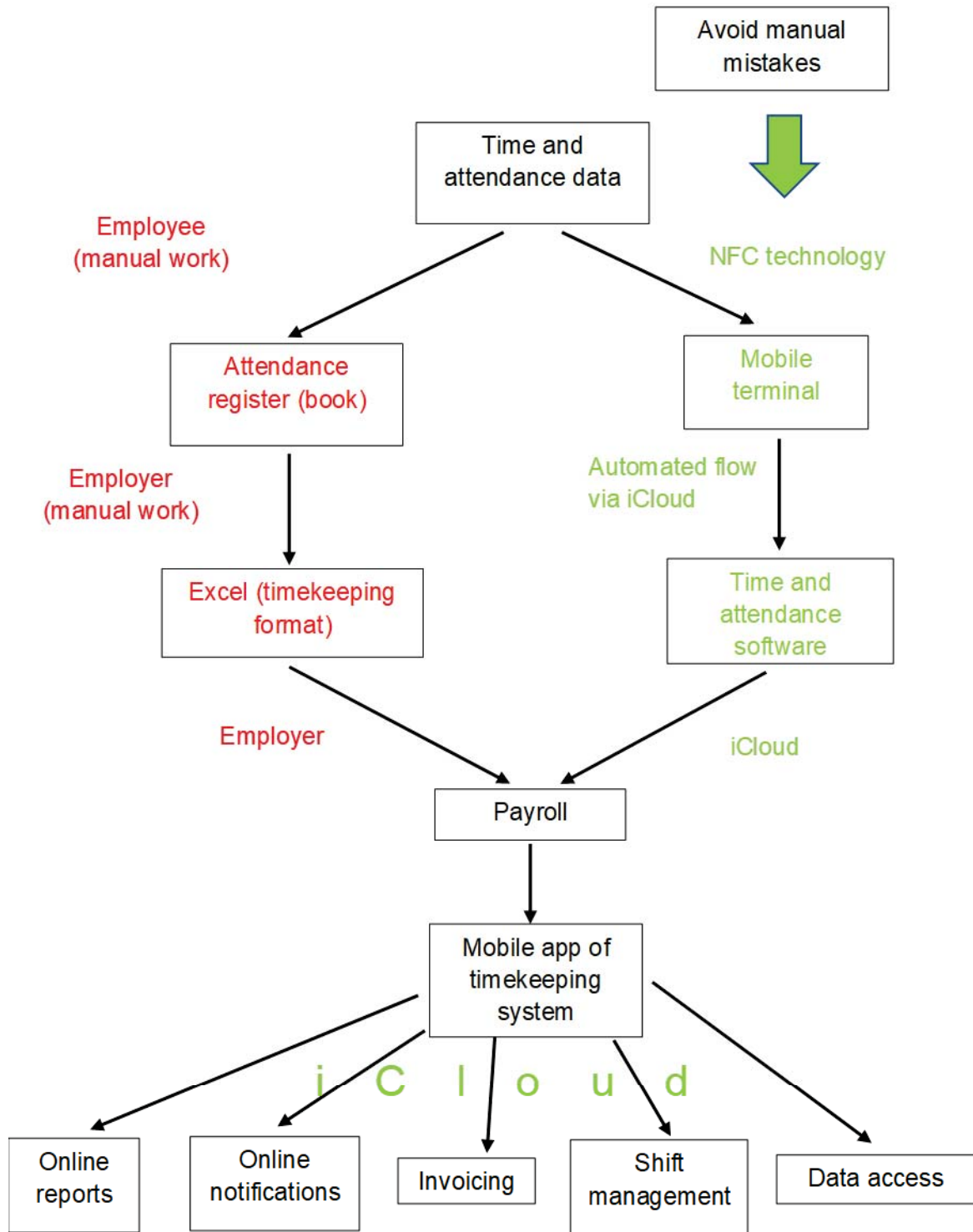


Figure 5.1: Model to-be of the timekeeping process

Drawing upon these conclusions, the following recommendations are made:

- a) Small businesses in Cape Town should pay more attention to the question of timekeeping.
- b) Mobile devices for timekeeping purposes should not be very expensive, as small businesses are not ready to increase their expenditure on a timekeeping system.

- c) Mobile devices should replace clock machine terminals and make the process of timekeeping more flexible.
- d) Mobile devices should replace fingerprint recognition in organisations, which experiences trouble with scanning.
- e) Small businesses should pay more attention to cloud-based storage as it brings significant advantage in the way of managing time and attendance data.
- f) Organisations should change from manual to automated timekeeping, as it can reduce the possibility of mistakes and increase transparency.

5.6 LIMITATIONS AND FUTURE RESEARCH

This research was conducted with small businesses in Cape Town, therefore, delimiting this study to this group only, which inevitably limited the generalisability of the research, but did not affect the validity of the results.

This research was conducted in the context of small businesses in Cape Town, using purposive and snowball sampling techniques. Future research can explore different aims and aspects, perhaps using different sampling techniques. However, there are some factors that ought to be taken into consideration in future research:

- a) The security concern with a cloud-based mobile timekeeping system
- b) What the possible challenges might be with implementing a mobile timekeeping system
- c) What the main concerns might be regarding a mobile timekeeping system and how to address them.

Future research can be conducted with revised interview questions and a larger number of respondents, perhaps from other centres or provinces. Furthermore, future research should involve not only small business but medium-sized businesses and even large organisations.

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APPENDICES

APPENDIX A: ETHICAL APPROVED FORM



P.O. Box 1906 □ Bellville 7535 South Africa □ Tel: +27 21 4603291 □ Email: fbmsethics@cput.ac.za Symphony Road Bellville 7535


Office of the Chairperson Research Ethics Committee	Faculty: BUSINESS AND MANAGEMENT SCIENCES
--------------------------------------------------------	------------------------------------------------------

At a meeting of the Faculty's Research Ethics Committee on **2 May 2018**, Ethics Approval was granted to **Kseniia Egorova (216277787)** for research activities of **MTech: Business Information Systems** at the University of the Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	USING MOBILE DEVICES FOR TIME TRACKING SYSTEMS AMONG SMALL BUSINESSES IN CAPE TOWN Lead Researcher/Supervisor: Dr. Z Mitrovic
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Comments:

Decision: **APPROVED**

 <hr/> Signed: Chairperson: Research Ethics Committee	4 May 2018 <hr/> Date
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Clearance Certificate No | 2018FBREC525

APPENDIX B: INTERVIEW QUESTIONS

Informed consent for participation in an interview

Dear participant!

The main object of this research is to explore how small businesses in Cape Town manage timekeeping of their employees and how mobile devices can help to do it efficiently and effectively.

Your participating is highly valuable and appreciated in order to gain insight to the situation regarding employees' timekeeping among small businesses in Cape Town and for researcher to propose mobile device based solutions for these purposes.

Participation in this study is voluntary, should you wish to withdraw for any reasons at anytime, you are welcome to do so without any objection to your decision. Your information provided on this questionnaire is confidential and shall be treated as such.

The interview will contain questions about current situation with timekeeping within your company; questions about using mobile devices in your working process; and opportunity of using mobile devices for timekeeping.

Thank you for your participation. For more information or queries, please feel free to contact the researcher on details below:

Kseniia Egorova

Kseniya.2803@mail.ru

0818669594

Name

Signature

Email

Date

Contact number (if applicable)

Interview questions

Research sub-question 1: What is the value of timekeeping of employees in businesses?

- 1) What is the size of your company? (How many employees do you have)
- 2) How do you track employees' working time?
 - a. If manually, then: have your organisation considered to make this process automated.
 - b. If automatically, then: please describe the system that your organisation currently uses and the data you are collecting.
 - c. If you "Do not track" then how do you manage attendance of your employees? Have your organisation considered to improve this process?
- 3) In your opinion what are the main benefits of tracking working time of employees?

Research sub-question 2: How do businesses manage timekeeping of their employees?

- 1) How do you manage timekeeping in your organisation (Where do you keep time and attendance data, in what format)?
- 2) Please describe possible challenges in current timekeeping process.
- 3) How do you use the captured time and attendance data?
- 4) What additional information would you like to be captured?

Research sub-question 3: How ICT can improve the efficacy of timekeeping of employees?

- 4) Do you see potential for developing automated timekeeping in your company using mobile device? Please describe.
- 5) How do you manage process of payroll in your organisation? Leave management? Rewards and benefits policy?
- 6) In your opinion how accurate is your current payroll process?

Research sub-question 4: How mobile devices can improve the efficacy of timekeeping of employees?

- 1) How often do you use any mobile devices and its application at your workplace?
- 2) What kind of platform do you have on your mobile device?
- 3) Are you familiar with Near Field Communication technology?
- 4) Are you familiar with cloud computing?
- 5) Do you use mobile timekeeping in your organisation?
- 6) What are some challenges for introduction of mobile timekeeping?
- 7) What solution would you recommend for an effective timekeeping of the employees?

APPENDIX C: SIMILARITY INDEX

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