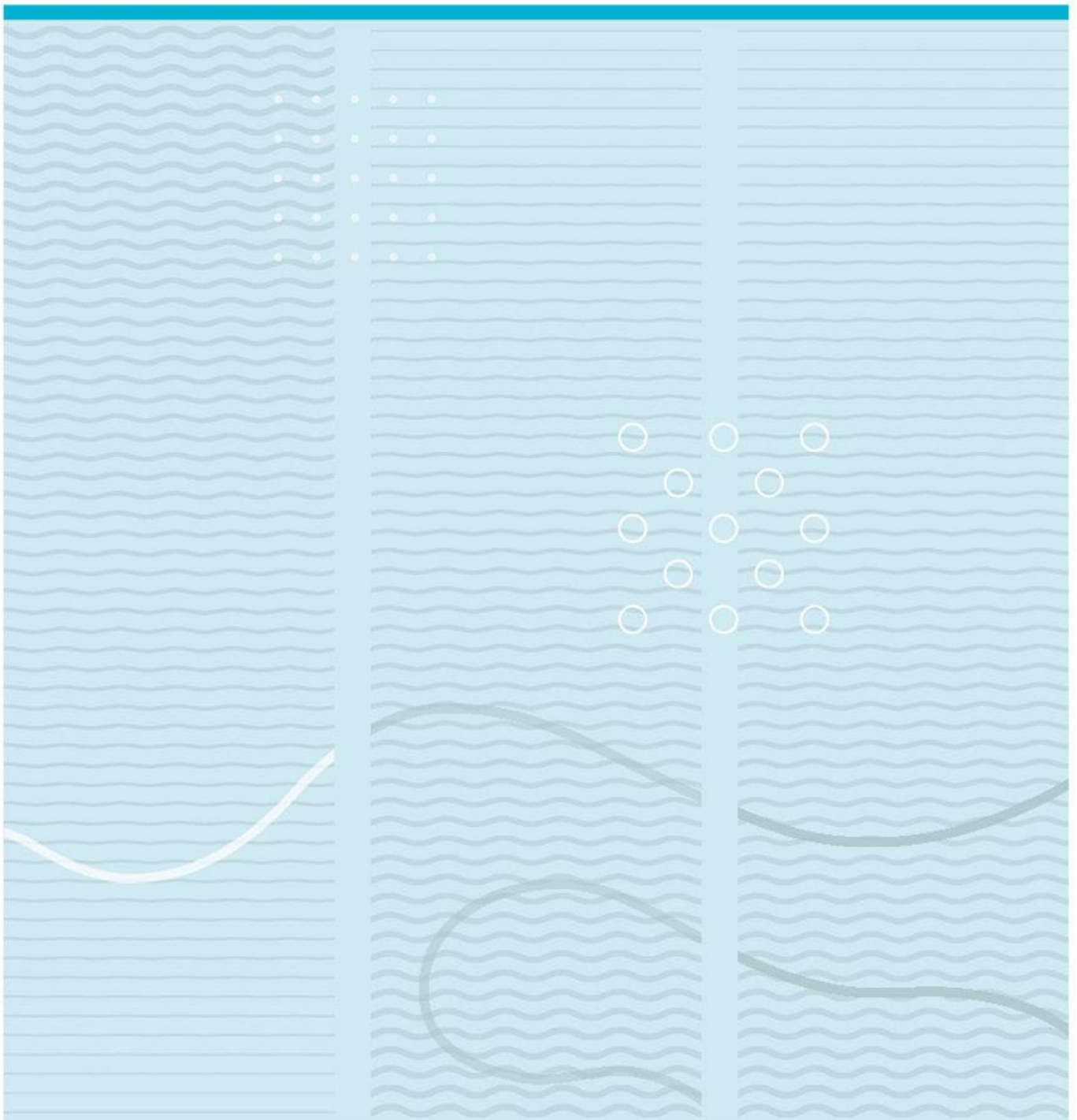


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Digitalization, Digitization, and Digital Transformation of SME Business in Bangladesh



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This thesis is worth 30 study points

Summary

Small Medium Enterprises have a less formal, lean, and flatter organizational structure than large enterprises (Chan et al., 2019). Those firms fall below a certain threshold in terms of revenues, assets, or employees, which varies by country (Liberto, 2020). This adaptable management culture adds to the ability to adapt to changes. Although due to their size and nature, small and medium companies (SMEs) in Bangladesh, like other markets, operate in complicated, fast-paced, and unpredictable contexts (Bangladesh Bank, 2008). Furthermore, digitalization, digitization, and digital transformation help businesses to re-imagine how they operate their operations through new digital procedures and technologies. This implementation of this new technology creates many issues, and the problem is even more intense in the case of SMEs because of the resource limitation (Li et al., 2017). Backlog or legacy data during this migration is one of the less highlighted obstacles along with other issues (Vartolomei & Avasilcai, 2019). In this study, a migration framework from a legacy system to a modernization system was tested in the case of SMEs in a developing country, Bangladesh was chosen as the developing country. It will testify through interviewing several SMEs who successfully migrated and will gather information on how they manage their backlogs during this migration. The study has identified some minor changes in the framework as well as the amount of data they process during this migration. To explain the amount of data for processing in the case of SMEs the study introduces a prioritization technic.

Keywords: Digitalization SMEs, Digitization, Digital Transformation, SME Legacy System Migration Framework, Backlog

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Foreword

It was an incredible journey through my master's study in Management Information Systems, learning and learning with many exciting challenges. That journey was impossible or difficult in my situation without the University of South-Eastern Norway (USN), its professors, and staff members.

First, I would like to thank Dr. Karen Stendal respectfully for her supervision in this master thesis.

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Honefoss/ 15 May, 2022

Mehmood Hasan

1. Introduction

In a business, digitalization entails a shift in all job and revenue-generating tactics (Rachinger et al., 2019). The implementation of a flexible management model to compete, quick response to demand, and the development of a long-term relationship with clients (Rachinger et al., 2019).

Digitalization is explored in all aspects of society (Jovanović et al., 2018). It incorporates economic, social, and political factors and refers to a societal shift that has an impact on everyone's professional and personal lives (*Digitalization and Social Life – Research – Department of Sociology and Political Science - NTNU*, n.d.). Digitalization has a significant impact on businesses in several areas, ranging from the digitization of existing processes to the enhancement of products, as well as the transformation of entire business models and the alteration of existing value chains via digital networks and information exchange (European Commission, 2017). In the recent decade, value creation with new technology has become increasingly important (Sanders & Elizabeth, 2005). Technological innovation has become more rapid and dynamic (Sanders & Elizabeth, 2005). As the backbone of most economies, small and medium-sized firms must rise to the challenge (Kilimis et al., 2019). Companies need resources, know-how, and a digital strategy for navigating in the new environment in order to actively pursue opportunities and respond to new requirements (Kilimis et al., 2019).

To continue, large organizations (Google, Apple) or start-ups that scaled using platform business models are frequently used as examples of successful digital transformations Amazon, Facebook (Ruggieri et al., 2018). The first has the advantage of market leadership and money, while the second has the advantage of speed and flexibility (Curraj, 2018). Small and Medium-sized Enterprises (SMEs) are critical to maintaining healthy economic growth; they have different characteristics that are also dependent on the economic, cultural, and political context in which they operate (OECD, n.d.). SMEs differ from larger firms in terms of governance structure and meaning, such as personalized management with little devolution of authority or family-run businesses and kinship; they have human capital and financial resource constraints, and they are typically dependent on a small number of customers and operate in limited markets (Hausman, 2005; Hudson et al., 2001). Business is always changing in our modern knowledge-based economy, and SMEs are constantly challenged to develop new and inventive ways to improve and adapt to the quick shifts (Kilimis et al., 2019). As a result, there is a growing interest and need for SMEs to

investigate and implement new and innovative decision-making procedures, which will lead to increased performance and competitiveness (Kilimis et al., 2019).

Furthermore, through new digital processes and tools, digital transformation allows firms to re-imagine how they manage their businesses (Li et al., 2017). Businesses will confront hurdles throughout the transformation processes, as with any change management endeavor, ranging from people-centric concerns to structural issues to technology barriers and everything in between. The problem is even more intense in the case of SMEs because of the budget constraints, proper human resources, and knowledge (Yoshino & Taghizadeh-Hesary, 2016). Backlog or legacy data during digitization is one of the less highlighted obstacles, along with other issues (Vartolomei & Avasilcai, 2019). The handling of old data/Backlog during the transformation is easier for organizations with a large budget and sufficient human resources, while SMEs have difficulties in this case. Large organizations can use the right equipment and manpower to solve the problem, however, small and medium businesses are always looking for the cheapest and most effective solution that does not put their finances at risk (OECD, n.d.). So, in this study the following research question is about to be answered:

How should SMEs in Developing Countries deal with data backlog during digitalization, digitization, or digital transformation?

Having the quality study approach, the study will investigate and summarize the different strategies of managing backlog by interviewing a different key person from different SMEs and in this case, the key persons of SMEs are interviewed from Bangladesh. The study will first walk through the related literature, then the research design and data collection methods. Next, the research question, related literature, and the data from several interviews bough together to summarize an answer to the research question.

2. Related Literature

Small and mid-size businesses (SMEs) are companies with revenues, assets, or personnel that fall below a particular threshold, and it is defined differently in each country (Liberto, 2020). According to the Bangladesh Bank, the definition of SMEs is based on the sector that is involved in the business. For example, in the case of the industry if the employee size is less than 50 and investment is below 0.17M USD equivalent to 1,50,00,000 Bangladesh Taka (BDT) is called SME, again for business, the employee size is reduced to 25, and investment reduced to below 0.58M USD equivalent to 50,00,000BDT (Bangladesh Bank, 2008). In terms of organizational structure, SMEs are often less formal, lean, and flatter than large corporations (Chan et al., 2019). They tend to operate on a smaller scale due to their inherent size limitations, using concentrated and specialized resources, capabilities, and processes to serve niche/specific markets, clients, and industry domains (Levy & Powell, 1998). Because of the shifting economic climate, SMEs have had to adapt to the new digital reality's norms. This means that businesses must become familiar with digital solutions, as they will eventually be unable to connect with suppliers and consumers in a fluid and effective manner (Genest & Gamache, 2020). Many businesses are still operating in a state of uncertainty and deferring decisions regarding digitalization expenditure, so it is important to emphasize the importance and long-term benefits of digitization (Doyle & Cosgrove, 2019). Many people have started to mix terminology, either out of ignorance or for their own benefit, which causes confusion because we are suddenly talking about different things but calling them the same thing. For a better understanding of those terms, one should be familiar with digitization, digitalization, and digital transformation.

2.1. Digitization

Digitization is the process of converting real items into digital representations (Gupta, 2020). We might, for example, scan a paper document and save it as a digital file (e.g., PDF). To put it another way, digitization is the process of transforming a non-digital object into a digital representation or artifact (Handan, 2022). It can then be used by computerized systems for a variety of purposes. On the contrary, the implementation of digital technologies that provide technical elements such as hardware or software devices is known as digitization (Cenamor et al., 2019). Information and communication technology (ICT) systems that standardize information to quickly code, store, formalize, and transmit enormous volumes of knowledge underpin digital technologies (Pfister &

Lehmann, 2021). That is, it turns a process into a software-driven event or occurrence from a set of occurrences. Digitization is not only limited to scanning files and converting them into a pdf or any digital format. Scanning is just a process that can be performed in a set amount of time and then moved on to the next assignment (Bill, 2011). Bill also said that after digitizing a document, it should be preserved so that future users can access it (Bill, 2011). Digitization began as a technical issue, but it is now increasingly becoming a strategic management topic that impacts value offerings (Pfister & Lehmann, 2021). Without modifying or converting a current business process or processes, digitalization increases its effectiveness and competitiveness while cutting costs (Handan, 2022).

2.2. Digitalization

Despite digitization and digital preservation are sometimes confused, they are not the same thing, and digitalization is often a necessary first step in digital preservation, to protect delicate artifacts and provide more access points for users, libraries, archives, museums, and other memory institutions digitize items (Bill, 2011). Which means digitalization is putting all the digitized documents into a process so that they can be usable. The term "digitalization" was initially used in the 1970s in conjunction with the phrase "computerization," and it alluded to the "digitalization of society" as the spread of information and communication technologies began (Curraj, 2018), from that beginning to till now their lots of literature on this topic. SME digitalization has piqued the interest of scholars in recent years, as SMEs are missing out on unimaginable potential due to a lack of resources and competencies (Cenamor et al., 2019). An SME can be digitalized by enabling a digital relationship between customers, suppliers, and employees (Laudon & Laudon, 2012). Here digital relationship means, adopting e-business processes in the entire value chain, for instance, direct selling (e-tailing), customer relationship management (CRM), supply chain management (SCM), etc. A study by Sorin and Antonio shows that the E-Receipt application can be a digitalization enabler for SMEs (Gavrila Gavrila & de Lucas Ancillo, 2021a). The study also shows that, the environmental benefit of implementing the e-receipt by reducing the use of paper and the benefit of SMEs from collecting the customer behavior. They also stated that the e-receipt enabler hypothesis is provided regardless of the market segment, and it is associated with the challenge of the digital transformation process. However, due to misunderstandings about the complexity and cost of digitalization, the implementation process is delayed, particularly for small and medium-sized firms (SMEs) (Kilimis et al., 2019). The article by Kilimis et al. (2019) also discusses the

prioritization of processes during digitalization in a company, based on a survey of three companies' implementation strategies. According to the article, due to the high cost of digitization, businesses always prioritize the most effective and urgent processes for digitization. In this case, the SMEs choose to digitalize the ERP first. It also stated that the priority can be adjusted based on the company's existing infrastructure and technical background. Several dependencies were also discussed by the author during the process of prioritization.

2.3. Digital Transformation

On the other hand, Digital Transformation is "The realignment of, or new investment in, technology, business models, and procedures to more successfully compete in an ever-changing digital market," according to Brian Solis of the Altimeter Group (Solis, n.d.). The definition itself explains the necessity of digital transformation in this era. The period of digital transformation is characterized by the transformation of entities, universities, the public, and employees, as well as the emergence of new business models and practices (Ulas, 2019). This means that digital transformation requires thinking about how new digital technology can be used to modify products, processes, and organizations. The article takes a broad look at the aspects that influence the digital transformation process. Ulas (2019) also summarizes the programmes and software in the following table which can be the benefits of the Digital Transformation of SMEs.

Table 2-1 Programmes and Softwares which can be benefitted from (Ulas, 2019)

Functions of operations	Programmes and softwares used in digital transformation
New product development and design	Deductions to the customers' needs can be made by big data and analytic, comments and complaints on social media, topics searched in search engines, the watched videos. Customers can lead operations to develop products which they ask for. Use of 3D printers Design preferences of customers can be detected by competitions and surveys. PLM (Product Lifecycle Management) programme Computer-Aided Manufacturing (CAM) Computer Aided Design (CAD)
Demand forecasting	Big data and advanced analytic can be used. Personalised product orders can be taken. Fair support software
Supply and logistics	Using of integrated systems ensuring reciprocal data sharing with suppliers, spontaneous stock follow-up of storage, providing packaging with automatic machines. Software of Purchasing and payment systems Robotics systems in intercosternal transport

Manufacturing	(Manufacturing Execution System) softwares, PLC(programmable logic controller), ERP (Enterprise resource planning) Use of big data and analytic systems Benefitting from industrial robots Automatically quality controlling Automation
Human resources	Total quality management (TQM), Just in Time (JIT) manufacturing Lean Manufacturing (LM) HUMAN RESOURCES Trainings of IT, increasing talent, adapt to changing work practices, digital skills of new employees, ongoing education, training, culture of collaboration, Human resources software Requirement of having multi-disciplinary information, knowledge and experience Use of robots in manufacturing Employees will be able to choose how, where and when to work New and flexible working patterns, mobile working, home working. Online voice and video calling platforms in communication, such as Skype and blog sites, videos and social media platforms such as Facebook.
Marketing, sale and customer management	Use of CRM (Customer Relationship Management) programmes Use of virtual assistants containing artificial intelligence, such as big data, advanced analytic, chatbot, voice assistant Use of augmented reality Keeping of customers information, making demand forecasting, quickly taking and answering of customers' opinions and complaints Following of real time purchasing activities of customer Customer's touch points about customer Presenting of virtual guides and remote maintenance service for products Offering digital training for customers Making personal promotions and discount Using of integrated marketing methods, such as internet marketing, mobile marketing, omnichannel, viral marketing, social media, vloggers, bloggers, youtuber, direct marketing, brand ambassadors, influencer marketing, attending fairs.
Payment	Offering payment alternatives, such as paying with a credit card in website, in store payment apps (a mobile device into a smartphone credit card reader), banking cards, mobile wallets, internet banking, digital currencies (such as Bitcoin), money transfer, virtual card, paying at the door.

Furthermore, along with describing the benefits of the digitalized company a study by Vartolomei & Avasilcai (2019) also shows the following challenges before digitalization,

- Time and data-intensive business processes:

Before digitalization business need to manage all the data manually which is time consuming and reduce productivity.

- Overwhelmed by information/data pools:

Because of the paper documents, there is less room and an uncomfortable environment, implying the necessity for physical storage.

- Quality and integrity of the data are underwhelmed:

Because the paper support is subject to different external variables that can destroy the material, data protection does not exist in a highly valuable manner. The risk of wetness, for example, or even its own footprint.

- Content or the documents are unmanageable:

Due to the potential of document loss or disorder in a physical file, time management is important in data query.

- Missing out on relevant information or news:

Inside the company, there is a lack of easy searches for various items, values, paperwork, processes, and so on.

- Important information about the company is missing:

Corporate Social Responsibility is missing. A company's social commitment can be demonstrated by participating in vital causes such as environmental sustainability. Digitizing documents encourages this reduction in paper usage. If anyone needs a copy of a document, it always can be printed.

- Important information about the company is missing:

For a company to remain competitive in its field, old systems and processes must be rethought and new technologies implemented. As they make their way through this digital transition, businesses encounter numerous hurdles. These barriers can range from a lack of funds for new technology to a lack of competence or know-how in implementing new digital projects. The creation of an effective digital strategy is the one challenge that must be solved.

A recent study by Gavrilă Gavrilă & de Lucas Ancillo (2021a) tried to find the impact of COVID-19 pandemic on SME business organizations and society digitization or digital transformation. The study shows that the Internet domain registration study is a valid indication, the COVID-19 pandemic was discovered to be an awful accelerator in terms of entrepreneurship and innovation as digitization and digital transformation lever. This study indicates the presence of new non-invasive complementary information approaches, such as Internet domain registration analysis, that could serve as an early and quick indicator of innovation and entrepreneurial initiatives in corporate activities.

2.4. Backlog or Legacy Data

From the above definition Digitization, Digitalization and Digital Transformation is a form of application migration or introducing of new applications, that add extra value to the business or help to rethink the business. Application migration or legacy system modernization entails converting legacy software to a modern system by improving an existing system, totally changing the environment, or replacing the system with a larger package or a complete redesign (Bell, 2008). This migration is a difficult and time-consuming task and creates two major issues (Hainaut et al., 2008). The first is the database conversion to a new data management paradigm. The application programs' adaption to the transferred database schema and the target data management system is the second issue. It is well acknowledged that migrating the data management service from the legacy to the target system is critical to solving many of the issues that legacy information systems present (Brodie & Stonebraker, 1995). There are several types of legacy system migration strategies (Althani & Khaddaj, 2018). To start with, A strategy called Big Bang or Cold Turkey (Brodie & Stonebraker, 1995) describes the process to be completed once the targeted system is fully prepared and the legacy data transferred to the new system. Next, the strategy named incremental migration proposes both legacy and modernized systems to be online (Warren & Ransom, 2002). This means the legacy data need to be alive while the modernized system migrates incrementally. Thirdly, the migration strategy named partially migration offer to use the "data migration framework (DMF)" in Microsoft Dynamics (Junction Solutions, 2012).

All of the SME-related literature reviews discussed the benefits of digitalization or the enablers of digitalization. During a study to propose a framework for retailer digitalization identify the researcher focus on SME digitalization (Hagberg et al., 2016). It was summarized that throughout his research he discovered approximately 22 pieces of literature on the topic of changes in

communication as a result of digitalization. Again, there are 37 pieces of literature on the human-digital technology relationship, continuing around 16 and 14 studies on altering organizational traditions and products or services. The Figure 2-1 is the summary of the study taken from the journal.

Transformation	Literature
Changes of communication channels Proliferation of transactions New forms of distribution	Bahn <i>et al.</i> (2015), Bhatnagar and Syam (2014), Brynjolfsson <i>et al.</i> (2013), Cao and Li (2015), Coll (2013), Colla and Lapoule (2012), Egels-Zandén and Hansson (2015), Gazley <i>et al.</i> (2015), Grewal <i>et al.</i> (2013), Herhausen <i>et al.</i> (2015), Hyunjoo and Young (2015), Jung <i>et al.</i> (2014), Pantano and Viassone, (2015), Peterson <i>et al.</i> (1997), Piotrowicz and Cuthbertson (2014), Reynolds (2002), Rotem-Mindali and Weltevreden (2013), Schoenbachler and Gordon (2002), Taylor (2016), Verhoef <i>et al.</i> (2015), Voropanova (2015), Wang <i>et al.</i> (2015), Yadav and Pavlou (2014) and Zhou and Duan (2015)
Intermixing of humans and digital technologies Blurring of boundaries New actors, roles and relationships	Alba <i>et al.</i> (1997), Arvidsson and Colleoni (2012), Arvidsson (2008), Bakos (2001), Beer and Burrows (2010), Belk (2014), Boothroyd (2009), Cluley and Brown (2015), Cochoy (2010, 2015), Cochoy <i>et al.</i> (2016), Collins 2010, Cova and Cova (2012), Cova and Dalli (2009), Crewe (2013), Deleuze (1992), Demirkan and Spohrer (2014), Denegri-Knott and Molesworth (2013), Doherty and Ellis-Chadwick (2010), Dujarier (2014), Hagberg and Kjellberg (2010), Hartmann (2016), Jung <i>et al.</i> (2014), Keeling <i>et al.</i> (2013), Kjellberg and Helgesson (2007), Krafft <i>et al.</i> (2015), Labrecque <i>et al.</i> (2013), Lehdonvirta (2012), Pantano and Migliarese (2014), Prahalad and Ramaswamy (2004), Ritzer and Jurgenson (2010), Schulten and Schaefer (2015), Sorescu <i>et al.</i> (2011), Toffler (1980), Vargo and Lusch (2004), Verhoef <i>et al.</i> (2015), Wang <i>et al.</i> (2015); Williams (2014) and Zwick <i>et al.</i> (2008)
Changes of traditional settings New settings Intermixing of settings	Atzori <i>et al.</i> (2010), Cao and Li (2015), Colla and Lapoule (2012), Crewe (2013), Cullinane (2009), Denegri-Knott and Molesworth (2010a, 2013), Doherty and Ellis-Chadwick (2010), Gazley <i>et al.</i> (2015), Grewal <i>et al.</i> (2011), Licoppe (2013), Lockhorn (2010), Pantano (2016), Pantano and Viassone (2015), Poncin and Mimoun (2014), Shankar <i>et al.</i> (2011) and Stein and Ramaseshan (2016)
Changes of products and services Extensions of offerings New forms of pricing	Amit and Zott (2001), Anderson (2006), Araujo and Spring (2006), Bhatnagar and Syam (2014), Denegri-Knott and Molesworth (2010a, b), Grewal <i>et al.</i> (2010, 2011), Hagberg and Kjellberg (2015), Krafft <i>et al.</i> (2015), Levitt (1981), Magauda (2011), Masten and Plowman (2010), Renko and Druzijanac (2014), Saarijärvi <i>et al.</i> (2014) and Vargo and Lusch (2004)

Figure 2-1 Summary of the researcher focus (Hagberg et al., 2016)

The researcher was preoccupied with process and return, and they overlooked the challenges regarding data backlog (Vartolomei & Avasilcai, 2019) or the data that need to be prioritized during

digitization or digitalization. The backlog, in this sense, refers to past data or activities that must be completed for the entire process, such as earlier data that must be digitalized or migrated in preparation for digitalization or digital transformation. On the other hand, the frameworks or the data migration strategy describe without considering the size or resource limitation of an organization.

3. Theoretical Considerations

Software technologies and paradigms are constantly evolving, posing a number of challenges in terms of migration decisions, such as risk, cost, target architecture, language, and platform (Althani & Khaddaj, 2018). In addition, managing data backlog is another challenge for SMEs due to their lack of resources (Vartolomei & Avasilcai, 2019). The study will consider a framework for legacy system modernization as well as a prioritization technique to minimize the cost of migration in case of SMEs in developing countries.

3.1. Framework

During digitization, digitalization, or digital transformation, one must work with a large amount of data or processes. The more things they start, the fewer things they finish, and the entire process slows down (Moreira, 2017). On the other hand, data must be transferred or migrated due to the legacy system's complexity, which is exacerbated by a lack of understanding of the code (Fanelli et al., 2016). This migration can be categorized as either: big bang, database first, database last, or hybrid (Lawless et al., 1997). The approach big bang performs a complete redevelopment of the legacy system in terms of database and software, to continue, the database first approach migrates user data (Fanelli et al., 2016). Both techniques, however, necessitate keeping the legacy and target systems operational at the same time (Fanelli et al., 2016). During this migration data inconsistency issues (Fanelli et al., 2016) occur which are undertaken as a black box or white box methodology (Comella-Dorda et al., 2000). According to Fanelli et al. (2016), only completely decomposable systems are suitable for the methods described above. Legacy application systems are rarely

entirely decomposable in reality. After considering all the limitations of the above approaches the author proposed the following modernization framework.

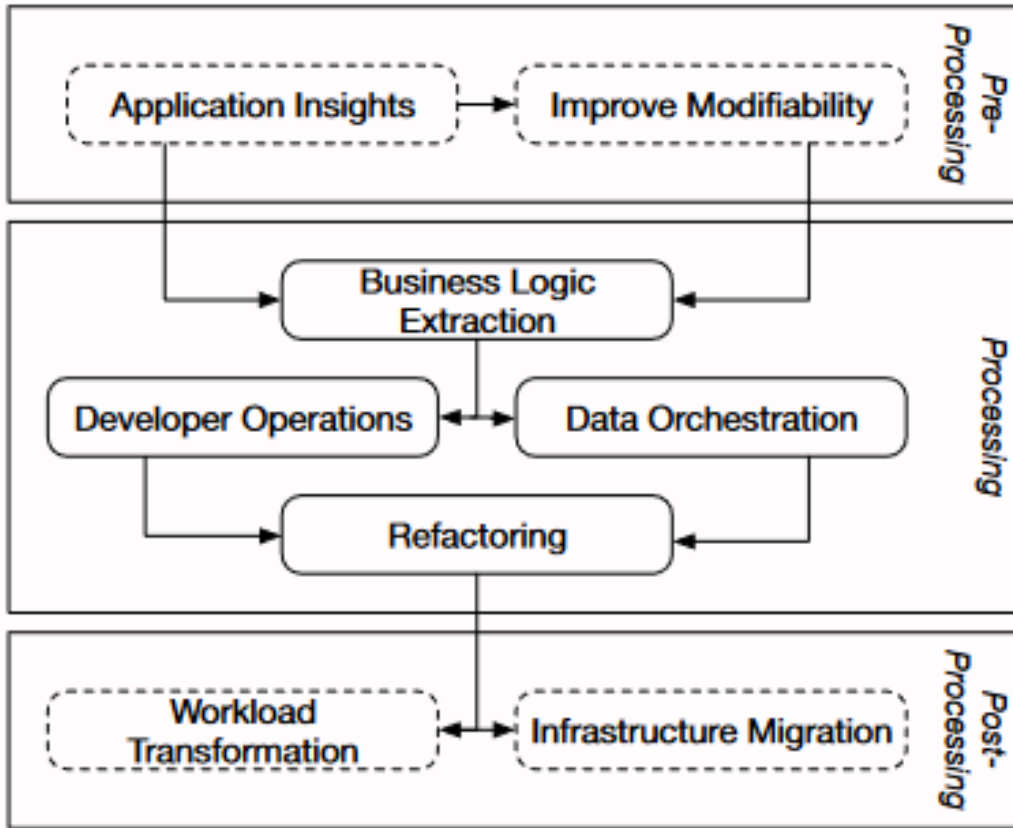


Figure 3-1 A systematic framework for legacy program module modernization (Fanelli et al., 2016)

According to the author, the framework can be applied either sequentially to any one program module or in parallel. The framework proposes 3 stages, pre-processing, processing, and post-processing.

3.1.1. Pre-processing

The stage pre-processing consists of 2 steps, Application Insights, and Improve Modifiability. The step Application Insights are the steps to analyze the code and system to get the requirements, and design from legacy software. According to the author, it allows the organization to reconstruct part of the lost domain knowledge regarding the system under inquiry. The step Improve Modifiability is for differentiated business and program logic from data orchestration. This makes business logic extraction easier during the processing step, and it allows legacy application subject matter experts to have a deeper understanding of the business requirements. Both steps produce two outcomes, business requirements and business logic.

3.1.2. Processing

During the processing phase, it defines the implementation of and development of culture. The stage consists of 4 steps. The step of business logic extraction is a language transformation that extracts business logic from program modules. It concentrates on program modules rather than methods within program modules, allowing for more reuse of business logic implementation (Ulrich, 2002). Second, the stage developer operations boost development efficiency, reduces time to market for changes, and yield more accurate project estimates and forecasts over time (Batlajery et al., 2014). Third, is the data orchestration stage which prepares the data for processing through input-output logic, record augmentation, and data validation routines (Fanelli et al., 2016). Finally, in the step “refactoring”, new programs are implemented by adopting known design patterns, best practices, and style guidelines which increased readability and maintenance. The result of the processing phase is that it prepares the modernized program module for handoff ownership. The following figure (Figure 3-2) illustrates how the legacy and the modernized system work simultaneously with the same underlying data. It will provide code confidence on modernized systems by comparing the with legacy system data processing.

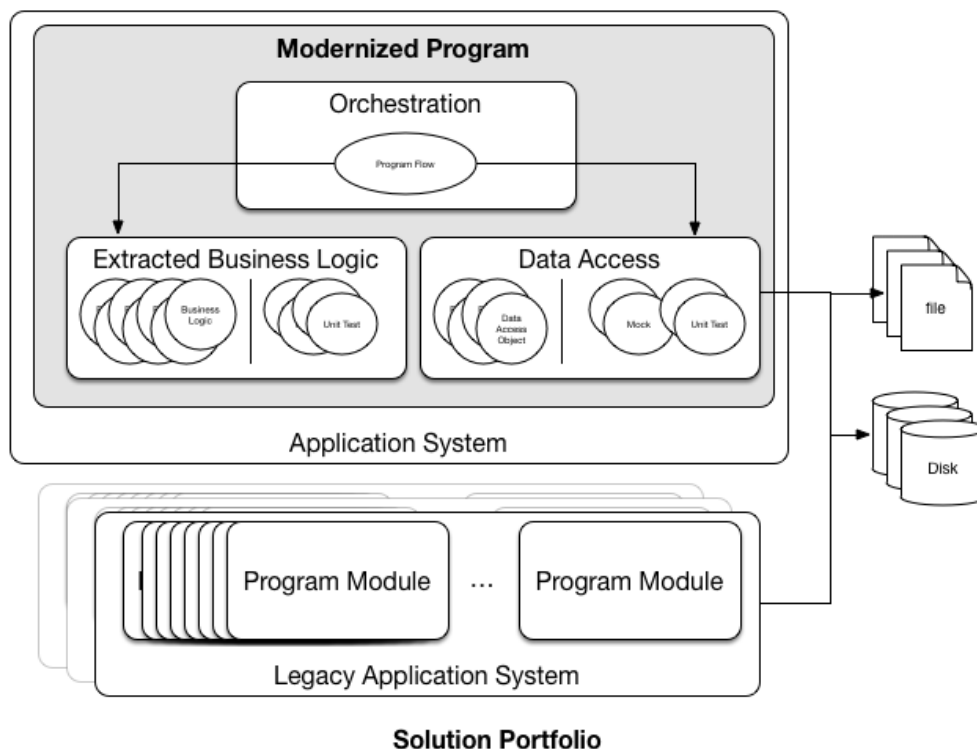


Figure 3-2 Structure of a solution portfolio after modernization of one or more (Fanelli et al., 2016)

3.1.3. Post-Processing

This phase consists of two steps, Infrastructure Migration, and Workload Transformation which can be defined by two very common examples, in which workload is migrated to on- or off-premises cloud infrastructures or consumed in online transaction processing workloads rather than batch workloads (Fanelli et al., 2016).

3.2. Prioritization

Because SMEs are limited in resources (Levy & Powell, 1998) processing all data during the data orchestration stage will be challenging (Vartolomei & Avasilcai, 2019). This study will also consider the prioritization method in the phase processing during the data orchestration stage to prepare all the data in optimal order to get maximum Return on investment (ROI) (Moreira, 2017). There are different prioritization techniques such as AHP, hierarchy AHP, spanning tree matrix, numerical analysis, bubble sort, MoSCoW etc. Each prioritization has its own advantage and disadvantage. A case study conducted by Hatton (2007) evaluated some prioritization which include Simple ranking, MoSCoW, hundred dollars and AHP. These requirements prioritizing strategies were evaluated based on their ease of use, time to complete the whole prioritization process, and stakeholder confidence. The needs prioritizing strategies are evaluated using 12 criteria related to cell phone functionalities. The users are given these needs. As contestants, a diverse group of people of various ages, sexes, educational levels, and occupations were selected. The results of 31 research were used to conduct data analysis. The research results are shown below.

Table 3-1 Characteristics of prioritization methods (Hatton, 2007)

Evaluation Criteria	Simple Ranking	MoSCoW	100 dollar	AHP
Ratio Scale Information			Yes	Yes
High Confidence from User	Yes	Yes	Yes	
Consistent	Yes	Yes	Yes	Yes
Low difficulty	Yes	Yes	Yes	
Low effort	Yes	Yes	Yes	
Able to handle a large number of alternatives		Yes		

According to this article, the author shows that the MoSCoW prioritization has high confidence from users with consistent, low difficulty, and low effort. This prioritization has the ability to handle

a large number of alternatives. On the other hand, SME owners in developing countries have less interest in education and more in business (Matama, 2017). According to the characteristics of MoSCoW Hatton, (2007) described, in the case of SME owners in developing countries it will be easier for to make them understand the MoSCoW prioritization technique.

So, the study will focus on MoSCoW prioritization during the data orchestration stage. The technic will prioritize by understanding the needs of each data (Benedicenti & Alshehri, 2013). This prioritization technique categorized the requirements into four categories: Must, Should, Could, and Won't (Brennan, 2009). The author describes the categories as below,

3.2.1. Must

In this category, the data should be processed which is mandatory to provide the final solution or modernization.

3.2.2. Should

It represents a high-priority item that, if feasible, can be included in the system.

3.2.3. Could

In this category, the data is considered as desirable but not necessary.

3.2.4. Won't

The category describes the data which are not required for new system.

This method aids in the comprehension of consumer requirements. The difficulty with this strategy is distinguishing between the terms "Must" and "Should," as they both represent a client choice or want (Benedicenti & Alshehri, 2013).

4. Research Methodology

Back to the research question, the approach taken in this study is qualitative research where this method will be used to understand the steps that has been taken by the concern of Digitization, Digitalization and Digital Transformation (Bryman & Bell, 2011). This will aid in the study and investigation of problems, as well as the discovery of fresh ideas and perspectives. This study's topic and research question suit the qualitative study's features, such as the researcher as an instrument,

inductive logic, participants' meanings, emergent design, holistic account, and reflexivity (Creswell & Creswell, 2018). In this research, for secondary data, some literature has been studied, and to collect primary data qualitative methods have been used. Through secondary data current scenario of research focus on SMEs digitalization/digitization in developing countries is picturized. The review of literature includes both academic and professional sources on digitalization, digitization, digital transformation, and related concepts. As input for a legacy system migration framework, the chances, risks, and focus areas are evaluated. The resulting categories are used to structure the interviews' questions.

4.1. Data Collection

In qualitative research, taking interviews is one of the data collection methods (Bryman & Bell, 2011). A qualitative study's scope is tied to the purpose of understanding and justifying why a certain occurrence is the way it is, unlike quantitative research (Stewart et al., 2008). The data collection method for qualitative research, interviews have been taken (Donalek, 2005). The interviews in this study were semi-structured to allow for fresh explanations and exploration, as well as the emergence of new possible angles (Matthews & Ross, 2014).

First, an interview guide (Annexes 2) was created to ensure that all relevant areas of the interviews were covered. The interview guide includes an introduction to the research, participant rights, privacy rights, the ability to withdraw consent, information security, and authorization to begin recording. The interview guide's body contains a series of questions about the steps, challenges, and strategies of Digitalization, Digitization, or Digital Transformation. The interview guide features a section at the end that informs the participant about how to stop the recording, re-informs them of their rights, and asks if they have any concerns.

Following that, a consent form was produced, which included information about the study, criteria, participant rights, including privacy and consent withdrawal rights, responsible individuals and parties, and contact information.

Furthermore, the interview started with some selected personnel. In this study, the interviewee is a person who works for SME and is responsible for or involved in digitalization or digitization. The following criteria are considered during participants selection,

- Being an employee or responsible person who is operating the digitalization/digitization of an SME.
- Have a relation direct or indirectly with the digitalization/digitization of an SME.
- Have an opinion about the research topic.
- Have experience with the research topic.
- Lives in Bangladesh.

Because this study is based on developing countries in this case Bangladesh has been chosen as a developing country for the analysis. Upon all the criteria following participants were selected for the interview.

Table 4-1 Semi-structured Interviews – Participants and Interview Duration

Participants \ Info	Gender	Position	Company Type	Interview (HMS)
Interview 1	Male	IT Consultant	Non-Technical	00:18:24
Interview 2	Male	IT Consultant	Non-Technical	00:17:30
Interview 3	Male	IT Consultant	Non-Technical	00:21:04
Interview 4	Male	IT Consultant	Non-Technical	00:25:10
Interview 5	Male	IT Consultant	Non-Technical	00:19:55
Interview 6	Male	IT Consultant	Non-Technical	00:22:20

Before the interviews, all the participants digitally signed the consent form. Due to the different geographical locations of the interviewees' the interview was conducted through the education account of the University of South-Eastern Norway in Zoom software. The purpose of this qualitative study through interviews is to understand the experience of each concern related to digitalization or digitization (Donalek, 2005). All interviews were taped with the participants' permission, then transcribed and anonymized for data analysis and future research. All interview was in the native language of Bangladesh that is Bangla. Due to the time limitation of the participants all interview was concise and focused on the research topic-related issues. Only the Voice has been recorded during the interview because the participant puts the camera off.

4.2. Data Analysis

Based on the theoretical considerations the interview has been structured to understand the framework (Adhabi & Anozie, 2017) that has been declared. The data analysis started with the interviews, taking notes, finding the similarity with the framework, and separating the dissimilarity with the framework. The logical strategy in this content analysis was to limit the concepts and be inductive to extract patterns, segments, and categories from the data (Borislav, 2016). The interview was transcribed to make visible the data and find the information related to the framework. Several software programs were tried to transcribe the interview session, but none of them worked effectively because the language was not English. So, by listening to the recorded interview session and typing, the transcribing was done manually. Following the transcription, the activity associated with each section of the framework was recorded. The activity was then classified as similar or dissimilar to the framework. The activity that is common to all SMEs and follows the framework steps is marked as positive and matched with the framework, while the activity that is atypical is marked as negative and suggests a change to the framework. The most common activity among SMEs that do not adhere to the framework is highlighted.

In addition, the prioritization technique MoSCoW has been used to understand how the data during data orchestration is being categorized (Hatton, 2008). This prioritization technique is chosen to understand the amount of data being used during the data orchestration (Hatton, 2008). The data were categorized in prioritizing list according to their importance in the modernized system to get online. The result of prioritizing Moscow refers to (Khan et al., 2015; Marthasari et al., 2018) as follows:

- Must have category lists all of user story that meets the criteria which are mandatory to put the modernized system online. For example, customer information, product information, etc.
- Should Have category lists all of user story that meets the criteria which are good for the modernized system if it is included. For example, current customer balance, current month/year transaction, etc.
- Could have category listed all of user story that meets the criteria which are not mandatory for the modernized system but good for the future analysis, reports, or describe the past story. For example, previous sales reports, transactions, etc.

- Won't have category listed all of user story that is not required for the modernized system. For example, relation table on the legacy system.

Below are the examples of how the activity was marked by Microsoft word.

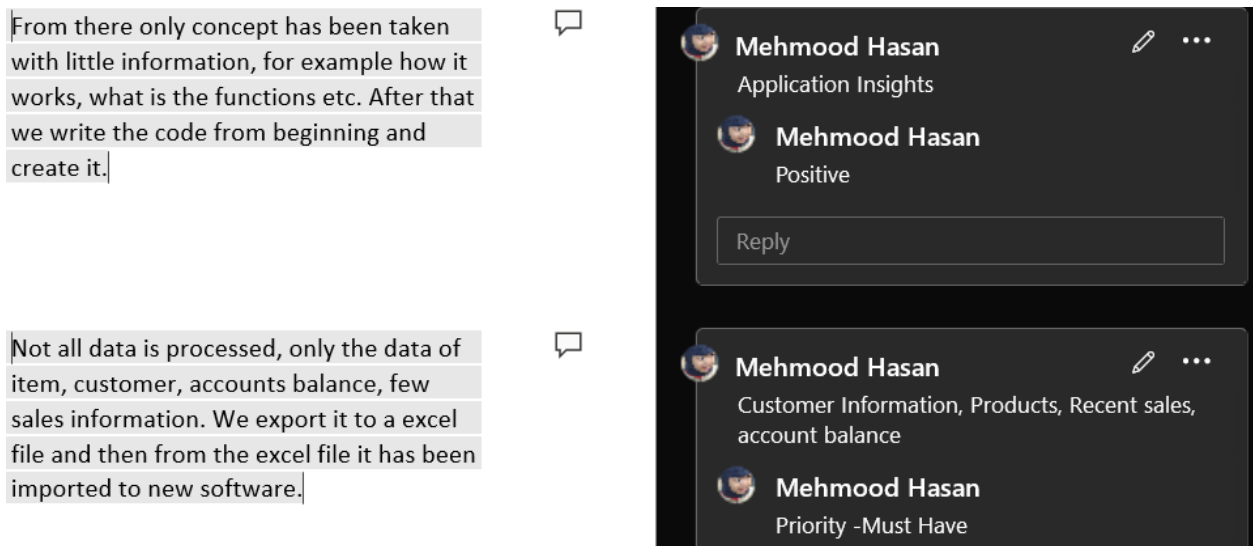


Figure 4-1 Example of marking activity in Microsoft Word

4.3. Limitations

During data collecting, data analysis, and the entire research process, there were several constraints. The first constraint was a time limit: the entire study endeavor had to be completed within a semester's time. Although the majority of the communications, such as corresponding with the Norwegian Centre for Research Data (NSD), contacting interviewees, obtaining consent, and conducting interviews, were conducted digitally via the internet, the process took longer than expected due to the different geographical locations. There may also be more interviewees and persons available to discuss the subject. On the other hand, managing interview time with participants was very difficult due to geographical time differences. In some cases, participants were not directly employed in the company which prevent the participants to share the information due to privacy policy issues. Digital interviews were also a stumbling block. Although technology has become an integral part of our lives, more data, particularly body language data, may be captured in a traditional interview context. The final constraint is biased: the finding and discussion are based on a limited interview in a specific location. The result may differ from location to location and can vary if more interviews can be taken.

4.4. Validity

Validity in qualitative research can be categorized by internal validity and external validity (Bryman & Bell, 2011). The book describes the internal validity of the relationship between observation and theoretical ideas. The related literature has a very limited discussion of the topic that is related to data during SME digitization, digitalization, or digital transformation. The framework is designed for an organization that is willing to migrate from a legacy system to modernize system without mentioning the size of the company. The limitation of resources of an SME always being a challenge (Levy & Powell, 1998), and in this context, the framework is a matter of observation. To continue, external validity is, refers to the extent to which findings may be applied to a variety of social situations (Bryman & Bell, 2011). The only tool, in this case, is taking interviews of the concerns who deal digitization or digitalization of an SME. The result may differ from country to country or city to city. The more interviews conducted, the more in-depth knowledge about the situation can be gained (Borislav, 2016).

5. Findings

Due to the resource limitation of an SME during digitization, digitalization, or digital transformation they tend to skip a few steps in an application migration process to minimize the cost (Levy & Powell, 1998). According to the interviewee, all SMEs in Bangladesh prefer to hire a third-party IT consultant for the entire migration process. Those IT consultants are usually from the company that is supplying the new software or system. The owners of SMEs are only marginally participating in this shift.

5.1. Pre-processing

The step of pre-processing involves recreating, supporting requirements, and designing from legacy applications (Fanelli et al., 2016). The owner of an SME is usually a non-technical person who can describe the whole process of business but have a limited idea about the software. “He (SME owner) was not from technical background, so he has a very limited idea about the software, but he describes everything about the business very well.” (Interview 3). The concern who is responsible for the migration is the person who looks to the legacy software for technical details (Interview 3). The framework suggests looking into the code and system, but the interview reflects that the concern related to migration only analysis the high-level view of the software to understand the

requirements and functionality “At first we check all the functionality of the previous software, for example, the sales form, purchase entry, etc.” (Interview 1). The framework offers "increasing modifiability" procedures such as using non-destructive editing to discover source code components that map to business requirements; however, the concern of the SME migration skips this step in favor of talking to the business owner to learn more about the company. The stage's result is the same as the framework's, which yields two outputs. The stage creates functionality and needs by observing the legacy system at a high level and learning the application's business requirements in depth.

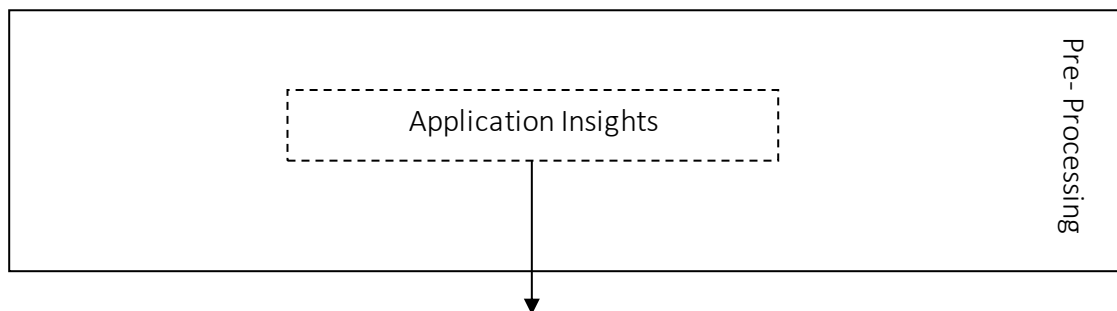


Figure 5-1 Used steps in Pre-processing

Within the application system, the processing phase handles both the implementation and development culture guiding the program modules. The steps remain similar but in the Data orchestration, the developer does not process all the data from the legacy system “Extracting data from previous software was not easy so and also time consuming so we process only the necessary data.” (Interview 1). To understand the data required for the migration the MoSCoW prioritization technic has been introduced in this stage. Due to the resource limitation the concern of the migration work only the data that is mandatory to operate, for instance, User, Customer, or Product information “Not all data is processed, only the data of item, customer, accounts balance, few sales information has been processed.” (Interview 5). From the nature of the selection process of the data in the data orchestration steps, the prioritization category “Must Have” can be related. In some cases, few SMEs can afford the data processing which helps the modernization system to merge with the operation immediately (Interview 4). For example, if the record of current months can be migrated to the modern system the application can run immediately without worrying about backlog or legacy data. This selection criterion can be categorized as “Should-Have” from the above mentioning prioritization system. The rest of the data is always ignored during the migration.

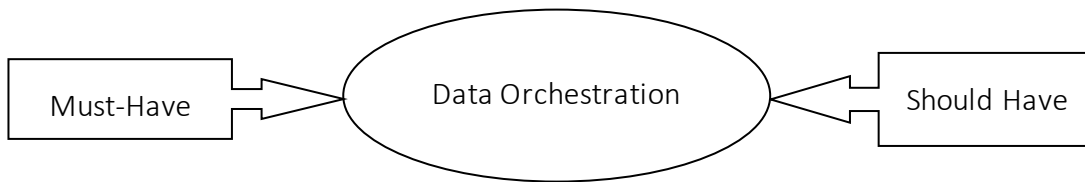


Figure 5-2 Data prioritization during data orchestration

5.3. Post Processing

The post-processing remains like the framework in all case of SMEs that has been interviewed. The phase involves Infrastructure migration and workload transformation. In this phase, all the SMEs that have been interviewed migrated their modernized system to the off-premises cloud infrastructure to reduce cost and maintenance.

The framework can be simplified for the SMEs in Developing countries like the following Figure 5-3.

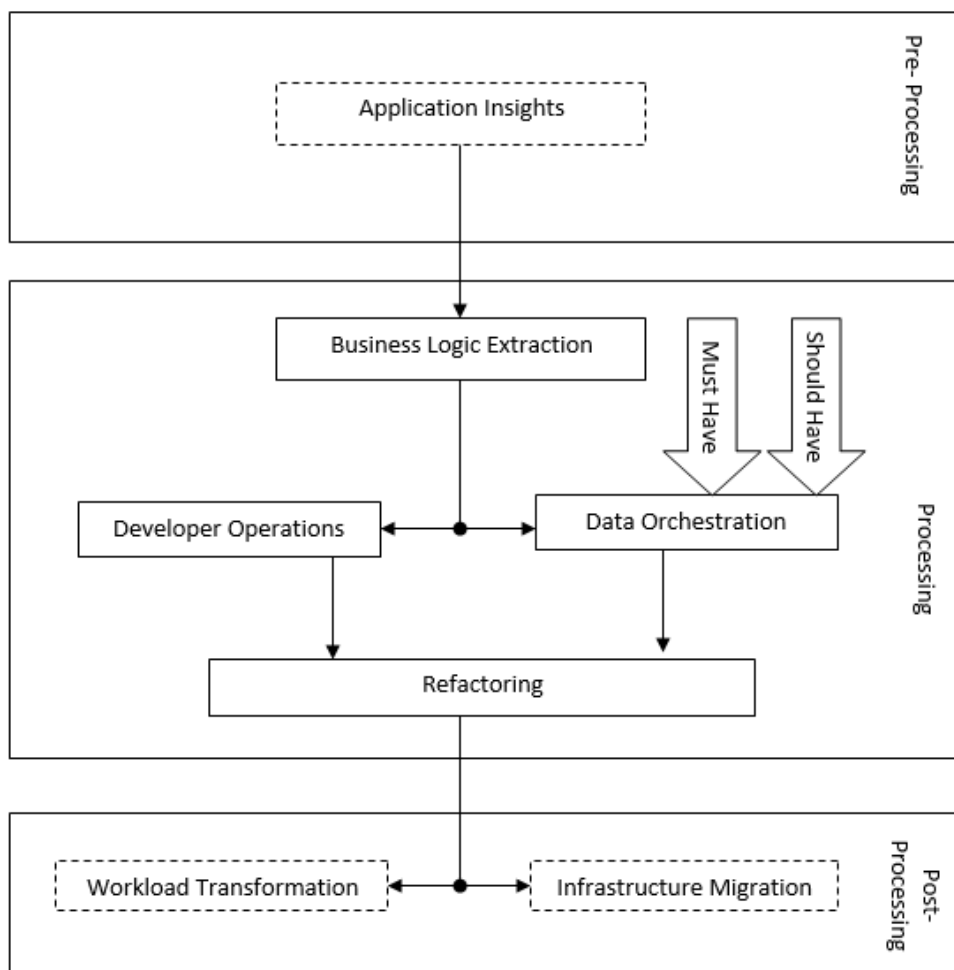


Figure 5-3 Framework for SME modernization

Improve Modifiability has been skipped in the suggested structure, and two data prioritizations have been added to the Data Orchestration stage. According to the empirical study (interview) of several SMEs' digitization and digitalization, they prefer to keep migration costs low. The study's findings led to the proposed framework.

The principal goal of this thesis was to figure out how should SME deal with the backlog data during digitalization or digitization. Managing backlog is always important, it occurs several issues, and data misalignment is one of them (interview 1). There should have proper guidance for the migration and the technical person should have a business logic idea because business is not for software, but the software is for business (interview 3). The modernized framework that is mentioned in the thesis was to guide the migration process of a legacy system. The framework's usefulness has been confirmed by interviews with SMEs with minor changes except in the case of digitization. The focus of the framework is to deliver a plan for migration to a new system with optimal cost (Fanelli et al., 2016). The framework was developed without considering the size of the organization and the location but in the case of SMEs in developing countries, the described changes were noticed.

5.4. Business Logic

The framework (Figure 5-3) suggests that the business logic should be identified and separated from the legacy code and data orchestration. To do that, it is suggested to make some non-destructive edits in legacy code that will map to business requirements. The figure (Figure 3-2) shows how the data orchestration should be used after business logic extraction. It also shows that the modernization of a legacy application consists of both modernized applications and legacy applications. Program and record orchestration: the input-output logic, record augmentation, and data validation routines that prepare the data for processing are the primary responsibilities of what remains in the original source when the business logic has been extracted from the legacy program module implementation. But from the interview of several SMEs in Bangladesh, it is noticed that the code and the legacy data are barely touched for the business logic extraction rather they rely on SME owners for the details. In one of the interviews, the concern about digitalization said that “initially, we investigate the old system to get an idea about what the functionality and facilities are providing and to do that we don't have to go into the depth of codes” (Interview 1). The old data are only used to get the database structure and the fields that are required in the new systems (Interview 5). The business logic is always provided by the SME owners

(Interview 2, Interview 3), and sometimes it happens that the old system functions completely need to be redesigned to match the owner given business logic (Interview 3). The interview reflects that during the migration the concerned of migration, tend to skip the business logic extraction from the legacy system rather they rely on the business owner's description.

5.5. Legacy Data or Backlog

Returning to the research question, how should SMEs in Developing Countries deal with data backlog during digitalization, digitization, or digital transformation, to find the answer to the question the framework was not enough. The theoretical framework (Figure 3-1) didn't suggest the amount of data that need to be processed during the migration. The data in the old system are essential for business logic extraction, input-output logic, and data validation (Fanelli et al., 2016). The test-driven development is suggested in the theoretical framework (Figure 3-1) where legacy systems with old data and new systems with access to legacy system data will work simultaneously. But the interview indicates that the SMEs don't process all the data during the migration. Processing all data during migration is time-consuming and costly (Interview 6) so they process certain data that is mandatory for the new system to be in operation (Interview 5). To select the data that need to be processed during migration the prioritization method MoSCoW has been introduced. This method assigns a priority to each requirement and includes a wish-list container that aids in the recognition of data that has been reviewed and expressly delayed or refused. This method clearly explains the decisions made and helps the team to concentrate on the "must-haves." From the interview, it is noticed that SMEs are always focusing on the data that is mandatory to run the operation, for example, customer information, stock, or product information (Interview 5). During the migration, the information about stock, products, and customers is transferred with the help of a script (Interview 6). With the definition of the category of MoSCoW prioritization, the interview reflects the example of the Must-Have prioritization category. Although some SMEs afford some additional data that will help the modernized system put in operation (Interview 4). The data that is put in the second prioritization category can be exemplified in the "Should-Have" prioritization category, which indicates that if the data can process during migration, it will minimize the time to put the new system in operation other than that must manage on a different way (Interview 1).

6. Discussion

Now back to the research question, how should SMEs in Developing Countries deal with data backlog during digitalization, digitization, or digital transformation, and it can be answered by the proposed framework (Figure 5-3). The proposed framework is divided into the same three-phase as mentioned in theoretical considerations (Figure 3-1) that is Pre-Processing, Processing, and Post-Processing. But the proposed framework's "Pre-Processing" phase has only one step, and that is "Application Insights". In this step to gain the requirement and functionality of the legacy system only the high-level view is analyzed (Interview 1). To separate the business logic the codes of the legacy system are barely touched (Interview 1) but rely on the in-depth details from SME owners (Interview 2, Interview 3). Although the framework mentioned in theoretical considerations (Figure 3-1) proposed to have non-destructive edit to map business requirements but in the case of SMEs it is completely ignored due to a lack of knowledge of the legacy system (Interview 1).

The following phase "Processing" in the suggested framework (Figure 5-3) starts with the step "Business Logic Extraction" which is used to map the discussion with SME owners and the legacy system functionality. Next, the steps "Developer Operation", require the use of a test-driven development technique during business logic extraction. This initiates a culture shift inside the firm to adopt agile development and project management practices, in addition to greater code confidence (Fanelli et al., 2016). Developer operations improve development productivity, reduce change time to market, and produce more accurate project estimates and projections over time (Fanelli et al., 2016). To continue, during the legacy system migration, the data are always considered to complete shift to the modernized system (Brodie & Stonebraker, 1995; Fanelli et al., 2016; Junction Solutions, 2012; Warren & Ransom, 2002). But due to the limitation of resources of SMEs (Levy & Powell, 1998), it is not possible to process all the data (Interview 6). The step "Data Orchestration" from the suggested framework (Figure 5-3) proposed to focus on two prioritization categories from the MoSCoW prioritization technic (Brennan, 2009). The data which is mandatory to put the modernized system online is categorized as a "Must-Have" (Brennan, 2009) which is always suggested to process (Interview 5). Again, the data that reduces the time to put the modernized system online are categorized as "Should-Have" (Brennan, 2009) and suggested on the second priority list to process if possible (Interview 1). The data that is in the category of "Should-Have" (Brennan, 2009) also can be managed in a different way (Interview 1). The final step in the "Processing" is to rework the new program implementation to follow well-known design patterns,

best practices, and style guidelines, resulting in improved readability and maintenance, as well as a simpler program design (Fanelli et al., 2016).

Finally, the Post-Processing phase includes any future end states for broader transformations, such as information systems and hardware infrastructure (Fanelli et al., 2016). To save cost and resources, this infrastructure migration and workload transformation will be done to an off-premises cloud infrastructure rather than an on-premises infrastructure (Interview 1, Interview 2, Interview 4).

To conclude, the answer to the research question “How should SMEs in Developing Countries deal with data backlog during digitalization, digitization, or digital transformation?” is described through the suggested framework. The suggested framework is designed on the basis of empirical study (Interviews) and previous works (related literature) are reviewed. The framework advises only dealing with the data backlog during digitalization, digitization, or digital transformation, which may be classified as "Must-Have" and "Should-Have" categories (Brennan, 2009) according to the MoSCoW priority technique. The suggestion comes in consideration of SMEs limited resources and reducing operation and maintenance costs.

7. Conclusion and Future Research

Many digital transformation projects fail. Regardless of the extent and depth of digitalization, the complexity of new technology, as well as the problems and opportunities it presents to businesses, necessitate a coordinated approach (Feichtinger, 2018). The goal of this thesis is to show small businesses how to deal with data backlogs during digitization, digitalization, and digital transformation. The investment and the size of the organization in terms of employees are very limited (Bangladesh Bank, 2008) and in this limited resource managing current operations as well as transferring to digitalization is always a challenge (Levy & Powell, 1998).

In recent years, consulting firms have mostly established digital strategy frameworks as a means of dealing with their clients' difficulties (Feichtinger, 2018). The thesis approach with a similar method which is gathering expert experience to test a framework that works in the case of SMEs in developing countries. Along with testifying the framework in the SMEs scenario it also tried to figure out how they deal with backlog during the migration. It has suggested a few minor changes in the framework in case it is applied to SMEs in developing countries. In addition, the suggested

framework also advised SMEs on "how to deal with the data backlog", processing just the data that can be classified as "Must-Have" or "Should-Have" using the MoSCoW prioritization technique.

Furthermore, many potential elements can be suggested along with this framework for optimal migration costs for SMEs. Future research can suggest a more efficient way to deal with the backlog of legacy data by gathering more experiences and literature reviews. Companies that have gone through or are going through a digital strategy process should also be interviewed as part of an open inventive approach.

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Annexes 1: NSD Assessment

Reference number

369629

Project title

Digitalization of SME Business in Bangladesh

Data controller (institution responsible for the project)

Universitetet i Sørøst-Norge / Handelshøyskolen / Institutt for økonomi og IT

Project leader (academic employee/supervisor or PhD candidate)

Dr. Karen Stendal, Karen.Stendal@usn.no, tlf: +4731009477

Type of project

Student project, Master's thesis

Contact information, student

Mehmood Hasan, mhshaon@gmail.com, tlf: +4793980495

Project period

01.02.2022 - 30.08.2022

Assessment (1)

08.03.2022 - Assessed

ABOUT OUR ASSESSMENT Data Protection Services has an agreement with the institution where you are carrying out research or studying. As part of this agreement, we provide guidance so that the processing of personal data in your project is lawful and complies with data protection legislation. We have now assessed the planned processing of personal data. Our assessment is that the processing is lawful, so long as it is carried out as described in the Notification Form with dialogue and attachments. TYPE OF DATA AND DURATION The project will be processing general categories of personal data until the date documented in the Notification form. LEGAL BASIS The project will gain consent from data subjects to process their personal data. We find that consent will meet the necessary requirements under art. 4 (11) and 7, in that it will be a freely given, specific, informed and unambiguous statement or action, which will be documented and can be withdrawn. The legal basis for processing general categories of personal data is therefore consent given by the data subject, cf. the General Data Protection Regulation art. 6.1 a). PRINCIPLES RELATING TO PROCESSING PERSONAL DATA We find that the planned processing of personal data will be in accordance with the principles under the General Data Protection Regulation regarding: •

lawfulness, fairness and transparency (art. 5.1 a), in that data subjects will receive sufficient information about the processing and will give their consent • purpose limitation (art. 5.1 b), in that personal data will be collected for specified, explicit and legitimate purposes, and will not be processed for new, incompatible purposes • data minimisation (art. 5.1 c), in that only personal data which are adequate, relevant and necessary for the purpose of the project will be processed • storage limitation (art. 5.1 e), in that personal data will not be stored for longer than is necessary to fulfil the project's purpose

THE RIGHTS OF DATA SUBJECTS As long as the data subjects can be identified in the data material, they will have the following rights: access (art. 15), rectification (art. 16), erasure (art. 17), restriction of processing (art. 18), data portability (art. 20). We find that the information that will be given to data subjects about the processing of their personal data will meet the legal requirements for form and content, cf. art. 12.1 and art. 13. We remind you that if a data subject contacts you about their rights, the data controller has a duty to reply within a month.

FOLLOW YOUR INSTITUTION'S GUIDELINES We presuppose that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data. Zoom is a data processor for the project. We presuppose that the processing of personal data by a data processor meets the requirements under the General Data Protection Regulation arts. 28 and 29. To ensure that these requirements are met you must follow your institution's internal guidelines and/or consult with your institution (i.e. the institution responsible for the project).

NOTIFY CHANGES If you intend to make changes to the processing of personal data in this project it may be necessary to notify us. This is done by updating the Notification Form. On our website we explain which changes must be notified:
<https://www.nsd.no/en/data-protection-services/notification-form-for-personal-data/notify-changes-in-the-notification-form> Wait until you receive an answer from us before you carry out the changes.

FOLLOW-UP OF THE PROJECT We will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded. Good luck with the project!

Annexes 2: Interview Guide

Interviewing the SMEs in the Bangladesh who were transformed into digital or in the process of transformation into digital

Introduction

- Information about the research project
- Information about the rights of the participants, including the privacy rights
- Information about the way data is being stored
- Information about the recording
- Start recording

Company and the interviewee information:

- Company Name?
- Company Type - Technical / Non-Technica
- Company Product?
- Target Customer?
- Number of employees?
- Location?
- Interviewee position in the company?
- Who is the responsible for the digital transformation?
- What is the management structures & hierarchy?

Information related to Digital transformation:

- What is the importance of digital transformation?
- Which section of your company is transforming to digital, if all what is the priority section to transformation?
- Why the above section of your company is important to be digitalized?
- What type of data/information your company have in the legacy system?
- Before digitalization how do you deal with those data?
- How the company planned to transform digitalize, explain?
- What are the challenges during the digital transformation?
- In your opinion what is data backlog? Can you exemplify the definition?
- Do you think the backlog is important during the transformation?
- How the company dealing with the backlog during the transformation?

- How do you prioritize your data backlog during the transformation?
- If you used backlog data, how do you transform the data into digital? Explain.
- Do you think the company has allocated enough budget for the transformation?
- Does company using customize technology?
- Does company focus on employee training for new technology?
- Do you think digital transformation is beneficial for the company? Why?
- Dose Digitalization reduce cost?
- Reduce operating costs?
- Increase revenue?
- Increase market share?
- Dose Digitalization reduce the time?
- Increase business speed and agility?
- Reduce the development time for new products/services?
- Dose employees are happy, or did they give any input in the digitalization transformation?
- If you want to do it all again, how would you do it?

Ending:

- Anything else to add?
- Turning off the recoding
- Again, giving information about the participant rights
- Asking if she/he has any consideration

Annexes 2: Information Letter and Consent Form

Are you interested in taking part in the research project “Digitalization of SME Business in Bangladesh”?

This is an inquiry about participation in a research project where the main purpose is to investigate how SMEs are dealing with the backlog during digital transformation. In this letter we will give you information about the purpose of the project and what your participation will involve.

Purpose of the project

We are doing this research project for my master thesis in Management information systems at the University of South-Eastern Norway (USN). Concentrating on the SMEs in developing countries as the study's case, we are interested in finding how SMEs are dealing with backlog during digital transformation.

Research Question: How should SMEs in Developing Countries deal with backlog during digital transformation?

Who is responsible for the research project?

University of South-Eastern Norway is the institution responsible for the project.

Why are you being asked to participate?

You are being asked to participate because:

- You are from Bangladesh.
- You are an employee or responsible person who is operating the digitalization of a SME
- You have opinion about the research topic.
- You might have experience within the research topic.

What does participation involve for you?

The data collected in this research project is primarily based on semi-structured interviews. There will be an education account in Zoom provided by USN as the primary software to interview and record the interview. It is totally up to you if you wanted to turn the camera on or off. You can also use an unidentifiable name while joining the interview section. You will be asked and informed when the recording starts and ends. Each interview takes a approximately 30-60 minutes. The questions are about company details, and how information about digital transformation of that

company. To explore those topics and questions from different angles, the research is interested in having an interactive interview.

Participation is voluntary

Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

From USN, my supervisor, Dr. Karen Stendal, may also have to access the data.

- Your and contact details will be replaced with a code
- The list of names, contact details, and respective codes will be stored separately from the rest of the collected data
- The data will be processed on the data controller's computer

We may use basic demographic information about the participant, such as gender, education, and age range. None of the participants will be recognizable in the project paper

What will happen to your personal data at the end of the research project?

The project is scheduled to end August 30, 2022. All recording and data, including lists and contact information, will be destroyed permanently, and only anonymized transcripts will be kept for future research.

Your rights

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and

- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent.

Based on an agreement with University of South-Eastern Norway (USN), Data Protection Services has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have questions about the project, or want to exercise your rights, contact:

- The University of South-Eastern Norway (USN) via

Mehmood Hasan by:

Email: 238843@student.usn.no

Telephone: +47 93980495

And

Dr. Karen Stendal by:

Email: Karen.Stendal@usn.no

Telephone: +47 31 00 94 77

- Our Data Protection Officer by:

Paal Are Solberg:

Email: Paal.A.Solberg@usn.no

Telephone: +47 35 57 50 53

- Data Protection Services, by email: (personverntjenester@sikt.no) or by telephone: +47 53 21 15 00.

Yours sincerely,

Dr. Karen Stendal

Project Leader

Mehmood Hasan

Student (if applicable)

(Researcher/supervisor)

Consent form

I have received and understood information about the project Digitalization of SME Business in Bangladesh and have been given the opportunity to ask questions. I give consent:

- to participate in *an* interview
- I give consent for my personal data to be processed until the end date of the project, approx. *30 August 2022*

(Signed by participant, date)