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Automation in Business Continuity

A descriptive study on the effects of automation in Business Continuity processes

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ABSTRACT (MAX. 200 WORDS):
Organizations' business processes depend on their system's proper functions. Any possible disruption due to a malfunction or a disaster could affect the company's reputation. Therefore, the firms need to prepare for these possible malfunctions to not shut down their crucial business processes by implementing business continuity. Over the years, business continuity management processes have evolved with the help of technology, and nowadays, specific phases can be executed automatically. To ensure business continuity, there are technologies that assist business continuity which are fault-tolerance, disaster recovery, disaster tolerance technologies as well as software that is a new and more advanced technology that can help with the overall business continuity management processes. This study aims to describe the effects of automation on the business continuity processes within organizations. Through a qualitative approach, several experts with the use of automation in BC processes were interviewed. The findings of this thesis indicate that there are benefits and challenges derived from the use of automation in the BC processes that are related to factors such as cost, workload, and time.

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1 Introduction

Customer expectations and needs are in high demand, and therefore, an unwanted disaster, attacks, or an extreme sanitary crisis that may result in a complete business shutdown, is an event that every company wants to avoid (Turulja & Bajgoric, 2018). Moreover, organizations' business processes depend highly on the IT system's proper function and could also significantly affect the organization if a malfunction occurs during a disaster (Winkler, Gilani, Guitman & Marshal, 2012). The firms need to prepare in advance for these kinds of disasters, otherwise, their business will shut down (Cerullo & J. Cerullo, 2006). A study by Datapro Research Company found that 43 percent of companies hit by a disaster or crisis never reopened again and that 29 percent failed within two years after the disaster, and 80 percent of all these companies lacked a business continuity plan (Cerullo & J. Cerullo, 2006). Creating a Business Continuity Plan is not a reactive approach; instead, it seeks to eliminate or reduce the impact of a disaster condition before the condition occurs (Cerullo & J. Cerullo, 2006). Business Continuity (BC) addresses those problems and aims to maintain crucial business processes in the unwanted incidents, consisting of standards, supporting policies and program development (Abdel-qader, AL-Jaber & AL-Hamami, 2011).

Business Continuity Management (BCM) aims to identify crucial business processes, services and IT resources, possible threats to the business processes, the IT services, or the systems, as well as assess and estimate possible damages or even losses that may be caused by those threats (Winkler, Gilani, Guitman, & Marshall 2012). BCM has also been recognized by ISO, where standards such as the ISO 22301: 2012, explain the requirements for creating and managing critical business functions (Sawalha, 2021). Business Continuity Planning (BCP) is the main process of BCM lifecycle and is used to generate and validate a plan for maintaining the ongoing business operations before, during, and after disasters and subversive events (Moşteanu, 2020; Supriadi & Sui Pheng, 2018). A business continuity plan is an essential part of the business plan since it assists organizations in recovering after a state of crisis and should be constantly updated (Lindströrm & Hägerfors, 2009). The BCP consists of objective and assessments setting, process identification, business impact analysis, business continuity strategies, and monitoring, testing and improving the phases mentioned above (Fani & Subriadi, 2019).

Over the years, the business continuity processes have evolved with the help of technology, and specific phases can be implemented automatically (Bajgoric & Moon, 2009). BCM capabilities and IT capabilities interact with each other to improve business performance (Bajgorić, Turulja & Alagić, 2022). Meanwhile, automation is a term for technology applications that minimize the humans' needs by having the ability to respond quickly to signals, be precise, perform repetitive tasks, store information briefly, reason deductively, and handle highly complex operations (Frohm, Lindström, Winroth, & Stahre, 2022). Automation technologies, which are classified as fault-tolerance, disaster recovery and disaster tolerance technologies can help with the business continuity of an organization (Bajgoric, 2006), while on top of that business continuity software, such as Business Continuity Management Systems (BCMS), that have features of the three technologies and is in charge with the BCM lifecycle are also being established in organizations (Aleksandrova, Aleksandrov & Vasiliev, 2018). According to Jorrigala (2017), the automation of the Business Continuity could provide many benefits regarding maintenance, testing, updating the software, consistency, and updating the plan with the latest technological changes and budget. Organizations are encouraged to invest money, time, and recourses to strengthen their BCM and take advantage of the IT capabilities, resulting in increased

organizational performance by always ensuring business (Bajgorić, Turulja & Alagić, 2022). However, these high costs and extra time might also be seen as some challenges when automation is implemented in the BC (Karim, 2011).

1.1 Research Problem

Companies take months or years to recover from the effects of disasters and sanitary crises, and in some cases, they may never open their doors again (Stanton, 2005). In order to prevent these unreversible damages, the companies follow business continuity processes that ensure the company will continue to run. However, with the COVID-19 pandemic, companies understood that they need to further consider various factors for a successful business continuity, and one of them is the automation of their business continuity processes (Siderska, 2021; Mirzazadeh, 2021). Companies have found the need to face new management, organizational, technological and financial challenges due to the online working environments, pandemic shortages and the need to reduce operational costs (Siderska, 2021). The field of information systems (IS) has revealed that technological evolution has the possibility to provide radical changes in an organization (Rogers, 2010). With that being said, there is an opportunity to learn more about the effects of automation in the business continuity processes. Many publications analyze the importance of having systematic business continuity and the effects that the business continuity plan can have on the organization during a time of crisis (Karim, 2011). However, there is not enough literature that talks about the automation in the business continuity processes (Siderska, 2021). Siderska (2021) states that many authors express that the world is seeing the effects of automation technologies, but they do not explain in detail what these effects are.

1.2 Research Question

To be able to provide a description of the effects derived from the automation in the business continuity processes within organizations, always in comparison with manual business continuity, this study aims to answer the following research question:

What are the effects of the use of automation in business continuity (BC) processes of organizations?

1.3 Research Purpose

Automation is a technology field that can have a significant impact on businesses processes. For this reason, the purpose of this thesis is to describe the effects derived from the use of automation in the business continuity processes of organizations. Given the research gap that can be found on the topic, the thesis will contribute to the literature by describing the effect of the use of automation in the BC processes.

1.4 Delimitations

When implementing BC, four main components are considered: Policies, which set out the organization's aims, principles and approach to what the organization aims to achieve and deliver; People which should define the roles and responsibilities of the employees involved; Processes which are a set of activities that define the deliverables; and Infrastructure, which should consist of technology, equipment and physical activities to respond to risks (SPRING, 2018; Supriadi & Sui Pheng, 2018). Therefore, in our research we will investigate the effects of automation in BC processes related to people, processes and infrastructure components.

However, in this thesis the policies required for implementing BC will not be investigated, such as ISO 22301, which started in 2012 (Kim & Amran, 2018). More specifically, according to Sawalha (2021), ISO 22301: 2012 is based on "normal operations" against "downtime" concepts of essential business operations. Even though ISO contributes to measuring the effectiveness of an organization's BCM program (Estall, 2012), this research will not focus on analyzing whether or not organizations comply with the ISO and the effects of automation in BC processes related to the implementation or lack of the ISO.

2 Literature Review

2.1 Business Continuity

2.1.1 Business Continuity Management

Since the 1970s, business continuity management (BCM) was evolved, which is a form of crisis management in response to the different risks that may threaten the process of an organization (Margherita & Heikkilä, 2021). According to Supriadi and Sui Pheng (2018), BCM is an evolution of the disaster recovery approach, and its roots lie in Information Systems (IS) protection. Nowadays, it has evolved even further and is concerned not only with technical aspects but also strategic organization requirements (Elliott, Swartz, & Herbane 2002). BCM scopes on minimizing the crisis effects, developing a realistic recovery plan, and developing a business continuity plan (BCP) to enable the organization to achieve critical business processes during an incident (O'Hehir 1999). Furthermore, based on the research literature, BCM has evolved from a simple reactive disaster recovery planning to crisis management mostly driven by information technology, and finally to a more dynamic, inclusive approach (Supriadi & Sui Pheng, 2018).

Organizations are becoming increasingly aware of the importance of taking precautionary approaches to build resilience in the continuity of their business processes against numerous events (Rezaei Soufi, Ali Tobari & Sahebjamnia, 2018). These events include natural disasters such as earthquakes and hurricanes, man-made events such as terrorism, and cyberattacks, sanitary crises such as COVID-19, market and supply chain crises (Castillo, 2005; Margherita & Heikkilä, 2021; Sáenz, Revilla & Acero, 2018). These events have a significant effect on the firm's ability to continue business processing since they may prevent an entire organization from functioning as intended or causes damage to people or facilities, such as destroying the entire facility or bringing all computing capabilities into the company down (Strause, 2008). Moreover, given the high customer expectations in todays' market, modern businesses have become dependent on their information systems (IS) whose incidents and failures can greatly affect their business operations (Turulja & Bajgoric, 2018). Therefore, experience has shown that ensuring continuity in IS and providing effective disaster response plans can help organizations maintain their reputation, ensure continuity of their processes and be resilient (Rezaei Soufi, Ali Tobari & Sahebjamnia, 2018; Turulja & Bajgoric, 2018).

Supriadi and Sui Pheng (2018) discuss that BCM has four essential processes which are developed in an organization. Those processes are the initiation process which initiates the BCM concept in the organization, the planning of business continuity that produces the business continuity plan (BCP), the implementation of the BCP through testing and exercising, and finally, the operational management process, which maintains and updates the BCP (Supriadi & Sui Pheng, 2018).

Business Continuity Planning (BCP) is the major process of BCM. The management of BCP aims to identify and protect the critical business resources and processes and actions to ensure the organization's survival in times of disasters and crises (Supriadi & Sui Pheng, 2018). More specifically, business continuity plans have been developed to reduce the effects on the company's ability to satisfy the customers' demand in the event of unexcepted incidents (Zsidisin,

Melnyk & Ragatz, 2005). Shaw and Harrald (2004) analytically discuss that the BCP consists of business management practices that provide guidance for the decisions and the actions that are required for a business to efficiently prevent, decrease, develop, respond, restart, recover, reinstate, and transition from an event of a major crisis. Moreover, the BCP management should define the responsibilities and roles of concerned employees and stakeholders, as well as should include financial measures such as credit, savings, and insurance to finance crucial operations and restore businesses after a disaster takes place (Kato & Charoenrat, 2018). Finally, planning and executing plans are two different tasks, and therefore the company should ensure through training programs that their employees are aware of emergency and recovery processes, as well as their expected roles and responsibilities (Kato & Charoenrat, 2018).

2.1.2 Business Continuity Management lifecycle

As previously mentioned, the main business continuity processes, the initiation process, BCP, implementation of BCP, and the operational management process which maintains and updates the BCP, can be divided more thoroughly into phases, which are also referred as the BCM lifecycle (Supriadi & Sui Pheng, 2018). Yet, before analysing the processes, it is worth mentioning that there is no specific structure for the BC processes, as well as that it can be seen that small firms may not implement a detailed BC plan (Fani & Subriadi, 2019). For this reason, an explanation is provided to understand the BC processes, which can also be seen in Figure 1. (Supriadi & Sui Pheng, 2018). More specifically, in the first phase, which is the initiation of the project, researchers describe as the fundamental and important activity of this phase to be the obtainment and confirmation of the approval and support from the senior management (Supriadi & Sui Pheng, 2018). After obtaining the management approval, the business continuity management needs, such as requirements and business and technical stakeholders can be identified (Supriadi & Sui Pheng, 2018; Fani & Subriadi, 2019). Moreover, Supriadi and Sui Pheng (2018) suggest that a steering committee should be set up that consists of senior executives who have a relevant strategic view of the company's operations as well as deputies who are properly informed and have an in-depth understanding of the BCP process.

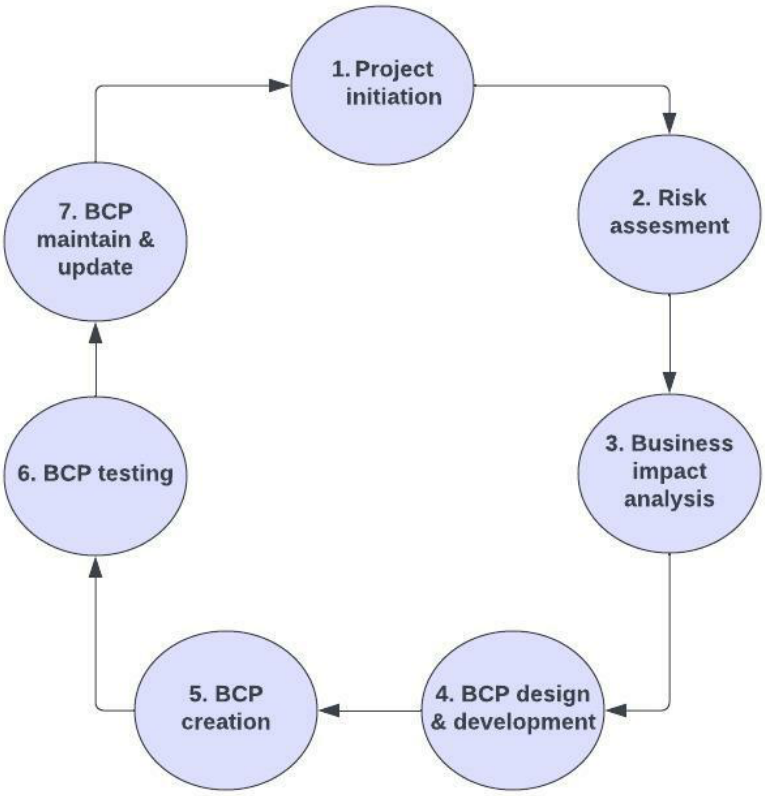

Figure 1. A representation of Business Continuity Management lifecycle (adapted from Supriadi & Sui Pheng, 2018, p. 51-52)

The following phase consists of the risk assessment (RA) and the business impact analysis (BIA). To begin with, the risk assessment is described as the process that requires the outline and form of the business risks through data gathering and risk analysis (Supriadi & Sui Pheng, 2018; Fani & Subriadi, 2019). Lam (2002) analyzes those businesses which are based on Information Technology rely in general on technology threats such as system and network failure, virus attacks, and natural disasters, information threats that may occur from hacking, fraud, natural disasters, etc. and people threats such as weather, and illness.

Having identified the risks, the business impact analysis (BIA) is proposed to be conducted, which points out the change and impact the event of an incident could have on the organization and categorize its level (Supriadi & Sui Pheng, 2018). Armstrong-Smith (2020), in his paper, describes BIA as a foundation for BCP. In this phase, the estimated recovery time objective (RTO), recovery point objective (RPO) and equipment for each key business operation and service are calculated, the cost of extended business interruption, as well as the resources required to develop, test and implement the BCP (Supriadi & Sui Pheng, 2018).

Based on the BIA results, the design and development of the BCP is suggested to start (Moore & Lakha, 2006). The major issues that can be addressed in this phase include identifying business services, identifying potential BC partners, and detailed continuity strategies in terms of cost, time, and benefits (Supriadi & Sui Pheng, 2018). When referring to business continuity strategies, activities such as preventive strategy determination, strategies for actions, recovery

strategy determination, and strategy correction are suggested to be conducted (Fani & Subriadi, 2019). Sawalha (2021) describes the continuity strategies to be developed for employees, premises (workplace as well as information locations), technology (applications, telephony, and systems), supplies (equipment and materials) as well as stakeholders (Sawalha, 2021). Moreover, an implementation plan is suggested to be produced and executed in this step, and BCP records, access, storage, and budget can be established (Supriadi & Sui Pheng, 2018).

Subsequently, the creation of BCP is proposed to be implemented, where the BC issues are being identified and documented, which could include responding to failure events, such as fire and network failures, virus management, backup and restoration of systems and business data, incident reporting, customer and staff communication, problem escalation hierarchies, and contact procedures for third-party support providers (Lam 2002; Supriadi & Sui Pheng, 2018).

Afterward, systematic testing and exercising of the BCP through simulation and rehearsal, recording of findings, documenting test results, and pointing out areas of weakness and improvement is suggested to be done and repeated until it meets the acceptance criteria, and builds confidence among people so that it reduces panic during the actual emergency (Supriadi & Sui Pheng, 2018; Fani & Subriadi, 2019). Sawalha (2021) describes BCP to be a comprehensive process that should be a part of the organization's culture, and in order for that to be achieved, training is promoted, which ensures the success of BCP and motivates the participation of people in the process.

Finally, the authors Supriadi and Sui Pheng (2018) propose the BCP to be maintained and updated by addressing the BCP review criteria and objectives, schedules and review program, and plan distribution and security. Sawalha (2021) outlines that the maintenance provides regular updates on the plans, ensures that they are consistently able to respond effectively to the dynamics of the business environment, and protects the company from having to re-develop processes each time a distraction takes place. There are two types of maintenance and updating, periodic and in-response, with the first being conducted regularly on an annual or monthly basis, while the second is conducted in response to sudden disruptions or in response to the dynamics of the business environment (Sawalha, 2021).

2.2 Automation in Business Continuity processes

2.2.1 Automation Technologies that assist BC

As explained above, business continuity is an organization’s ability to ensure essential functions during and after a crisis, collapse, catastrophe, disaster, pandemic etc. (Siderska, 2021). Automation technologies that help with the business continuity of an organization are classified into three main groups based on their purposes which are fault-tolerance, disaster recovery and disaster tolerance technologies (Bajgoric, 2006). Fault-tolerance technologies are automated technologies that have the ability of a computer system to resume operations on their own in case of hardware failures (Bajgoric, 2006). Redundant unit-based features such as power supplies, disks-RAID, network cards, routers and other communication devices fall into this category of technologies (Bajgoric, 2006). The second group consists of disaster recovery technologies which are computers/systems/operating systems and networks that have the ability to resume operations after a disaster takes place within the IT infrastructure (Bajgoric, 2006). The

operations that these kinds of technologies perform take some time before data processing takes place. The methods that the disaster recovery technologies follow are local and remote standard tape backups, hot sites, data vaulting, disaster recovery sites and so on (Bajgoric, 2006). Finally, the last group of technologies are disaster tolerance technologies that can keep a system running despite a disaster (Bajgoric, 2006).

All the above mentioned three groups of technologies are composed of different servers, server operating systems (SOS), serverWare, local storage/backups, LAN/WAN infrastructure and off-site storage/backup technologies, which are critical to successfully accomplishing business continuity (Bajgoric, 2006; Bajgoric & Moon, 2009). While not the whole process of business continuity can be automated, several steps can benefit from this automation, such as identifying business threats, conducting risk analysis, and testing business continuity planning (Bajgoric & Moon, 2009). All of these can be achieved with different kind of technologies that fall within the above-mentioned different categories such as resiliency drivers, online CPU, memory re-configuration, online I/O reconfiguration, alternate root installation, dynamic kernel patching, crash-handling techniques, workload management solutions, high-availability clustering features, support for storage scalability and symmetric multiprocessing (Bajgoric & Moon, 2009).

2.2.2 Business Continuity software

On top of these technologies, software has been implemented, that further assist the automation of the business continuity planning of different organizations. Some kind of this software programs, such as Business Continuity Management Systems (BCMS), allows companies to control, analyze and continuously improve their BCM (Aleksandrova, Aleksandrov & Vasiliev, 2018). Some examples of BCMS include the AutoBCM and CloudOak (Assent Business, 2022; CloudOak, n.d.). More specifically, these business continuity software systems assist the business continuity planning by performing the tasks such as the business impact analysis, which can help the employees identify critical processes in the organization, risk assessment, BC testing and exercising, crisis management which defines the scope of the incidents, and Emergency notification which triggers Voice/SMS/Email notification (Ascent Business, 2022). Moreover, the software programs can provide training awareness that can train the employees both on BCM Practices and AutoBCM, an audit Survey that simplifies the Audit compliance requirements, BC repository that maintains every version of BIA, BCP, RA and testing record from BC coordinator, as well as reporting and dashboard (Ascent Business, 2022). Finally, programs such as the AutoBCM can help the organization by identifying scenarios of BCP disruptions and enabling the employees to build strategies to recover, provide the MITCON tracking module that helps will help examine whether the risk-mitigating and control measures are effective, as well as help in the audit processes, and finally, they provide the Issue and Action Tracker module that collects all the testing results (Ascent Business, 2022).

In this respect, BCM software can help businesses achieve functional resilience with better readiness in all business activities, supply chains and third parties and improve the business resilience with a coordinated and flexible business recovery strategy (MetricStream, 2022). Moreover, BCM software can help businesses make better decisions with 360-degree BIA that can help prioritize important data and recovery processes and improve incident response flexibility through seamless integration with mass emergency notification systems (MetricStream, 2022). Randeree, Mahal and Narwani (2012) discuss that implementing a BCMS in an

organization can protect the organization from various subversive events by providing appropriate plans for defined critical business processes/functions precautionarily.

BC software automates manual tasks such as triggering emails, scheduling, approval processes, assignments, monitoring, follow-up and approval processes and strengthening the company's BCM program through collaboration, distributing the work, and automated workflows (Strait, 2021). Moreover, Strait (2021) discusses that BCM software can provide more accessible, more efficient, and reliable maintenance by using a relevant database and automated data uploads and integrations, as well as can assist with controls through automated review and documentation paths.

2.2.3 Level of Automation in BC processes

The above-mentioned automated processes have different levels of automation and are implemented according to the task that these systems and tools is required to perform (Parasuraman, Michael, Keryl, & Sandeep, 2007). According to Vagia, A. Transeth and A. Fjerdingen (2015), these levels of automation are divided into eight primary stages, which are analytically described in Table 1.

Table 1: Levels of automation (adapted from Vagia, A. Transeth & A. Fjerdingen, 2015, p. 196)

Level of Automation	Name	Description
Level 1	Manual control	No assistance from the computer.
Level 2	Decision proposal stage	The computer offers some decisions to the operator. The operator is responsible to decide and execute.
Level 3	Human decision select stage	The human selects the decision that the computer executes.
Level 4	Computer decision select stage	The computer selects one decision and then executes with the human approval.
Level 5	Computer execution and human information stage	The computer executes the selected decision and then informs the human.

Level 6	Computer execution and on call human information stage	The computer executes the selected decision and informs the human only if asked.
Level 7	Computer execution and voluntarily information stage	The computer executes the selected decision and informs the human only if it decides to.
Level 8	Autonomous control stage	The computer does everything without human notification, except if an error that is not into the specifications arrives. In that case the computer needs to inform the operator.

Companies and governments have implemented the automation technologies described to reduce the workload for humans, managing the organization, and ensuring business continuity (Siderska, 2021*).* Businesses are seeing the benefits of this kind of technology in their business continuity plans since they save time, maximize recourses and ensure business continuity during an unprecedented and unexpected crisis (Siderska, 2020). In consequence, automation in BC processes can minimize potential errors, improves security, and helps companies analyze their data faster (CloudOak, n.d.) A study done by Siderska (2021) shows that sixty percent of Polish companies indicate that automated tools allowed them to maintain the continuity of their business processes during the Covid-19 pandemic.

Despite the benefits that these technologies provide for businesses, they come with challenges; the two main ones are high costs, and extra time (Karim, 2011). The high costs are associated with the high cost of automated technologies that are required to be bought and implemented in the company, and the extra time is related to the necessary training that the employees have to go through to be able to use these kinds of technologies (Karim, 2011).

2.3 Summary

Chapter 2 addresses several different concepts derived from the key themes which are Business Continuity and Automation in Business Continuity processes. As a consequence, according to our literature review, we summarized our key concepts derived from our key themes, which are the Business Continuity Management, Business Continuity Management Lifecycle, Automation Technologies that assist BC, Business Continuity software, and Level of Automation in BC processes, that are relevant and important to our study (Kvale & Brinkmann, 2009). The literature overview is therefore intended to guide our research through the main concepts and their supporting literature. Moreover, the literature review will also be used as the base for designing our interview guide, which will be further analyzed in the subchapter 3.2.2.

2.3.1 Summary of Business Continuity

Business Continuity Management (BCM)

BCM is an evolution of the disaster recovery approach that focuses on minimizing the crisis effects by developing critical business continuity processes to enable the organization to achieve and provide for its client's critical business processes during an incident (Supriadi & Sui Pheng, 2018). Its roots lie in Information Systems (IS) protection, and today, it has evolved and is concerned with technical aspects as well as strategic organization requirements (Elliott, Swartz & Herbane, 2002; Supriadi & Sui Pheng, 2018)

Business Continuity Management Lifecycle
The main business continuity processes, which are also referred to as the BCM lifecycle, contain processes so that the organization can respond to risks that define the deliverables, people, and infrastructure, which should consist of technology, equipment and physical activities (Supriadi & Sui Pheng, 2018). Yet, according to the literature, there is no specific structure for the BC processes, as well as that it can be seen that small firms may not implement a detailed BC plan (Fani & Subriadi, 2019). Therefore, the BC processes, as seen in Figure 1, can include project initiation, risk assessment, business impact analysis, Business Continuity Plan (BCP) design and development, BCP creation, BCP testing, and BCP maintenance & update (Supriadi & Sui Pheng, 2018).

2.3.2 Summary of Automation in Business Continuity processes

Automation Technologies that assist BC
Automated technologies used in business continuity are classified into three main groups based on their purpose. Fault tolerance technologies have the ability of a computer system to resume operations on its own in case of hardware failures (Bajgoric, 2006). Disaster recovery technologies are computers/systems/operating systems and networks that can resume operations after a disaster within the IT infrastructure, while disaster tolerance technologies can keep a system running despite a disaster (Bajgoric, 2006).

Business Continuity software
There are several business continuity software currently existing on the market, such as the Business Continuity Management Systems (BCMS), that can give companies the chance to control, analyze and improve their BCM (Aleksandrova, Aleksandrov & Vasiliev, 2018). This software assists in different business continuity processes and is currently being established in organizations (Aleksandrova, Aleksandrov & Vasiliev, 2018).

Level of Automation in BC processes
Different levels of automation exist based on what the machine is required to perform. These levels, as seen in Table 1, are manual control, decision proposal stage, human decision select stage, computer decision select stage, computer execution and human information stage, computer execution and on-call human information stage, computer execution and voluntarily information stage, autonomous control stage (Vagia, A. Transeth & A. Fjerdingen, 2015).

3 Research Methodology

3.1 Research Strategy

This research study aims to describe the effects derived from the use of automation in the business continuity processes of organizations. For this to be achieved, we first needed to understand employees' experiences with automation in the business continuity processes, which aligns with the aim of qualitative research (Fossey et al., 2022). Because our topic presents a gap in the literature and follows a descriptive approach, a qualitative research study has been conducted (Moen & Middleton, 2015; Patton, 2015). Qualitative research allows us to present our findings as textual descriptions that illuminate the subjective meanings of the phenomena, which in our case is the experience of the companies with automation in business continuity processes (Fossey et al., 2022). Qualitative research is helping us understand the human experience (Silverman, 2020) by letting employees working with business continuity describe their point of view about the effects of automation in the company's business continuity processes. Moreover, qualitative research is appropriate since our study focuses on interviews and not numeric data (Bhattacherjee, 2012).

Moreover, according to Bhattacherjee (2012), depending on the purpose of the research, the research studies can be categorized into three different types which are exploratory, explanatory and descriptive. With that in mind, our research study focuses on providing straightforward descriptions of perceptions and experiences, and we decided to adopt a descriptive research type (Sandelowski, 2010). Our research question wants to outline the 'what' and, more specifically, aims to outline the effects of the use of automation in the BC of a company and not explain or explore those effects (Bhattacherjee, 2012).

Considering that, we decided to adopt a qualitative descriptive type since it was the most appropriate as it acknowledges the subjective nature of the research problem and the different experiences our interviewees have from the use of automation in the BC processes (Bradshaw, Atkinson & Doody, 2017). Moreover, the qualitative descriptive design can present our findings to directly reflect the terms used in our research question (Bradshaw, Atkinson & Doody, 2017).

We derived our conclusions using an interpretive approach through an examination of the field of interest (Thomas, 2010). When following an interpretive approach, we use meaning-oriented methodologies through observation instead of measurement (Thomas, 2010). Therefore, in-depth examination and observation are done through interviews in our study, and our descriptive results about the effects of automation on business continuity processes are our interpretation of the collected data. We analyzed the data collected from the interviews to build conclusions, and according to Reeves and Hedberg (2003), the interpretive paradigm stresses the need to analyze the data.

3.1.1 Literature approach

Before conducting the interviews and collecting our data, we conducted a literature review. The literature review is based on important concepts for our study, including business continuity, automation, and automation in business continuity processes. Through literature review, we

aimed to understand the meaning of these concepts as well as the literature gap in the topic through research that has previously been done in the area. We used different research engines such as Google, Google Scholar, LUBSearch, LUBCat, and SciHub. While searching online, we filtered the recourses based on their citations, year of publication, authors, journals and covered topic. Since technology is a fast-changing field, we tried to find recourses published in recent years; however, some concepts that have not changed over time have been cited from older recourses. Some of the keywords that were used during the research were: "Business continuity", "Automation", "Levels of automation", "Automation technologies", "Automation in business continuity", "Business continuity processes", "Business Continuity Management", "Business Continuity Management lifecycle", "BCMS", etc.

3.2 Data Collection

Our data collection method in our study was interviews since, in qualitative methods, one of the most appropriate methods for gathering data is interviewing (Recker, 2013). Through interviews, employees are able to point out scenarios from their point of view that their company has gone through with automation in business continuity, and they can tell information in a more detailed way (Bryman, 2016). Moreover, we aimed to conduct five interviewees due to the limited time for our research. We conducted our interviews online due to the COVID-19 pandemic and due to the long geographical distances between our interviewees. A challenge with online interviews is that it can cause the interviewer to miss essential details such as body language, and facial expressions, which can help understand the meaning behind the interviewees' words (Bryman, 2016; Gillham, 2005). According to Mero-Jaffe (2011), analyzing the previously mentioned features plays a positive role in the quality of the research study. With that in mind, to prevent this from happening, we asked our participants to conduct the interviews through video calls instead of phone calls. Moreover, Salmons (2009) suggests that conducting the interviews online allows the interviewees to be in a familiar environment for them. Therefore, although we were not able to perform the interviews in a physical environment, we can argue that this had a positive impact on our research since our interviewees were in a familiar place when they were interviewed, such as their office or home, and they felt comfortable throughout the whole process.

The conducted interviews had a semi-structured character since they have a similar form to a conversation where follow-up questions and bidirectional discussions about the topic can occur (Recker, 2013). We followed the above-mentioned approach since it encouraged a conversation between the interviewer and the interviewee and gave us the flexibility to extend our questions and get more in-depth answers from our interviewees (Recker, 2013). We prepared a list of predetermined questions, which will be further analyzed in the subchapter 3.3.2; however, the interviews followed in a conversational manner offering the participants the chance to talk about issues that they feel are important (Longhurst, 2003). More specifically, the semi-structured interviews were based on an interview outline where we had prearranged the majority of the questions. However, we still could deviate and improvise from the predefined question to ask follow-up questions when we thought it was necessary or when the interviewees said something interesting (Myers & Newman, 2007; Recker, 2013). This kind of flexibility creates a more natural conversational environment that is beneficial for us as researchers when asking delicate questions, which helps generate more comprehensive detail-rich answers (Recker, 2013).

3.2.1 Informant Selection

According to Sargeant (2012), one of the most critical tasks in qualitative research is identifying the appropriate participants who can best inform the research questions and increase understanding of the phenomenon under study. Therefore, to collect the correct data for our thesis, we chose to target people from organizations that have already implemented automation in their BC processes so that they can be able to describe their experience with that use and identify the effects it has on the business. Organizations without expertise and implementation of automated BC were not included in the scope of this study. With that being said, for the answers to be as clear and valuable as possible, we chose to interview people in direct charge of the business continuity processes, such as business continuity management consultants, lead product owners, and global business continuity program manager.

Moreover, since the purpose of the study is not to describe the effects that the use of automation in BC has only in a specific country, our selected companies were located in different countries such as Sweden, the USA, and Germany. We found the interviewees through LinkedIn and colleagues, and they were contacted via e-mail and LinkedIn messages. We explained why we contacted them, the aim of our research study, the estimated time of the interview, confidentiality information, and how the interview will be conducted. At a later time, when the participants accepted our request and were willing to be interviewed for our research study, we asked them to let us know which tool was more applicable for them to conduct the interview, as well as the date and the time that they were available for the interview. Table 2 shows a summary with details about our interviewees' position, organization, and country of employment, while Table 3 provides an overview of the interview date, the time that the interview lasted, and which tool was used for the interview. In addition, all the interviews in total lasted 193:26 minutes.

Table 2. Interviewee Details

Interviewee	Position	Organization	Country
R1	Business Continuity Management Consultant	RedCloud Consulting Inc. (Client: Expedia Group)	USA
R2	Global Business Continuity Programme Manager	SUTHERLAND GLOBAL SERVICES	EMEA
R3	Senior Manager	CPPE Inc.	Germany & Canada

R4	Lead Product Owner	Ikano Bank	Sweden
R5	Deloitte	Manager	Germany

Table 3. Interview Details

Interviewee	Interview Date	Interview Tool	Interview Time
R1	20th April 2022	Zoom	36:55 minutes
R2	21th April 2022	Zoom	35:09 minutes
R3	22th April 2022	Zoom	46:05 minutes
R4	28th April 2022	Zoom	33:32 minutes
R5	29th April 2022	Microsoft Teams	41:45 minutes

3.2.2 Interview Guide

The interview character followed a semi-structured approach, and therefore, we created an interview guide with predefined questions, which can be seen in Table 4, but we were also able to ask followed-up questions depending on the interviewee's answers. More specifically, we structured our interview guide to be with introductory questions regarding the interviewees' backgrounds so that we can be able to understand their relation to our topic. After the introductory questions, we structured the interview guide with our key questions that are connected to

our research aim and our chosen literature review, which we divided into three different parts. For further analysis, we started our key questions regarding the implementation of business continuity in the company (inspired from subchapter 2.1) followed by questions about automation in BC processes (inspired from subchapter 2.2). Moreover, it should be noted that the questions in our interview guide were not asked in the exact order they appear in the table to all our interviewees. However, they were used to ensure that we had covered all the relevant themes and that we did not miss any vital information for our research. Finally, as previously described, since we conducted semi-structured interviews, whenever the interviewee talked about an interesting topic and we wanted to learn more about it, we asked probing questions, as seen in Appendix A, B, C, D and E.

Table 4. Interview Guide

Theme	Question
Introduction	1. What is your role within the organization? 2. What does your role include? What type of tasks and responsibilities? 3. How is your role related with BC?
Business Continuity	4. What is the scope of Business Continuity within the organization? 5. How long have you been implementing BC? - Is it important for your organization and why? 6. How do you ensure the proper implementation of your BC processes? By BC processes through the literature review we came across these 7 processes: Project initiation, risk assessment, business impact analysis, BCP design and development, BCP creation, BCP testing and BCP maintaining and updating.

Automation in Business Continuity processes	7. In which BC processes do you use automation? - For how long have they been automated? 8. What level of automation are you using in your BC processes? Based on the literature review there are 8 different levels starting from manual control (L1), decision proposal stage (L2), human decision select stage (L3), computer decision select stage (L4), computer execution and human information stage (L5), computer execution and on call human information stage (L6), computer execution and voluntarily information stage (L7), and autonomous control stage (L8). - Has this level of automation changed over the years? - If yes, what has changed? 9. Do you use any BCM software? - If yes, what has its effects been? - If not, do you use any specific technology such as fault-tolerance, disaster recovery and disaster tolerance technologies? 10. Which of the automated processes of the BC has had the greatest impact on your business and how? 11. Have you experienced any disruptions that could have been prevented with the use of automation in the BC processes? 12. Have you experienced any situations that the use of automation in the BC processes helped? For example, during COVID-19. 13. Do you think automation in the BC has an impact on sustaining the company processes? 14. In general, what has worked well in using automation in BC processes and what has not?

3.3 Data Analysis Methods

3.3.1 Transcribing

According to McGrath, J. Palmgren, and Liljedahl (2019), transcription is the process of reproducing spoken words from recorded data and converting them into written form to be analyzed. Verbatim transcription is the most common form of transcription in qualitative interviews and refers to the word-for-word reproduction of verbal data, where the written words are an exact

duplication of the audio-recorded words from the interviewees, and they can include giggles, pauses, and other cues (Poland, 1995; McGrath, J. Palmgren & Liljedahl, 2019).

Moreover, our interviews were transcribed using an online tool called Otter.ai, an artificial intelligence tool that does real-time transcription. When the interviewees consented to be recorded, we started the live recording transcription, meaning that while we were conducting the interviews, Otter.ai was also transcribing and recording our interviews. Moreover, we also recorded the interviews through our phones. Therefore, the tool did a rough transcription, and afterward, we listened to the audio while reading the transcription, and we were able to correct any misinterpretations or mistakes. The emotional expressions such as laughing and pausing, which we included, were transcribed using "(!!)" and "...", respectively. Furthermore, to avoid bias during the transcribing process, after the first corrections from the one researcher, the other researcher also proofread while listening to the recorded interview to ensure all our raw data were transcribed correctly. Finally, as we have informed our participants, we sent our interviewees the transcriptions so that they could accept, remove, or make any changes to the transcript, which is known as the member checking technique (Candela, 2019). All our transcripts can be found in Appendix A, B, C, D, and E.

3.3.2 Code

Qualitative data analysis could involve a form of coding, where researchers define short tags or codes, such as individual words or short phrases, to indicate their content by grouping their gathered data into categories and examining relationships between these codes (Marathe & Toyama, 2018). We decided to code our qualitative data since according to Recker (2013) is one of the most valuable techniques for converting qualitative data into meaningful information. We decided on our codes based on the key concepts derived from the key themes of our interview guide, as seen in Table 5, which itself had the base of the literature review. These codes are based on the following concepts: business continuity management, business continuity management lifecycle, business continuity software, automation technologies, level of automation, and effects of automation in BC processes. Finally, we also created abbreviations of our names and the interviewees, as seen in table 6, to help us with the coding process.

Table 5. Code for data analysis

Concept	Aspect	Code
Business Continuity Management	Scope of BCM	SC
Business Continuity Management	Awareness	AW
Business Continuity Management lifecycle	Project Initiation	PI
Business Continuity Management lifecycle	Risk Assessment	RA

Business Continuity Management lifecycle	Business Impact Analysis	BIA
Business Continuity Management lifecycle	BCP design & development	DD
Business Continuity Management lifecycle	BCP creation	CR
Business Continuity Management lifecycle	BCP testing	TES
Automation Technologies that assist BC	Fault tolerance technologies	FTT
Automation Technologies that assist BC	Disaster recovery technologies	DRT
Automation Technologies that assist BC	Disaster tolerance technologies	DTT
Business Continuity software	Business Continuity Management software	BCS
Level of Automation in BC processes	Level 1: Manual control	L1
Level of Automation in BC processes	Level 2: Decision proposal stage	L2
Level of Automation in BC processes	Level 3: Human decision select stage	L3
Level of Automation in BC processes	Level 4: Computer decision select stage	L4
Level of Automation in BC processes	Level 5: Computer execution and human information stage	L5
Level of Automation in BC processes	Level 6: Computer execution and on call human information stage	L6
Level of Automation in BC processes	Level 7: Computer execution and voluntarily information stage	L7

Level of Automation in BC processes	Level 8: Autonomous control stage	L8
Effects of Automation in BC processes	Challenges	CH
Effects of Automation in BC processes	Benefits	B

Table 6. Abbreviation of participants

Abbreviation	Name
ET	Author Emine Tatari
DP	Author Despoina Patsavou
R1	Interviewee 1
R2	Interviewee 2
R3	Interviewee 3
R4	Interviewee 4
R5	Interviewee 5

3.4 Ethical Considerations

Information Systems research, in most instances, does not present possible harm to participants that are part of the study (Recker, 2013). Therefore, to ensure that this study follows the ethics within the IS field and does not cause any harm to the interviewees, specific rules and guidelines that are suggested by Recker (2013) have been followed throughout the process. To begin with, the interviewees have participated in the interview voluntarily, and for this reason, it was essential, according to Patton (2015), to inform them beforehand through e-mails and LinkedIn

messages about who we are, the purpose of our study, and the research procedure. We also informed our participants that they could stop the interview whenever feeling insecure or uncomfortable. Subsequently, as neutral researchers (Walsham, 2006), we made it evident to the interviewee that we had no intention to judge their responses and their actions, and we did not question any personal questions. Furthermore, since our aim was to record our interviews, we aimed for a confirmation from the interviewees to be recorded before starting the interviewing process, which is suggested by Bhattacherjee (2012).

Moreover, protecting the confidentiality of the personal data of our participants has been among our top priorities. According to Bhattacherjee (2012), when applying confidentiality, the researcher can analyze the interviewees' responses but promises not to reveal that person's identity in any paper, report, or public forum. However, we have named their position in the company so that our readers can be able to understand the participant's knowledge in the field and be aware of their intentions to provide reliable answers.

Additionally, the storage and analysis of the data that we have collected were aspects that we have extensively considered (Recker, 2013). To minimize the risk of our data being accessed by unauthorized parties, we made sure that our data were saved in a private, safe, and encrypted environment where only the two of us had access. For this reason, we stored our collected data on our personal devices. We also decided to create many backup files on our devices to avoid losing any of the collected vital information.

3.5 Scientific Quality

The scientific quality, and the credibility of the findings in qualitative research, are typically associated with aspects such as validity, credibility, and reliability, which we as researchers aim to fulfill to the greatest extent possible (Noble & Smith, 2015). For further analysis, Recker (2013) describes validity as validating whether the data that have been collected measure what the researchers aim to measure in their research papers. With that in mind, to achieve validity, the validity of our results can be ensured through credibility, also known as a truth value (internal validity), which was achieved through recognizing that there are multiple realities and therefore outlining personal experiences and views of our interviewees and presenting their opinions clearly and accurately (Noble & Smith, 2015). Moreover, we also made sure to secure our interviewees' credibility, which is obtained since all of our interviewees are experienced with automation in business continuity, which also leads to having rigorous and correct results (Seale, 1999). Through data triangulation, where we compared our interview data with published data from peer-review articles, we assisted and strengthened our findings (Recker, 2013) and through investigator triangulation we both analyzed and interpreted the data (Carter, Bryant-Lukosius, DiCenso, Blythe & Neville, 2014). Finally, we applied the member checking technique, to ensure the accuracy of the interviewees' words and give them the opportunity to confirm or deny the accuracy of the transcriptions (Candela, 2019). More specifically, after transcribing our data, we asked our participants to read, make changes, delete, or accept our findings in order to reach the conclusions we both aimed for.

Reliability is described as the means to count the degree to which a variable or set of variables is accordant with what is to be measured (Recker, 2013). Noble and Smith (2015) also describe reliability as the coherence of analytical procedures, including accounting for research methods or personal biases that may have somehow influenced the findings. Taking that into

consideration, to achieve reliability, we aimed for consistency and confirmability, which were criteria followed throughout the overall process (Noble & Smith, 2015). To achieve confirmability, we aimed for the verification by our participants to confirm that our findings are based on their narratives and words and not on the prejudices derived from us (Noble & Smith, 2015). Therefore, this also leads to achieving consistency since our results are not biased and are based on the experiences of the specialist in the field, and for this reason, potential researchers in the future that will be concerned about the topic of automation in business continuity, will reach to similar results (Noble & Smith, 2015). Finally, we aimed for authenticity since we made sure to represent different realities through interviewing people from different companies and countries and intended to help other researchers understand our studied phenomenon better and the different participants' viewpoints (Seale, 1999).

4 Findings

4.1 Business Continuity

4.1.1 Business Continuity Management

Business continuity management is handed down by business continuity specialists, as stated by R1 (1.8). R4 (4.12) explained that the tasks related to different phases of BCM are decentralized between different specialized teams that serve other functions within the organization. R4 (4.2) gives an example of what the decentralization of the tasks looks like, stating that people in development teams usually work at the application level and that people working at the infrastructure level are the ones hosting the business continuity software and making sure that the software is updated, upgraded and running all the time. However, R5 (5.12) disagrees with R4 by stating that the BC systems do not need to be running all the time but only when necessary.

R1 (1.32), R3 (3.2), and R4 (4.8, 4.50 & 4.52) stated that it is essential for BCM to ensure that the business can continue to run and can continue to give services to its clients, even during disasters, so that the organizations do not lose money, clients and their reputation. More specifically, R1 expresses:

"We were a service that couldn't close at that time. We had to be open. So basically, we were going… we were definitely going to be impacted but that, but we had to still continue to give a service." (1.32)

R4 (4.6) stated that business continuity covers several departments within an organization and that within the IT department where the interviewee works, they consider business continuity across the whole department. R4 (4.8) explained that within the IT department, business continuity is responsible for every single system that supports business processes and the products for the customers. R4 (4.15) stated that their focus of business continuity is not on projects anymore but on products, where each product has to make sure that their business continuity plan is in place. R5 (5.2) also stated that the business continuity is spread across different departments and that in the IT department, the scope of business continuity focuses on high availability and making sure that the systems will be online.

R5 (5.4) argued that business continuity serves as a strong selling point in specific offers with clients and that it provides you with the possibility to find solutions for your organization. R1 (1.32) stated that before facing some significant challenges within their business, business continuity management was done manually, and R3 (3.2) said that most of their BCM is still done manually since they are a small company. R3 (3.12 & 3.24), on top of that, also stated that they do not have any Salesforce running, but instead, they use emails, cell phones and yearly management meetings for their business continuity. R3 (3.54 & 5.56) commented that the reason for this approach is that every business has a different scope of work, and the level of tolerance from one business to the other changes. However, R3(3.10) stated that they still use back-ups as a form of automation for their business continuity which they constantly check and restore.

R1 (1.32) and R3 (3.22) both agreed that the pandemic was not a surprise for BCM since most of the organizations had considered a pandemic in their business continuity planning, and R4 (4.34 & 4.36), as well as R5 (5.56), discussed that the pandemic did not affect their systems at all. However, it did affect their business in terms of the number of customers and purchases they have had and their human recourses since people started getting sick and could not work. R4 (4.38) stated that the pandemic was not a test for business continuity management, and he went on by saying that if a war were about to happen, that would be an actual test for business continuity.

R2 (2.31 & 2.33) stated that BCM practitioners were pushing to implement work at home solutions before the pandemic since they believed it was an efficient way of working. Yet, both R2 (2.33) and R3 (3.22) said that an online working environment was not implemented before the pandemic because employees were not willing to think out of the box unless it was necessary. R3 (3.46 & 3.50) discussed that the most significant challenge with BCM has been to raise awareness within the organization about the importance of BCM, which was accordant to what R1. More specifically, R1 stated:

"The bad thing though, is that we're talking about objective public, a group of people that already know what business continuity is, and they have a level of awareness that is big. So now let's go to the other side where there are people that don't know enough about the business continuity." (1.24)

R5 (5.18 & 5.20) also agreed, and he added that awareness among the employees about business continuity is crucial since without including the people, you miss 80 % of the point. R4 (4.42) said that even though people may not be directly related to BCM, it is still essential for them to be aware of BCM. Furthermore, R1 (1.32), R2 (2.41), R3 (3.16) as well as R5 (5.56) all agreed that before COVID-19 or before a disruption that the company experienced, most the companies did not have the proper awareness of the importance of business continuity management. Moreover, they agreed that the challenges they face nowadays have helped them become more mature and evolve into learning and adapting BCM. The approach that the company where R1 (1.38) is working had taken to raise this awareness was by conducting seminars on the importance of BCM and conducting a step-by-step explanation of how it can be done. R5 (5.44) stated that his company is more direct when implementing changes within the organization and the approach that they follow is by showing the employees a clear view of all the benefits that come with the changes in the business continuity processes. R2 (2.41 & 2.47) commented that as BCM has evolved from these different challenges that organizations have faced, it will constantly continue to grow to maintain its status and life. R2 thought that this change is crucial for business continuity management not to die.

4.1.2 Business Continuity Management lifecycle

R1 (1.2) and R4 (4.12) both expressed that the business continuity processes that the company performs are risk assessment, business impact analysis, creation of strategies or attaining of plans, and testing of plans. R2 also expressed that they follow a specific business continuity management lifecycle, and more specifically, he stated:

"...all the business continuity management activities that are related to the different phases of the lifecycle, meaning business impact analysis, risk assessment, strategy, and so on." (2.4)

In contrast, R3 (3.10 & 3.22) mentioned that in the company, they do not follow a specific business continuity lifecycle but that they apply risk assessment and business impact analysis, as well as project initiation. R5, as seen in (5.8) and in the picture he shared with us during our interview, they performed a risk assessment, BIA, BCP program assessment, BC program design, IT strategy design, implementation, program validation, and resilience program management.

R2 (2.6) added that you need the right people to fully execute and complete all the phases, not to have an incomplete and inefficient outcome since phases depend on each other. R1 (1.6) and R2 (2.8 & 2.10) both agreed that the most important thing for having complete and successful business continuity processes is to be able to get the people that work within the company engaged with the business continuity processes in order to get the approval for the proper budget, which is in the initial phase. In more detail, R2 expresses:

"It is number one, let's say prerequisite, is to have a sponsorship within the executive in the senior management of the organization, otherwise we cannot proceed them, we cannot produce anything. This is I think, based on my experience during the 30 years that I have been working as a BCM practitioner, this is the top and the most important factor that drives the BCM efficiency. You need to have someone sponsoring the project, the effort in a very high level of management within...within our organization, preferably within the boardroom." (2.8)

Even though R5 (5.10) stated that all the processes are equally important, later, he added (5.12) that it is essential to be aware of the first three phases. R1 (1.6) and R2 (2.8) both continued by saying that the best way to do that is by engaging the people that are on top within the company; where these people consist of CSR, CFO and executive managers who need to be very strictly committed to having an efficient business continuity plan. R1 (1.6) also stated that after getting approval from their CSR, CFO and executive managers, business continuity specialists start with planning their business continuity processes, which need to be updated constantly, as well as that they need to sell the plan to the owner of the product and always keep them informed (1.8).

R1 stated that before COVID-19, the companies did a risk assessment. However, he continued by mentioning that after COVID-19, they took the risk assessment phase even more seriously and considered information, threats, and vulnerabilities that they had not considered before. R1 expressed in more detail how COVID-19 affected the awareness among companies by saying:

"But in the case of COVID they are not Black Swan because like I said, all the experts consider pandemic for their assessment, but nobody cared to be honest. Nobody cared about it. It is very funny, but then after everything that happened now, they say: "oh yeah, I should have listened to you." (1.32)

R1 (1.32), R3 (3.6) and R5 (5.2) agreed that nowadays, BCP also takes into consideration the human resource management as an essential part of BCP, meaning that organizations also have to consider when the employees get sick. R1 (1.12), R2 (2.29) and R3 (3.6) stated that all the different kinds of data from the human resources and clients of different departments within the organization are not integrated with the business continuity when done manually. As a result, specialists had to analyze and update this information manually and separately.

Moreover, of the tasks related to BIA that specialists conduct is calculating the number of people that could have been affected by disasters and the impact that disasters could have on organizations if their business continuity plan were not in place, as stated by R1 (1.32) as well as by R5 (5.8).

4.2 Automation in Business Continuity processes

4.2.1 Automation Technologies that assist BC

R1 (1.22) and R2 (2.27, 2.29 & 2.31) discussed that they have complementary tools that helped their organization improve communication, crisis management and employee notification. Later, R2 added that it is not right for him to divide the technologies into fault tolerance technologies, disaster recovery technologies, and disaster tolerance technologies. More specifically, he stated that:

"They are part of the same, let's say... attitude, target, whatever. So, you cannot separate them. For me it's not correct to separate them to functions. It's like seeing the tree and not the forest." (2.43)

R2 (2.29) continued to comment that those tools need to have accurate data, such as the personnel information of employees, to send an automated message when an incident happens and inform them about what needs to be done and discussed an example about the SMS old way of notification. R3 (3.62) also said that they use communication tools.

R2 (2.37) said that these complementary tools are mainly used for backups in the cloud. R4 (4.17 & 4.29) discussed that there also have other technologies that can do backups and different kinds of similar things. R5 (5.27) mentioned that he did not categorize the tools they were using. However, R5 referred to a past example (5.38), explaining that he had written a script and an email notification was sent to him in case of an event.

R3 (3.2), as a small company, discussed that they have a lot of engineering files, CAD files, Autodesk AutoCAD files, and a lot of offsite backups to store their data. He classified these technologies as disaster recovery technologies (3.16). Later on, R3 stated that they also have other kinds of technologies that serve similar purposes (3.6, 3.8, 3.14, 3.38 & 3.40), such as backup systems that google handles, Network Attached Storage NAS and Synology NAS, which are automated in Linux and automated backup to an Amazon s3 bucket. R3 (3.20) referred to an example that made them update their system, where they lost some project files from an old project, but luckily that project was not ongoing, and therefore, they did not have losses. R3 (3.10) also added that they need to ensure that their backing-up system works.

4.2.2 Business Continuity software

R1 (1.6) stated that for the business continuity software to be implemented or updated inside the company, business continuity specialists need to get the approval of executive managers of

the company. After that, R4 (4.42) agreed that it is essential that these specialists keep updating and upgrading the software constantly. R2 (2.22) discussed that the specialists that deal with the software involve IT people because to manage and administrate the software, those specialists need to know other fields, such as SQL.

R1 (1.10) and R2 (2.18) stated that they use a tool that can be applied in all of the BC phases. In agreement, R4 (4.19 & 4.23) also said that the software covers almost all of the phases of the lifecycle, and he added that most phases are done entirely automatically with the help of the system, while in some regions, it may also require the use of manual intervention (4.19). In contrast, R2 (2.18 & 2.20) mentioned that they use the BC software mainly in the initial phases of the lifecycle, such as BIA and risk assessment. R1 (1.10) also stated that they are currently applying the tool in phases of risk assessment, business impact analysis, creation of plans, and maintenance of plans. More in detail, R1 discussed:

"In our case, we just acquire a new tool for business continuity. So, the good thing is, for example, that it can be applied for all the phases of the business continuity system. However, we are still in this phase where we only using it for risk assessment, business impact analysis, creation of plans, well and the maintenance of plans. So, we're only focusing on those specific parts of the phases." (1.10)

Later, R1 (1.26) mentioned that they use automation in the business impact analysis and risk assessment processes. He also added that the software gives details to the specialists about RTOs, NTPDs, the responsible people that need to be contacted, and the steps to be taken. On the other hand, R2 (2.35) stated that automation is used in all the stages of the BCM lifecycle. R1 discussed that the new software tool they are using is the primary tool used for business continuity management, and he specifically stated:

"Let's say that that the software tool is the main tool that we use for the whole business continuity..." (1.22)

Moreover, R2 (2.14) discussed that the BC software is mainly used by big organizations, and R4 (4.50) also highlighted that smaller companies do not need to invest in the software since the consequences of closing for a couple of days are not as high as the consequences that larger companies will have. This is also reinforced by R3 (3.14), that comes from a small family business and stated that they do not use any business continuity software. However, he later (3.24) said that his organization is thinking of implementing business continuity software because he believes that it will help with risk prevention.

4.2.3 Level of Automation in BC processes

R1 stated that in the company's BC process, they are using different levels of automation. Moreover, R1 (1.16 & 1.28) and R4 (4.17) agreed that different levels of automation are used in the different phases of the BCM, and the assistance is increased when the level of automation is higher. More specifically, R1 (1.16) mentioned that they apply the computer execution and human information stage level of automation in the company's assessment phase, which is level five 'L5'. More in detail, R1 stated:

"We are getting that information we are treating the information and at the end the software is helping us in a way to make a better decision based on that. So, I definitely say like level five in that case." (1.16)

On the other side, he (1.18) revealed that in the creation of the planning phase, where the business continuity strategies are developing, they are using level three 'L3'. To further analysis, he declared they are using level three since people are still doing the strategies because they do not have a large system that can suggest the best way to create the plan. Therefore, according to R1, employees make their strategies, and the computer can provide some options. In agreement with R1, R3 also mentioned that they have computers to make suggestions for them and not make decisions for them, and for this reason, he stated that they are using level three 'L3', the human decision select stage. He specifically stated:

"So, we don't have computers making decisions for us, but we have computers that make suggestions for us." (3.12)

Contrariwise, R2 (2.24) argued that the company is using computer execution and voluntarily information stage, which is level seven 'L7', and later (2.45), he commented that the maintenance of the BCP is not being done entirely automatically, therefore not level eight 'L8'. However, R4 (4.19 & 4.23) stated that most of the phases are done entirely automatically, 'L8' with the help of the system. He expressed that:

"It doesn't require any manual intervention to to make sure that the application is recovered. So, it's... it's fully autonomous in terms of a specific region." (4.19)

However, he later added that in some regions, the system might also require manual intervention, which is 'L3' (4.19). R5 (5.16 & 5.35) said he has not yet seen a fully autonomous 'L8' system as well as that we are not in the stage where risk assessment and business impact analysis could be done without human intervention. However, he later discussed (5.48 & 5.50) that the fully autonomous stage has the potential to appear in the future.

4.3 Effects of Automation in BC processes

4.3.1 Challenges

R1 (1.24, 1.28 & 1.36), R2 (2.39 & 2.45) and R5 (5.44) agreed that there are some challenges with the software. R5 (5.44 & 5.46), R3 (3.22) and R2 (2.39) commented that one crucial challenge with business continuity is cultural change and employees not being fond of learning new tools. This statement reinforces what R1 said (1.36 & 1.38). In more detail, these challenges include explaining to the employees how the software works, why it is necessary to be implemented and creating a mature environment overall through training the employees before implementing the software.

R4 (4.46) stated that the level of automation used in business continuity software would not change in the near future because the cost increases significantly when the level of automation increases. Moreover, he added that the organizations need to find a balance between how much

risk they want to take related to the cost of the software they want to use and how much tolerance they want to have related to the software's performance. R3 (3.30, 3.32 & 3.36) that comes from a smaller company reinforced this challenge by stating that the reason that has prevented them from buying the software is the high cost that this software has since they did not want to use all the features. More specifically, he stated:

"And we don't have to pay I think the licence fee was just so high. We don't. We don't really use all the features. We don't have to pay that much." (3.30)

This statement is supported by R4 (4.46 & 4.48), who stated that the cost is an issue with smaller companies but at the same time explains that the reason that they do not increase the level of automation within the software is because of the high cost. More specifically, he discussed that:

"I would say cost is one of the main barriers for simple companies to implement this business continuity software... to implement business continuity in general. So, as a small... smaller companies would have harder time to take these measurements, as they still growing, they perhaps didn't have the right budget, they must be... most... mostly worried about getting new customers, getting new products and so on." (4.48)

R2 (2.45) argued that the challenges with the software implementation differ from one industry to the other. R1 (1.40) and R5 (5.18 & 5.52) agreed that another important challenge for business continuity specialists is related to programming the software because it could result in biases. R3 (3.30) and R5 (5.16) gave examples of how the wrong programming caused the company to lose many months of work done since an employee within the organization that they are working on accidentally deleted the wrong databases with necessary information for their organizations. R4 (4.42) also stated that the development team needs to follow specific rules within the software. Furthermore, R5 (5.54) highlighted that no matter how good the software is, companies should test their procedures since, if they do it rarely, they may face risks. R2 (2.27 & 2.29) commented that there are specific complementary notification tools that have not been affected by the COVID-19 pandemic that notify the employees when an incident that requires their attention takes place but highlighted that the company needs to consider having accurate data as well as the means of communication in the company's country, for them to work accurately.

4.3.2 Benefits

R1 (1.22) discussed that they have complementary automated tools that helped them improve communications and crisis management. R2 (2.27) also mentioned that these supportive tools had helped them notify employees of an incident that requires their attention and that this has increased their response to invoking the business continuity plans. He later (2.29 & 2.31) went into more detail about the complementary tools and how they have been used to notify people massively, where he also added that automation in these tools had not been affected by the COVID-19 pandemic. On the contrary, R2 (2.37) expressed that the companies' systems have benefited from automation since now every company can use the cloud to maintain backups. R3 (3.2, 3.16, 3.42, 3.48, 3.56 & 3.58), as a small company, discussed that the automated tools that they use have helped them secure their data for a long time as well as save money in case of an incident, and furthermore he classified these tools as disaster recovery technologies. Later on, he (3.6, 3.8, 3.14, 3.38, & 3.40) added that they also have other types of automated

technologies that ensure that everything runs appropriately within the organization. R3 (3.8, 3.12, 3.18, 3.20 & 3.22) also stated that they currently have a notification system and a backup system that Google handles.

When specialists calculate the effects of the disasters, R1 (1.32) stated that if the tasks are done manually, they can cause the organizations to lose money. Meanwhile, R4 (4.32) and R5 (5.10 & 5.28 & 5.25) stated that the software has assisted in planning, designing and implementing solutions. Moreover, R1 expressed:

"Because if we are talking about like a very advance software of artificial intelligence to say it, definitely we are going to get our jobs easier."(1.28)

R2 (2.18 & 2.20) mentioned that automation has mainly been beneficial in the initial phases of the lifecycle (BIA and risk assessment) since it helps with handling the massive amount of data that has been collected. R1 (1.16 & 1.18) discussed that the use of different levels of automation within different phases of the lifecycle had helped the specialists conduct risk assessments and build business continuity plans. Moreover, he (1.26) also mentioned that automation has been beneficial in the business impact analysis and risk assessment processes since it has assisted the specialist in gathering information more quickly and accurately. Particularly, R1 mentioned that:

"So basically, I will say the greatest impact of automation is in the gathering part of the systems... of like the business impact analysis, business continuity risk assessments. So, that is where the automated processes are more helpful because if you want to gather that information without automation, it could take months, or in this case of the company that I am working, I believe it will take a year to gather all that information. So, definitely the business continuity tool is making us gathering information more quickly, more accurate, and definitely get the results easier. That is what we want." (1.26)

R2 (2.35) commented that automation has increased efficiency and reduced the time required for each process in all of the stages of the lifecycle and not only in some of them. R4 (4.23) also discussed that the automation that takes place has helped most of the steps of the lifecycle by taking over almost all the actions. R1(1.10) stated that they have just implemented the software, and therefore they are only using it in some of the phases of the cycle. The software assists in these phases since they have the heaviest load and are the most time-consuming phases. Moreover, he also added that implementing a business continuity software might seem chaotic at first, but after being appropriately organized, it assists a lot in maintaining plans in the future.

R1 (1.12, 1.26 & 1.40) and R2 (2.14 & 2.16 & 2.27) went into more detail on how the software can assist with business continuity management by explaining that the most significant advantage of the software is collecting information quickly and accurately from different sources simultaneously and at the same time integrating many systems around the company which results in more realistic data and better indicators. R2 (2.43) stated that the software results in a complete and more efficient outcome by assisting the specialists in doing their job better. R1 (1.26) and R4 (4.40) stated that without the software, it would take months or even years to gather the necessary information required from the company, which R2 (2.37 & 2.41), R3 (3.26), R4 (4.17 & 4.42) and R5 (5.14 & 5.40) agreed with, by saying that the software is less time consuming and more efficient for the organization as well as it provides the company with a high recovery time. R2 (2.37) explained how the software provided these benefits by saying

that now the reports are not done manually anymore, and they do not use many documents. Instead, they can quickly search for the documents through the software by having a safe space where to keep them in the cloud. More specifically, R2 stated:

"Efficiency, less time consuming. Before, the whole report was done manually using a lot of documents. Now it is more quickly, you know where to search documents, you have a safe place to keep them because most of the system now are using the cloud to maintain the back-ups. So, I think that in every aspect of the mission lifecycle automated software and tools have greatly assisted the evolution of the BCM lifecycle. Increased efficiency, and as I told you, minimization of the time that was required for each of these to be executed." (2.37)

R4 (4.40) discussed that the decrease in manual processes decreases the companies' ability for human error. R2 (2.22 & 2.27) went even further and said that the software does not help only with the data but also with facilitating the management of effort, the maturity of the organization, the recovery solutions and the notifications systems. R4 (4.17 & 4.25) stated that software such as Kubernetes can even implement self-recovery, both at the application level and the infrastructure level, which will be back up and running immediately after an incident and will give resilience to recovery activities. He (4.17) added that Kubernetes software is also used to transfer all the data from one virtual machine to another if a computer goes down because of a disaster. R5 (5.12 & 5.16) also stated that they have different software, in which case one comes down, the other comes up quickly.

R1 (1.24) and R2 (2.39) expressed that the software has made the business continuity specialists' life easier since they can interact a lot less with the users and facilitate their whole effort through the software. More specifically, R1 stated:

"So, in the case of the advantages, it basically makes my life easier. I do not have to be interacting a lot with users and, you know, trying to get more realistic data." (1.24)

R5 (4.48 & 5.50) agreed that the fully autonomous tools make the life of employees easier. Moreover, he went one step further and added that in the future, robots can do the same job as employees with more accuracy and will also save money for the companies.

R1 (1.30) and R2 (2.27) also agreed that the benefits of this software could be fully seen during crisis events when every employee is in panic, but the software can keep the situation under control by giving the specialists all the details they want in real-time. R4 (4.27) and R5 (5.8) also agreed that the software is beneficial during crisis events because it provides the organization with emergency responses, high availability systems, and plans to restore the initial systems. However, R4 (4.27 & 4.19) stated that the software is more beneficial in more minor incidents than bigger ones because it automatically recovers everything without even notifying the specialists. R5 (5.38 & 5.42) went even further and stated that the software helped prevent incidents from happening, and it helps sustain standard business functionality. R5 (5.42) expressed that not using automation for these purposes is a waste of recourse. However, R2 (2.27) stated that the software could not prevent any incidents but could only assist.

All the features of the software have been helpful during the COVID-19 pandemic, according to R1 (1.34) and R4 (4.34). With the help of the software R1 (1.34), R4 (4.52) and R5(5.6) said that the company could also keep the information updated about the employees or their clients and, at the same time, generate data about the consequences of their reputation, operations,

finances and legal procedures that the company could have if they closed. By keeping the information updated about the employees, R2 (2.20) stated that the tasks could be decentralized, and responsibilities could be shared between different departments.

R4 (4.44) also stated that he did not see any disadvantages to the use of software for the different BC phases. This comment was also supported by R5, which discussed that even though the company needs to invest in an automated software, it will reduce its overall cost. More specifically, he stated:

"The tools actually can help you a lot in order to reduce your cost basically, of your your overall solution because yes, you invest in the tool but in the end if it's a lot easier to manage and if it's a lot more effective, then it means you are going to spend less on the lower high availability system. Makes sense?" (5.22)

5 Discussion

5.1 Business Continuity

5.1.1 Business Continuity Management

The importance of business continuity is discussed and is acknowledged in the literature (Rezaei Soufi, Ali Tobari & Sahebjamnia, 2018; Castillo, 2005; Margherita & Heikkilä, 2021; Sáenz, Revilla & Acero, 2018; Turulja & Bajgoric, 2018). The same goes for Business Continuity Management (BCM), which aims to help organizations achieve business processes during an incident by developing a business continuity plan (O'Hehir, 1999; Shaw & Harrald, 2004; Kato & Charoenrat, 2018). All our interviewees were accordant with the literature since they all discussed the importance of BC and BCM to ensure that the organizations can continue to give services even when a disaster occurs. R5 pointed out that different tasks are decentralized between independent specialized teams that serve other purposes within the organization. As addressed by R4 and R5, within the IT department, the scope of business continuity is focused on making sure that the systems will be online and will be able to support the products to their clients, which was also discussed by Turulja & Bajgoric (2018). R4 also added that the employees should also aim to ensure that the business continuity plan is in place, which concerns the organization's survival in times of disasters and crises, as stated by the literature. Supriadi and Sui Pheng (2018) mention that BCM has evolved through the years, which was accordant with what R2 discussed. He stated that BCM has evolved from the different challenges that the organizations have to face. He further supported that BCM will constantly continue to grow to maintain its status.

Moreover, the literature highlights that it is essential to define the responsibilities and roles of the concerned employees and stakeholders, as well as training and awareness of the recovery processes (Kato & Charoenrat, 2018). R3, R5 and R1 agreed that it is challenging to raise awareness about the importance of BCM since, in an organization, not everyone knows enough about that importance. At the same time, R4 added that even people that are not directly related to BCM need to be aware of it. Furthermore, R1, R2, R3 and R5 commented that before the COVID-19 pandemic or before a disruption that the company they are working for had experienced, they did not have the proper level of awareness of BCM. However, they added that those incidents made them more mature.

A topic not found in the literature was the implementation of the work-from-home solution for the companies to continue their processes during a sanitary crisis and support their business continuity. According to the findings from R2, before the COVID-19 pandemic, BCM partitioners were pushing through that change since they believed it would be efficient.

5.1.2 Business Continuity Management lifecycle

The literature discussed that there is no specific structure for the BC processes and that small companies may not implement a detailed BC plan (Fani & Subriadi, 2019). This is coherent

with our findings since interviewees did not follow precisely the same BC processes as each other. R1 and R4 pointed out that the BC processes consist of risk assessment, business impact analysis, creation of strategies or attaining of plans and testing of plans in their companies. The processes performed by R5 in his company were slightly different. They consisted of risk assessment, business impact analysis, BCP program assessment, BC program design, IT strategy design, implementation, program validation and resilience program management. Moreover, the literature is further supported by R3, which comes from a smaller company and explains that they do not follow a specific or detailed BC lifecycle. All the interviewees talk in detail only about the three first stages of the lifecycle: project initiation, risk assessment, and business impact analysis. As explained by R5, the reason behind this is that the most critical part of the BC lifecycle is the awareness of the three first phases of the lifecycle. However, the interviewees mentioned other stages of the lifecycle as well but without going into more detail about them.

Supriadi and Sui Pheng (2018) describe the project initiation phase of the lifecycle as the most crucial phase, where the approval from the senior management is received. R1, R2 and R5 all stated that getting people on top of the company engaged with the plan is the best way to ensure an effective business continuity plan. The interviewees discussed that this is necessary for getting the proper budget for the project as well as having strictly committed executive managers.

Risk assessment is described as the form of the business risks built through data gathering and risk analysis (Supriadi & Sui Pheng, 2018; Fani & Subriadi, 2019). In the information technology (IT) businesses, these risks consist of several threats such as system and network failures, virus attacks and natural disasters, information threats that include hacking, fraud etc and people threats that consist of illnesses or weather (Lam, 2002). R1 explained in detail why the risk assessment phase of the lifecycle is important and how most companies were not taking it that seriously until the COVID-19 pandemic happened. Furthermore, the findings indicate that he is also accordant to the literature since the interviewee stated that the risk assessment mainly consists of analyzing the organization's information, threats, and vulnerabilities. R1, R3 and R5 also acknowledge the importance of analyzing the people threats when building successful business continuity plans.

After conducting the risk assessment, business impact analysis is proposed to be conducted by the literature, where the specialists analyze the impact that an event or incident could have on the organization (Supriadi & Sui Pheng, 2018). Our findings show that our interviewees, specifically R1 and R5, agreed with the literature. More specifically, they stated that the specialists need to calculate the number of people that could have been affected by disasters and the impact that the disaster could have on organizations if their business continuity plan was not in place.

5.2 Automation in Business Continuity processes

5.2.1 Automation Technologies that assist BC

In the literature, we are presented with automation technologies classified into three main groups based on their purposes: fault-tolerance, disaster recovery, and disaster tolerance technologies (Bajgoric, 2006). R1, R2 and R3 also stated that these kinds of automation technologies are used as complementary technologies for helping with business continuity. The

interviewees also discussed that the functions of these technologies mentioned above are mainly for improved communication, crisis management and notification of employees in case of incidents. However, R2 disagreed with our literature by stating that dividing these technologies into such categories is not correct. He highlighted that this is not correct by highlighting that in this way, you cannot see the bigger picture of business continuity. In contrast, R3 classified the kind of technologies they use mainly as disaster recovery technologies.

Different examples of these technologies are presented in the literature, such as computer/systems/operating systems, local backups, off-site backups, CPU, LAN/WAN infrastructure, online I/O reconfiguration and so on (Bajgoric, 2006; Bajgoric & Moon, 2009). The most common automated technology mentioned by the interviewees that assists their business continuity was backups. R2, R3 and R4 stated that they frequently use both local and off-site backups in different states than the ones where their headquarters are present. R3, as stated in the literature, mentioned that his company also uses computers and operating systems such as LINUX to assist their business continuity. Moreover, he stated some new technologies that they use in his company that were not mentioned in the literature, such as CAD files, AutoCAD files, Network Attached Storage NAS and Synology NAS, and Amazon s3 bucket.

A new point that was not found in our literature and was made by our interviewee R2 concerns the data of the above-mentioned technologies. More specifically, he pointed out that for these automated technologies, the data that are implemented into them are of crucial importance.

5.2.2 Business Continuity software

According to the literature, software programs, such as Business Continuity Management Systems (BCMS), allow companies to control, analyze and improve their BCM through performing tasks such as the business impact analysis, risk assessment, building strategies, BC testing and exercising, and crisis management (Aleksandrova, Aleksandrov & Vasiliev, 2018; Ascent Business, 2022). R1, R2, and R4 agreed with the literature and pointed out that the BC software can be applied in the BC phases. Based on their point, R1 highlighted that the software is the primary tool used for business continuity management. However, R1 and R2 pointed out that they do not use it in all the stages of the BCP, but they are mainly using it for the initial phases of the lifecycle, such as BIA, risk assessment, and creation of plans. R1 addressed that they only apply their BC software in specific phases because it is a new tool. In contrast, R4 commented that they use it for all the BC processes.

One crucial piece of information gathered through the research was that even though the literature stated that the BCMS could provide emergency notifications that can trigger Voice, SMS, or Email notification (Ascent Business, 2022), no interviewee supported that. All of our interviewees claimed that they use complimentary tools for notifying employees in case of an emergency.

On the other hand, no literature pointed out that mainly big organizations acquire BC software. However, R2, R3 and R4 discussed that by commenting that big organization uses BC software while the small organizations may not need to invest. Yet, R3, which comes from a small company, pointed out that they are considering purchasing software since it will help with its risk prevention.

5.2.3 Level of Automation in BC processes

According to the literature, there are different levels of automation that the systems and tools require (Parasuraman, Michael, Keryl, & Sandeep, 2007; Vagia, A. Transeth & A. Fjerdingen, 2015). R1 discussed that they are using Level 5 since they are getting the information, treating that information, and the software is helping them make better decisions based on that information. R1 and R4 agreed that they are using Level 3 in specific BC phases since even though they have computers that can make suggestions, people are those that make decisions and create strategies. R4 also agreed that in specific regions, they use Level 3, but he added that most of the BC phases are done completely automatically (Level 8). On the other side, R5 stated that he has not yet seen a fully autonomous system in his experience but that it can be implemented in the future through robots. R2 also commented that the maintenance of the BCP is not done completely automatically. He stated that the company he is working with primarily uses Level 7, which is the computer execution and voluntarily information stage. With that being said, the findings indicate that different levels of automation are used in the phases of the BCM lifecycle depending on each company, as well as that the assistance can arise when the level of automation is at a higher level.

On the contrary, no interviewee mentioned that they are applying Level 2, Level 4 or Level 6 in their business continuity processes.

5.3 Effects of Automation in BC processes

5.3.1 Challenges

Karim (2011) describes how automation in business continuity can come with challenges, which was accordant to what R1, R2, R3 and R5 discussed. Karim (2011) stated that one of the main challenges of automation in business continuity is the high cost of buying and implementing automation in the company. R4 and R3 agreed that cost is an important issue when it comes to automation in BC. More specifically R3, that comes from a smaller company, expressed that they are not using a business continuity software in their company because they do not have the right budget for it and at the same time, they do not need to use all the features of these kind of software. However, he expressed that they would prefer to have this kind of software for their business continuity. R4 also reinforced what was mentioned in the literature and what R3 stated. R4 explained that automation comes with a cost that small companies cannot afford in most of the cases and the higher the level of automation that you want to use, the higher the cost of the technology will be. He also explained that the best approach to this problem would be to find a balance between the risks that the companies are willing to take and the amount of money that they are willing to pay for implementing this kind of software into their company.

Another important challenge presented in the literature was that implementing automation technologies is time consuming since the employees need to be trained in order to learn how to use this kind of technologies (Karim, 2011). This important challenge was supported by our interviewees. More in detail, R1 stated that it is important, but also time consuming, to explain to the employees how the software that is going to be implemented work and why is it necessary to be implemented. The interviewee also stated that it is necessary to create a mature environment through training the employees within the organization to be able to use the software

efficiently. R5, R3 and R2 on top of that added the fact that it takes time for the employees to adjust to cultural changes since in general they are not fond of learning new tools.

A new and important challenge that was discussed in our findings, was the importance of programming the software correctly and having accurate data. R1 and R5 agreed that this is a challenge since the wrong programming can result in biases. Furthermore, R3 and R5 also acknowledged how the wrong programming caused their company to lose many months of work. That situation is why, according to R5, companies need to constantly test their procedures to avoid these kinds of risks. Finally, R4 recognized the importance of following specific rules when employees are using the software.

5.3.2 Benefits

According to the literature, some of the benefits that automation provides are reduced workload for humans, assistance in managing the organization, and ensuring business continuity during an unexpected crisis (Siderska, 2021; Siderska, 2020). R1 and R2 mentioned how automation in the complementary tools have helped the companies they are working ensure their business continuity during crisis events by improving communication, notifying employees of an incident and managing crisis. They stated that the benefits of automation can be fully seen only during crisis events since the software helps manage the situation by keeping it under control and giving specialists real-time information. R4 and R5 also supported the literature stating that the software provides the organization with emergency responses, high availability systems and plans. R3 also agreed that these tools have helped ensure that everything within the organization runs properly. Our interviewees R1 and R2 discussed in more detail the benefits of the new automation technology that the software involves. Furthermore, they also agreed with the literature by stating that the software assists with business continuity management. Its most beneficial aspect is collecting information quickly and accurately from different recourses simultaneously. This is crucial for BCM because the software can integrate many systems around the company and get real-time data and indicators from different departments.

In accordance with the literature, R1 and R2 also discussed that automation provides reduce workload. More specifically they expressed that the software has made the business continuity specialists' life easier. Based on the findings from our interviewees, one of the factors that has caused this, has been the reduced interaction that the specialists are required to have with the users. R5 also agreed with them by stating that if fully autonomous systems were implemented, the life of employees would be much easier. Moreover, R2 also highlighted that the software does not only make the employees life easier, but it also helps the specialists do their job better by providing them with more complete and efficient outcomes. This statement was coherent with what was presented in the literature when stated that automation in BC processes minimizes potential errors (CloudOak, n.d.). This statement is also supported by R4 when he said that decreasing the manual processes decreases the companies' ability for human error.

As stated by Siderska (2020), automation saves time and maximizes resources. R1 and R2 agreed with the literature by saying that automation increases efficiency and reduces the time required for each lifecycle stage. According to both interviewees, this is the case because automation helps handle massive amounts of data collected by the company, which is very time-consuming to handle. This is also supported by CloudOak (n.d.), which explains how one of the benefits of the software is analyzing data faster. Furthermore, R1 and R4 agree with the literature, particularly with Siderska (2020) and CloudOak (n.d.), by stating that without the

software, it would take months or even years to gather the necessary information for the company. The findings indicate that this statement is further supported since R2, R3, R4 and R5 discussed that the software is less time-consuming and more efficient. R5 also made a critical comment by stating that not using software is a waste of resources which is coherent with what was said in the literature.

Furthermore, some important benefits presented in the literature are improved resilience, recovery processes, incident response and flexible recovery strategy (MetricStream, 2022). What R2 stated is coherent with the previous literature since he expressed that the software has helped with the recovery solutions. Our findings show that this statement is further supported since R4 also explained that the software they use can even implement self-recovery solutions. The coherence with the literature can also be seen when the interviewee, later on, explained even further that the software gives resilience to recovery activities.

One other benefit of automation that R2 discussed was the assistance that the software provides in task decentralization, which is also supported in the literature by Strait (2021). Moreover, another benefit highlighted by the interviewees was regarding the COVID-19 pandemic. More specifically, R1 and R4 stated that the software's features helped during the pandemic, which was accordant to Siderska (2021). At the same time, Mahal and Narwani (2012) also have discussed that the software can assist during a subversive event by providing appropriate plans.

The findings show that our interviewees were considerably accordant with the literature regarding the benefits of automation in the BC processes. However, our interviewee R4 added a specific point not found in the literature. He particularly discussed that the software is more beneficial in minor incidents than in bigger ones because it automatically recovers everything without the specialists noticing that something went wrong. In contrast, Siderka (2020) mentions that automation in BC processes improves security in the literature. Yet, this benefit regarding the security analyzed in the literature, was not discussed by any of our interviewees.

6 Conclusion

The aim of this research was to describe the effects derived from the use of automation in the business continuity (BC) processes of organizations. To achieve this, the following research question was proposed: "*What are the effects of the use of automation in business continuity (BC) processes of organizations?"*. To answer this question, we conducted a qualitative research study by interviewing five experienced employees within the field of automation in business continuity. The results of this study identify both challenges and benefits from the use of automated technologies that assist BC and software programs, such as Business Continuity Management Systems (BCMS).

Challenges related to costs, time, and technology have emerged from the research. Buying and implementing automation in the organization is a challenge that both big and small organizations need to consider. The empirical findings show that big organizations are willing to invest in BC software despite the high cost, while small organizations do not have the budget. Interestingly, employees from small organizations are also considering investing in a more advanced system, and not only in automated technologies. In addition, organizations believe that it is time-consuming to train the employees to use a new tool since employees may not be fond of learning new tools. On top of that, the results showed technological challenges, specifically related to programming the software and the accuracy of the data used by the software.

On the other hand, the empirical results show that companies can acquire several benefits from the use of automation in their business continuity through automated technologies and software systems, regarding the workload, assistance that the technologies provide, and time, resources, and solution efficiency. The interviewees pointed out that automation assists their companies through notification systems which helps them have real-time information concerning critical situations that need their fast response and collects information quickly through different resources. Additionally, the software can help with recovery solutions and helps distribute the tasks. The results indicate that software greatly reduces the employee workload and minimizes human errors. Finally, automation saves the companies vital time and minimizes their resources by increasing efficiency, handling a massive amount of data, and reducing the required time in the stages of the BCM lifecycle. Yet, it can be noted that even though during our interviews it was stated that automation can be used in all of the processes of the BCM lifecycle, the results indicate that it is mainly used in the first stages, such as the risk assessment and the business impact analysis (BIA).

In conclusion, our study and the results show that automation can assist with organizations' business continuity (BC) processes to a great extent. However, automated technologies and software systems, such as BCMS, can also provide organizations with challenges that they need to be aware of.

6.1 Future Research

Nowadays, we live in a digital world, where organizations are going towards a more automated workplace. Organizations use automated technologies to get assistance for their vital business processes, such as business continuity processes. Through our research, we found out that all

the interviewees made the same point about the importance of the data used in automated technologies and the BC software. Moreover, the interviewees also highlighted that the software should properly be programmed. Therefore, future research can focus on the effects of the use of automation in business continuity processes concerning the accuracy of the data and programming.

Appendix A - Interview 1

Organization: RedCloud Consulting Inc. (Client: Expedia Group)
Position: Business Continuity Management Consultant
Date: 2022-04-20
Interview length: 36:55 minutes
Language: English
Participants: Interviewee 1 (R1), Emine Tatari (ET), Despoina Patsavou (DP)

Row	Person	Interview Questions and Answers	Code
1.1	ET	So, firstly we would like to start with an introduction about your role within the organization that you work on.	
1.2	R1	Okay. Yeah. Well, my name is X. I have been doing business continuity for around... nine years. My role right now is basically... I'm working in a consulting firm that works in scientific peer group. So, my role right now is like Business Continuity Management Consultant. My primary activities and my roles are related to supporting all the stages of the business continuity system in Expedia Group. We are talking about risk assessment, business impact analysis, creation of strategies or attaining of plans, awareness. We are also helping the testing of some planning strategies, so right now I am like working around all the phases.	RA, BIA, CR, TES
1.3	DP	Thank you very much for the introduction. We want to begin with some general question about the business continuity. What is the scope of business continuity within your organization that you are working?	
1.4	R1	Well, in our case. We are in that stage that we're not well mature… we are in a stage that definitely we want to get to that point. The difference between this company and the company that I have been before, that I used to work is that... I have not been working even for one year in the Expedia for example, but my whole previous experience has been in the bank. So, the difference there is that we have a lot of external audits that have to achieve, some politics or ISO. We were like highly, highly audit in that business. In Expedia we don't have like a big audit like we used to have to the banks. But right now, Expedia wants to achieve this like the ISO 22301... For example, we want the certification so basically, we're going into good practice. So, what we want to do here is to basically have like a solid and mature policy of business continuity in the upcoming years. We are in that process right now; we are trying to achieve that. But basically, the companies before were stricter audit. So, they were more like, there were a lot of policies that we had to follow. Here	

		in Expedia is a little bit more freely, to be honest. Because we want this certification, 22301, we have to be you know, working on that.	
1.5	DP	Okay, thank you. How do you ensure the proper implementation of your business continuity processes? And by business continuity processes through the literature review, we came across these seven main processes: project initiation, risk assessment, business impact analysis, business continuity plan design and development, business continuity plan creation, business continuity testing and business continuity plan maintaining and updating.	
1.6	R1	I will say that the most important thing is engaging with the people that work in the company. By saying this I mean that I believe that in business continuity we have employees from the top to bottom. That means that, if you want to engage with the whole people in a company, you have to engage with the people that are on the top. So, let's say for the CSR, CFO, between all the executive managers of a company, they have to understand the importance of business continuity. Basically, that gives you like, you know, a green flag for, for business continuity to spread around the whole company and allow us and give us, let's say, let's say, power in a way that allows us to interact with different types of teams, responsible and others, and allow us, you know, to have also the budget for us to create new projects, to start those projects. So, that will be our core. So, we have to sell that idea to our executive managers based on that, then we can start everything which project witness we are required to implement for this to make our system more mature. Then we execute our risk assessment with business impact analysis and for them to be success, like I said, we need to have these teams engaged, that they understand the importance of business continuity in the company. Because something that I have seen a lot is that when doing a risk assessment or business impact analysis is basically say people are like: "Oh, this is not ever going to happen to me, no this is not for me, you are exaggerating"… But the thing is that when you finally realize that things happen you say: "Oh, I told you so." But we don't want to reach to that specific part. We want to have this implemented. So, after we have engaged the executive leaders, the system is definitely implemented, or it would be much easier to upgrade our business continuity system. Let's say this will be done in a better way.	PI, BCS
1.7	ET	So, it's safe to say that it’s really important to have the right people to have an effective BC plan. Right?	
1.8	R1	Exactly. Yes. Yeah. And the best way to make like a best business continuity plan is to have the people in charge of the	AW PI,

		processes, the owner of the products, because they are, they're the ones that saw the processes like every day. So, we need for them to own the plan, be responsible for that and create the strategies because us as business continuity specialists, basically what we're doing is like, we're like a support role. I'd say like you have to do your plan, you have to keep them updated. And that's it. But they have to buy the idea, they have to know that they are responsible, and they have to update and stuff. That's when you get the best plans, the best strategies. We will be done like that.	DD
1.9	ET	Thank you. So, we have also read that before a lot of BC processes were done manually, but now this has shifted automatically. In your company, in which BC processes do you use automation?	
1.10	R1	In our case, we just acquire a new tool for business continuity. So, the good thing is, for example, that it can be applied for all the phases of the business continuity system. However, we are still in this phase where we only using it for risk assessment, business impact analysis, creation of plans, well and the maintenance of plans. So, we're only focusing on those specific parts of the phases. Why are we focusing on that? Because that's the heavy load. Let's say the ones that take more time. Because we are talking about a company that's super big. So, the thing about this is that you are required to have like a proper, you know, process to update your business continuity plan. So, it can be chaotic at first but… if you're organized regularly, it will help a lot to maintain your plan in the future.	BCS, RA, BIA, DD, MU, B
1.11	ET	In what ways do you think that it will help? Because you mentioned that you think it will help a lot.	
1.12	R1	Sure. So, I believe that the best way that will help is basically to obtain the information. Sometimes when I got the information about business impact assessment, normally the way I do it, is basically have an interview with the other person from your team and say: "Oh, what is the impact in reputational impact? What is your operational impact? What is your financial impact?" So, did they have that information? Because sometimes they don't even know what is business continuity at all. So that happened to me a lot… So, the good thing about the tools is basically that it allows to integrate a lot of systems around the company that allowed us to get the number more easily and a more realistic one. So, we are not making a speculation, we're getting the real information that it actually helped us with our indicators at the end. So that's something that is definitely going to help and is helping the company to get you know these results.	BCS, B

1.13	ET	Thank you. We also know that automation comes in different levels. Based on our literature we came across eight different levels which are manual control (L1), decision proposal stage (L2), human decision select stage (L3), computer decision select stage (L4), computer execution and human information stage (L5), computer execution and on call human information stage (L6), computer execution and voluntarily information stage (L7), and finally autonomous control stage (L8). So, what level of automation you are currently using in your BC processes?	
1.14	R1	Yeah…	
1.15	ET	Also, in different BC processes are you using different level of automation? How does that work?	
1.16	R1	Yeah, yeah. I will say for example, in the part of the assessments, in the beginning, we are talking about computer execution and human information stage. We are getting that information we are treating the information and at the end the software is helping us in a way to make a better decision based on that. So, I definitely say like level five in that case. But for the part for the plans… Can you give me more details about the human decision select stage?	L5, RA, BCS, B
1.17	ET	Yes, the human decision select stage is that the automated device gives you some choices and the human select one of those choices.	
1.18	R1	Okay, perfect. Yeah. Then for the plans. The other strategies, we are talking about that level three. Why? Because the strategies at the end are still done by the people because we don't have a big system that says: "Oh, this is the best way to make your plan." And I know the people are still making their own strategies or plans, but the computer does give us like options. Let's say, okay, this is the approaches that you can take.	L3, DD, B
1.19	ET	Also, you mentioned that you use BC software for...	
1.20	R1	Yes, yes.	
1.21	ET	But do you only use the software, or do you have any other tools that you use for the automation of BC planning?	
1.22	R1	Well, in that case. Let's say that that the software tool is the main tool that we use for the whole business continuity system. However, we have a small set we use but they are not like the main business continuity focus. So basically, they are complementary tools that we use, yes, to help us to improve you know, crisis	BCS, FTT, DRT, DTT, B

		management, keep communications sometimes, but they are not business continuity focus.	
1.23	ET	Thank you. You also talked a little bit about how the automation with the software in BC has helped. But do you think it has only had positive effects or has it come with some disadvantages as well? How do you compare the advantages and the disadvantages, if there are any?	
1.24	R1	Sure. So, in the case of the advantages, it basically makes my life easier. I do not have to be interacting a lot with users and, you know, trying to get more realistic data. The bad thing though, is that we're talking about objective public, a group of people that already know what business continuity is, and they have a level of awareness that is big. So now let's go to the other side where there are people that don't know enough about the business continuity. They say: "What is that? Why are we doing that?" So, if we go to that part, and we're working with the tool, we have to teach them what is business continuity and why are we doing this. And still after that we have to go to the tool and then obtain information from the tool. So, the tool is a great advantage but only if we're focusing on at least a little level of maturity or awareness for business continuity. So that's the thing.	BCS, AW, B, CH
1.25	DP	That was really helpful. And then would like to ask you which of the automated processes of the business continuity has had the greatest impact on your business and how?	
1.26	R1	So basically, I will say the greatest impact of automation is in the gathering part of the systems... of like the business impact analysis, business continuity risk assessments. So, that is where the automated processes are more helpful because if you want to gather that information without automation, it could take months, or in this case of the company that I am working, I believe it will take a year to gather all that information. So, definitely the business continuity tool is making us gathering information more quickly, more accurate, and definitely get the results easier. That is what we want.	BCS, BIA, RA, B
1.27	ET	You mentioned that the different processes had some different levels of automation. Do you think that the different level of automation has something to do with the impact that the automation has on the business?	
1.28	R1	Yes, definitely. Because if we are talking about like a very advance software of artificial intelligence to say it, definitely we are going to get our jobs easier. So, but what's the thing is that every time that we have to implement like a new AI, we have to	BCS, B, CH

		understand that the ones that have to give the permission, to feed information are us or also like a subject matter expert, or like an engineer. So, for that to happen we have to still wait to make that happen, to create this you know more mature environment for this artificial intelligence. So, I will say definitely if we have like, like a more mature software, definitely that will be helpful. But I believe that for us that on the stage that we are definitely that's not going to happen. I think at least a couple of years.	
1.29	DP	Thank you very much. Have you experienced any disruption that you could have prevented with the use of automation in the business continuity processes?	
1.30	R1	Oh yeah (!!). Well, comparing with my past experience on the bank that basically we didn't have like a software there. We only had like just one stage of business continuity… I believe that when you see more, the more importance of these of these systems are basically crisis events. Because when a crisis happens, everybody's going to be around looking at each other and say: "oh, what do we do?" And the human the human being is like that, you will get desperate, you're in like, you know in a stress environment, definitely you will say you don't know exactly what you used to know at the time. And that happens in companies a lot, trust me. So, so something that definitely will help, I believe is a tool because that will give you all the details that you want in real time. They will give you the information that you require. For the process, my RTO, my ntpd, who are the responsible that I should contact for, what are the activities, tasks that we have to be involved during a crisis. So that's, that's the reason why it's important for our tools to be like into separate locations because if it's located in a data centre in the cloud, if something happened to that space you won't be able to access your tool, so you have to be also had your backup for your backup, stuff like that. So, like we say… be ready for, for the worst, but expect the best, something like that. So, something like that is that definitely I believe that crisis events are going to be the places that always will require this information.	BCS, B
1.31	DP	Such as COVID-19?	
1.32	R1	Well, COVID-19 it could apply. When it happened , I was not in Expedia but I was in a bank in Peru, something that happened during COVID basically is that, I don't know if you heard that before, that business continuity experts in all the companies… we always have to do like a risk assessment for business continuity and then you… basically is that you put at least all the possible threats or vulnerabilities and then you will define like a while and then the Impact and based on that you give like a score for the risk. So based on that you create your action items	RA, BIA, DD, SC, AW, B

		and stuff. So basically, all companies and I can assure you this have considered in their risks a pandemic. I can tell you that maybe 100%, maybe 99%. But that 1% are not good business continuity experts. But basically, I can tell you that all of them have considered pandemic, but only probably let's say 10, 15 or maximum 20 have actually done something for pandemic before COVID like a risk assessment. Now, if we see the risk assessment today, you will see the difference that this is more centrally at around 90, 95, that have something for the COVID… So basically, at that time, we didn't have aid, we did calculation by ourselves, we lost some money. So, if we close… how many people would have been affected? How many impact that will have for us? So, if we reduce the forum industry on these offices, that information is something that the bank required. Because we were a service that couldn't close at that time. We had to be open. So basically, we were going… we were definitely going to be impacted but that, but we had to still continue to give a service. So that information to gather that information, to print that information, to know that information because you have to take decision based also on data space of human resources, right. If they have an injury, if they have a health condition that could affect them, we couldn't send those people to the office. So, that information that integration with that data space and the business continuity plan was non-existence. So, we have to enter manually gather information manually update that information manually because it was not updated. So that took us like a length for work during that time. So, in case of COVID I definitely said that you got to know information. Although I believe COVID was not called to have this term called Black Swans, these events that basically are difficult to predict, that you won't predicted them, but they will happen and if they happen, they will create a great impact for you. Like for example, the towers attacks, the Brexit. So those are considered a Black Swan. But in the case of COVID they are not Black Swan because like I said, all the experts consider pandemic for their assessment, but nobody cared to be honest. Nobody cared about it. It is very funny, but then after everything that happened now, they say: "oh yeah, I should have listened to you."	
1.33	DP	Yes, that's a good point.	
1.34	R1	It happened to me I like when we wanted to buy masks…face masks. They were not many, so we managed to find some by the very high price. So, I told them: "OKAY, we have to buy this more, but we have to pay this extra." But the CEO at the time said: "No, you're exaggerating." And I said: "okay, okay, no problem." At the end when everybody was looking for that he said: "Can we find something?" But there was nothing more. But we got a leader pack for us. So, we could use that in the	BCS, B

		offices for clients. But well, before going too far, basically what I think is that definitely yes. I think that automation in Business Continuity definitely is going to help for COVID-19. It's like I said, is that event with great impact… The sector that will help basically is to keep the information updated, keep maintain this information about the connection between all data, databases like human resources, about employees, about clients also, about the impact that it will generate, if we close the store, our offices, how much impact could we have, reputation, operation, financial, legal if closed. Because as a bank, we have to be open. So, if we close what will happen to us… I think that all of this consideration will definitely make it easier. If I have the tool, I will say oh yeah, I just press like clicks and that's it and I know all that I need and I can just print them and show it to the board and say okay, these are the things we need to consider. However, because we didn't have this software to maintain the data then… it took us a while. Probably when COVID stared was basically the most stressful week I have them for work (!!).	
1.35	ET	Thank you, that was a really detailed explanation actually. Yeah, so you also said previously that automation in general has mainly helped a lot and that the main challenge has been with people that were not trained enough in the area. But do you think that has been any other challenges in implementing automation in the BC processes?	
1.36	R1	Yeah, definitely. Although, for example, you're not an expert in business continuity... let's say you do not to have a level of awareness enough and you know, and you know that you need that. Sometimes also people don't react like… they don't care much about business continuity. So that's, that's when they for example, they prefer to do their own processes. They say I will put business continuity on the back. So that's why it's important for them to know about the Business Continuity and another thing that I have to say is that basically because we are talking about technology here is also that we have people that are not very used to work with high technology, although I work in a tech company, you will you will find it very surprising that a lot of people are not very tech savvy. So, you will see that for them to use the software sometimes they say maybe I don't know how to use that. So, they will go on a training or something like that, although we were sure before launching the tools that they are basically trained. So, that happened a lot… to be honest. So that's something that I believe is a problem because for people to adapt to any technology sometimes it takes time.	AW, BCS, CH
1.37	DP	Yeah. And how do you face that when they take a few more time to adapt?	

1.38	R1	Well, we do training, however we know for sure that one training is definitely not going to teach all the employees or your key employees what they want to learn from the tools. So basically, yeah, it's like it's like a process to be honest. So, it's like a process you will teach them the basics. First, they need to know why business continuity is important, and how are they going to use this tool. Next is our indicators… RTO, TPD, RPO. What are they? Why are they important? Then, just display step by step this is that we do, how we enter this and how we get information, this is what the software is going to calculate by itself and what will give you as a result. So definitely that's something that you have to teach and to be honest… I know that for example right now, we are in a stage with Expedia where we have already started and did some assessments. And in the first one basically was like… we want to make one session and just teach them how to how to use the tool but at the end we had like three or four sessions. So that's the thing. It's like different teams are different. So basically, it will be very hard to to see who is going to be the best to you know, adapt to this way of working. But at the end the benefits are greater. So yeah, let's go with it.	AW, SC, CH
1.39	DP	That sounds good.	
1.40	R1	I think that on the time that we're living right now, automation definitely is going to be like an improvement in general in your work. I believe that we have to be careful how we do it, though. We have to be careful how we program them because sometimes there can be biases. So that's something that we have to take into consideration. That's something that we know that if we create basically our policies we have as a group, we create our policies on what is going to be the best approach for the company, then that's something that can be moved towards this software, and in the future it will improve our way that we do business continuity and through time, I am basically 100% sure that this will help us a lot, a lot a lot, to have the data, to read the data, you know, obtain all the information. And like I said, I believe it will help a lot of crises in the future.	BCS, B, CH
1.41	DP	Thank you very much.	
1.42	ET	Thank you so much. I think it was really helpful. Do you have something else that you want to add that you believe is something important?	
1.43	R1	No. I think that was it. I love business continuity. I have been doing it for many years. I entered because I wanted to make video games at first so when I discovered that there was another branch related to IT and then I learned about business continuity, I started doing that. I like sometimes to be under that	

		pressure during a crisis. But yeah, let me know if you have any questions. Please let me know, I'm here to help and I'm happy that I could help in any way.	
1.44	DP	Thank you very much.	
1.45	ET	We also would like to send you the transcribed data so that you can approve it. You can check if it's what we discussed in our interview. It's in order to fulfil our ethical requirements.	
1.46	R1	Yeah, that is okay.	
1.47	DP	Thank you very much.	
1.48	ET	Thank you. Have a nice day.	
1.49	R1	You are welcome. Have a good day. Bye.	

Appendix B - Interview 2

Organization: SUTHERLAND GLOBAL SERVICES
Position: Global Business Continuity Programme Manager
Date: 2022-04-21
Interview length: 35:09 minutes
Language: English
Participants: Interviewee 2 (R2), Emine Tatari (ET), Despoina Patsavou (DP)

Row	Person	Interview Questions and Answers	Code
2.1	ET	So, I would like to start by asking you a little bit about the role within the organization that you are working with.	
2.2	R2	Okay, let me give you an overview. Currently I'm working in an organization that has a global footprint within the BPO industry, business process outsourcing. It's called Sutherland Global Services and I'm responsible, I have a global role. I'm responsible for the business continuity management activities of my organization in the regions of EMEA, and partially for Abak, covering China, Malaysia and Philippines. I am covering about 40% of my organization footprint in the globe, and I'm responsible, let's say to manage all the business continuity management activities along with the crisis management issues.	
2.3	ET	That's good to know. Thank you. Can you also tell us a little bit about the tasks and responsibilities that the Business Continuity Management include?	
2.4	R2	Yes. Okay. First of all, I don't know whether you are familiar with the business continuity management lifecycle, you know, all the stages of the business continuity management lifecycle. Well, what is required to do in my organization, is to fully execute all the business continuity management activities that are related to the different phases of the lifecycle, meaning business impact analysis, risk assessment, strategy, and so on. This is suggested and recommended by the industries standards and the relevant ISO 22301 for business continuity management. All of these activities are conducted on annual basis.	PI, RA, BIA, DD, TES, MU
2.5	DP	Thank you very much. How do you ensure the proper implementation of these business continuity processes? Because in the literature review, we also found these specific lifecycle processes and we want to know more about that.	
2.6	R2	All the people, all the practitioners that are dealing and managing… are involved with business continuity management roles.	PI,

		They are the let's say, the gatekeepers of this lifecycle. If you cannot fully execute and complete one of the stages you cannot go the other and if you are not able to complete one of the tasks or one of the phases that means that you have incomplete outcome and due to the dependency, that existed during the phases, then that means that this lack of outcome is further, let's say moved to the another phase. And finally, you get that you won't have an empty satisfactory and incomplete and inefficient solution for your arrangement.	RA, BIA, DD, TES, MU
2.7	ET	What do you think it's important to consider before implementing the BC processes, like what does the company has to make sure that they have?	
2.8	R2	For the business continuity management discipline, it is number one, let's say prerequisite, is to have a sponsorship within the executive in the senior management of the organization, otherwise we cannot proceed them, we cannot produce anything. This is I think, based on my experience during the 30 years that I have been working as a BCM practitioner, this is the top and the most important factor that drives the BCM efficiency. You need to have someone sponsoring the project, the effort in a very high level of management within...within our organization, preferably within the boardroom. Apart from that... I think that if you have these prerequisites, you can, let's say work with any other factors that impact the outcome of this effort. But... again, this depends on the level of the maturity meaning in each organization, the industry and the driving force that let's say in... three years in an organization to implement such an effort, because it requires very strict commitment from a senior management and also requires time, effort and budget. It is not something, it's not just to produce documentation. This is the last... let's say priority list of the BCM. The documentation is something that, let's say, accompanies the whole effort, but it requires some other issues to be completed first.	PI
2.9	DP	Thank you. So is the project initiation, to take the approval of the senior manager the most important issue, right?	
2.10	R2	Yes, yes. Of course. Project initiation is for me really important.	PI
2.11	DP	Thank you. So, how long have you been implementing business continuity and why is it important for the organization?	
2.12	R2	I am working in the specific area for almost the last 20 years. I was in Greece, EMEA. In general, the last, let's say 10 years I'm involved in global roles. In the organization that I am working currently, I have been working during the last six years but before that I was working also as a freelancer working in multiple	

		countries in the Gulf region, United Arab Emirates, Saudi Arabia, also Europe and, sorry, Germany. I was about to say Deutschland (!!). So, I have been involved in numerous projects in different industries and organizations.	
2.13	ET	Thank you. During these BC processes, does the company use automation?	
2.14	R2	Let me give you… let's say an overview. Big organizations use some specific software that contained automation that exist in the market. There are specific let's say companies that provide these kinds of software because this kind of software has been involved during the last years because of the necessity to collect a huge amount of information and to keep it somewhere. That's why they have generated and have developed certain software to be used. Okay, there are, I don't know your familiarity with a specific organization to provide this kind of solution, but there are plenty similar solutions. The only thing that... the philosophy is the same, but what differs, the one from the other is the user-friendly interface, and this is critical for organizations to use, if you're using a software that is more user friendly, then it is easier to manipulate it, to manage it and the people that are using it do not complain so much (!!). Let's put it in simple words.	BCS, B
2.15	ET	You also said that this software has been used in the recent years?	
2.16	R2	No, no. More years. I have been using software for BC, for the last... I have... I think that the first time that I have used it was about 2012-2013. I used it also in the Greek market, for the Athens Stock Exchange… Let's say the pioneer for such products, it used to be SunGard. I don't know whether you have heard of this specific organization, but it was the first organization that produced this kind of software because they were very involved in the BCM and in the software and this was the first organization that produced this kind of software and I remember that I have used that during project in the Athens Stock Exchange back in 2013. That doesn't mean that in Europe, these kinds of similar software have not been used before, prior to a specific date that I mentioned. Now most of the organizations, big organizations I mean, they are using this kind of software because as I told you information that needs to be collected for BCM is huge. And you need to manage complicated things, dependencies and these kinds of things are helped very much by the software.	BCS, B
2.17	DP	You said that you need this to manage a huge amount of data. Therefore, you mostly use the software for the risk assessment or the business impact analysis.	

2.18	R2	Yes, yes for everything. Especially for the business impact analysis in the initial stages of implementing BCM programme and business impact analysis, you need to collect a huge amount of information. Mostly whatever the organization does, whether these are processes, technical details, everything and in this phase, the collection of the data is is massive. And of course, during the risk assessment and so on the software is used. Also, you need to collect data, but in the next stages when you are starting to produce the activities, strategies and the plans, then you produce by using the software. You have collected your data in the initial phases and afterwards you start producing outcomes that are facilitated by the use of software.	BIA, RA, BCS, B
2.19	ET	Except the fact that it has helped with gathering huge amount of data, do you think that the automated software has had any other effects?	
2.20	R2	Of course. In some cases, and in some organization, you can decentralize, let's say the whole level... since it is an annual and repeated effort. Then imagined that BCM practitioners especially in large organizations, employing thousands of people. They cannot, let's say do all the activities in the system, in the software that is used. So, they need to decentralize some of the activities like the business impact analysis, you assign it to a specific department, specific users, and on annual basis this is updated by the system by sorry… by the specific function, unit or user. So that's why you need to have this kind of software in order to be able to accommodate this kind of decentralization and let's say expression of the responsibilities to other functional units in order to collect the information that is required on annual basis.	BCS, BIA, B
2.21	ET	And as we previously said that this software is used for different phases of the BCM. Do you think that the different levels of automation within these phases have had a different effect? Like, do you think maybe in one phase automation is much more helpful than the other one?	
2.22	R2	I think that each phase has its own criticality and its own purpose. So of course, software helps not only to work as a depository of the collection of the data, but also to accelerate, to facilitate the management of the effort. So... I cannot distinguish let's say, separate, which face is better to use this kind of software, and which is not. I think that the software has helped a lot BCM effort and its integral part and is proving the maturity of an organization. The only thing is that... okay, it involves IT people meaning that mostly tactile practitioners are also users of the software. In most of the cases, this kind of software is managed and administrated by IT people because it requires also to have knowledge of... technical knowledge that in most cases, BCM partitioners do not	BCS, B

		have it to manage the database behind, you need to SQL, for example, knowledge and things like that. So, it is a system, like all information systems, that are used by an organization.	
2.23	DP	So, based on our literature we came across eight different levels which are manual control (L1), decision proposal stage (L2), human decision select stage (L3), computer decision select stage (L4), computer execution and human information stage (L5), computer execution and on call human information stage (L6), computer execution and voluntarily information stage (L7), and finally autonomous control stage (L8), and as I understood the automation level that you are currently using is level seven computer execution and voluntarily information, right?	
2.24	R2	Exactly, exactly. Level seven.	L7
2.25	DP	Thank you. Have you experienced any disruption that could have been prevented with the use of automation in the business continuity processes? That you haven't maybe used software...	
2.27	R2	No no. I think that the automated system it is not something that will prevent....in especially, I don't know, let's put it this way... that in the BCM industry, there is no such software that will prevent you that will prevent any incident, that will lead to the interruption of the operation. What can be done is to accelerate, to facilitate, let's say the recovery solution or to be used, there are also some certain software that are used for the notification of people. To notify employees of an incident that requires their attentions, that requires their response to invoke the business continuity plans. There are certain tools and software that do this kind of job and greatly facilitate the response during such incidents. But not to prevent.	FTT, DRT, DTT, BCS, B
2.28	DP	Thank you very much for that clarification. And these tools that you mentioned that they notify, are they also automated? Can you explain a little bit more about their level of automation that they have?	
2.29	R2	Yes, these tools are automated as well. First of all, in order for these kinds of systems to be able to operate they need to have very accurate data. It's... it's like a database for example, that contains all the personnel information of the employees. Let's say phones, for example, the most simple, easy way to communicate. So, what they do is that in case of unactivation… of an incident that leads to activate the notification process they send automated messages to the employees to notify them about what needs to be done or that happened and that something happened. In the first stages, in the early stages of this kind of system... It was used... I don't know whether you are familiar also with	FTT, DRT, DTT, CH, B

		knowledge related to communication... Telecom... telecommunication, so they were using SMS, the old way of notification. Now because of the fact that let's say technology has been involved and due to the fact that let's say technically some of the challenges that are used for this kind of communication are congested during such crises, they are using data, data channels, or even the communication can be done through the social media because based on my experience that I have worked in different regions for example, they don't take as granted the communication method that is used in Europe. Because okay, we are using our phones, but in other parts of the world, the most critical and used mean of communication is social media, and maybe messaging in Facebook, or even WhatsApp and things like that. So, this system needs also to take into consideration what is used in which area, region, and they take it into consideration when you are implementing such notification system. There are many choices... I think that, especially in the most recent years that we have a lot of crises due to the globalization, these systems have been informed greatly using different means of notifying people massively.	
2.30	ET	Also, because the pandemic happened recently, how do you think these systems have affected the organization during the pandemic?	
2.31	R2	Well, the pandemic has other side effects. I don't think that it had greatly affected or influenced the notification systems, because and especially when it comes to pandemics most of the organizations around the globe, what they have implemented as a proper solution is to... let's say (!!), identify the work at home solution as a recovery to be used. So even when this has happened, let's say that the people were not so mobile as they used to be because they were obliged to stay at their places longer than they used to do prior to the COVID 19 outbreak. Remember the lockdowns and believe me that the lockdowns in other regions were much more stricter than in Europe. It is nice to have the notification system in the actual start of a crisis, of the incident, and to communicate things during the management of the crisis, but it was not let's say affected, influenced, or helped the evolution of that systems during the COVID-19 situation.	AW, FTT, DRT, DTT, B
2.32	ET	But do you think organization were prepared? Did they have a BCM plan for the pandemic?	
2.33	R2	I think that the funny thing about this is that the BCM practitioners were pushing... before COVID-19 to apply, to implement work at home solutions and recovery system cases... I was not saying to apply, to be implemented very drastically, but nevertheless, many practitioners were asking that I'm talking about	AW

		also in my organization, when I first came with this specific organization and due to the complexity and dispersity of the organization to different countries, regions, cities and so on, the work at home solution would greatly assist my organization to work efficiently recover in any case, but due to let's say attitude thinking such solutions prior to COVID-19 will not solve problems… they were not implemented in a very drastic way. We were forced to do that. Within a night, let's say, when we saw that there was no other solution available. And I think that the only thing that the COVID-19 pandemic has helped the business world is that the practitioner needs to think out of the box when it comes to such solution, to the implementation of such solution. Because as it has proved work at home solution is a reliable solution that is used by organization and is not counterproductive as it was thought before.	
2.34	DP	Thank you. So, I want to go back a little bit with the BC lifecycle. What has worked well in using automation in this cycle and what has not?	
2.35	R2	As I told you, I think that automation and the software that it has practically helped all stages of the BCM lifecycle.	BCS, PI, RA, BIA, DD, CR, MU, TES, B
2.36	ET	In what way do think it has helped?	
2.37	R2	Efficiency, less time consuming. Before, the whole report was done manually using a lot of documents. Now it is more quickly, you know where to search documents, you have a safe place to keep them because most of the system now are using the cloud to maintain the backups. So, I think that in every aspect of the mission lifecycle automated software and tools has greatly assist the evolution of the BCM lifecycle. Increased efficiency, and as I told you, minimization of the time that was required for each of these to be executed.	BCS, FTT, DRT, DTT, PI, RA, BIA, DD, CR, MU, TES, B
2.38	DP	Thank you. Do you think all the employees that work with this automated software and tools are familiar with them? And if not, is it time consuming to get the employees to know the tool?	
2.39	R2	Listen, every tool in every organization when you ask an employee to know it, to learn about it, manage and use it. It is human	BCS,

		characteristic that let's see they are so fond of it. I think that everything that you learn in real life, no matter whether it's this within BCM or in any other discipline or in another area that aims to facilitate your business, your life, the quality of your life is good. So, I think... I put also the BCM software and documentation as part of this because not only it facilitates the whole effort for all BCM partitioners, but also facilitate and minimize the load for the employees. That means that they have better quality in their life, and in the world. So, I say that, as it happens in all systems, it's good for the people to know.	AW, CH, B
2.40	DP	Thank you so much. As you have said that you have been working many years in the BC, do you see some general automation effects that has changed over time? By this I mean the effects from year to year.	
2.41	R2	The BCM in general is a discipline like other discipline, like InfoSec and risk management, and so on, that evolves during the year. Based on the requirements, the challenges that we have during the years automation has helped us a lot to work and be more efficient. Imagine that who could have imagine that prior COVID-19, we could have lived such situation and we needed to cope and find more alternatives for our life and our world. That means that I think that the challenges that we are facing in our everyday life greatly assist us to be more mature and to evolve, to learning, adapting and BCM is one of them. As in all other phases of life, other areas, other specialization, disciplines. BCM also is involved and further matured with the help of automation by the challenges faced in our everyday life.	AW, BCS
2.42	ET	Thank you very much. You talked a little bit about the complementary technologies that you use for sending messages. We wanted to know if they are divided based on their functions. And by this I am based on the literature review that divides this kind of technologies into fault-tolerance technologies, disaster recovery and disaster tolerance technologies?	
2.43	R2	They are part of the same, let's say... attitude, target, whatever. So, you cannot separate them. For me it's not correct to separate them to functions. It's like seeing the tree and not the forest. Because I think that this kind of software implementation can assist the people to do the job better and to have one final outcome more complete and more efficient. So, I don't think that...at least for me, I wouldn't separate this kind to functions.	FTT, DRT, DTT, BCS, B
2.44	DP	Okay. Thank you. I want to ask you about the maintenance of the business continuity plan, if the software is doing it completely automatically?	

2.45	R2	No, no. Because depending on the organization, the industry, the requirements, to start working you need template. This template, the plan itself may be complying to the industry standards and to the, for example to the ISO of BCM, meaning that it needs to have certain characteristics, but keep in mind that it depends on the maturity of the organization, depends on the industry, and the specifics. So, the templates used by each organization even if they are using the same system does not mean that they are identical. There may be changes. Okay based on their industries standards, the ISO of business continuity management they have to have minimum requirements, specifics, but apart from that this is customized based on the organization industry and maturity.	DD, L8, BCS, CH
2.46	DP	Okay, thank you very much. Do you believe that on the future something will changed, I mean furthermore?	
2.47	R2	This is general. All disciplines struggled between them especially when they have close relation to each other to take over, to assure, let's say paths from the others. For example, business continuity is very closely related to InfoSec, information security, to risk management. Each of these disciplines tries to manipulate what needs to be done. For example, you may hear now, business continuity management, in a couple of years or more you will be hearing more operational resilience. That means that, as I told you, it's the role of life that everything needs to be revolved otherwise, if they remain stable, they die. So, I think that the next year this specific discipline will need to further involve in order to maintain its status and its life.	AW, SC
2.48	DP	Thank you. Thank you very much for your time.	
2.49	ET	Thank you so much. We would also like to send you the transcript after we transcript the interview so that you can approve it and you make sure that says what we have discussed here.	
2.50	R2	Okay. Sure.	
2.51	DP	Thank you very much for your time.	
2.52	ET	Thank you so much.	
2.53	R2	Wish you the best in your work life. Bye bye.	

Appendix C - Interview 3

Organization: CPPE Inc.
Position: Senior Manager
Date: 2022-04-22
Interview length: 46:05 minutes
Language: English
Participants: Interviewee 3 (R3), Emine Tatari (ET), Despoina Patsavou (DP)

Row	Person	Interview Questions and Answers	Code
3.1	ET	So, firstly, we would like to start by you explaining us a little bit about your role into the organization that you are working and also about your relation to business continuity.	
3.2	R3	Okay, okay, so business continuity is very important for us of course it's important for a lot of businesses. So, it can be manual or automated. So, my role is... how can I put this?... I started in software development, and then I moved into project management. So, from project management, I moved into business development. Essentially, I work with our engineers, I take trips to client sites. Our clients are in North Africa. Right now, I'm in Germany, and usually I'm in Toronto. So, my company does oil and gas, it is not IT path, but this is a family company. I was working in Atlanta, Georgia, for big companies. I was working for IBM, and then I started working for some start-ups. And then... our company essentially designs and builds crude oil processing systems. So, it's equipment. So, this stuff that when the crude oil comes out of the ground, it has to be cleaned up. There is sand, water and other things in it before it becomes a pure crude oil that then goes to the European refineries and becomes gasoline and other by-products. So... that's the that's the energy side. Of course... I like to call it a mom-and-pop shop. So, essentially, we have a team of 10 people in our office, in our head office in Toronto, and it's divided between engineering and admin. And so, on the engineering side, we have people who have multiple displays, you know, I've got my laptop here. I travelled back to Toronto with it, I plug it in there. So, we have a lot of big engineering files, and so their CAD files, essentially their SolidWorks files and other CAD files, Autodesk AutoCAD files so we generate a lot of big files. So, for us... sorry, I know I am all over the place. Business continuity to us revolves around the fact that if our offices burn down or if something happens, we can continue doing what we do, and possibly without the client noticing. So, our hope is that the client will not notice, and you know... If our office burns down, our data is backed up off outside. So, we have offsite backups. It's just a matter of how long will it take to replace the laptops and the servers and get back	SC, DRT, B

		up and running again? So sorry, your question was actually quite simple, but I kind of went all over the place(!!). So, my role is I'm the VP, my official title is I'm the VP of Business Development. But I prefer I prefer senior manager. I wear a lot of hats.	
3.3	ET	Okay, thank you. Maybe I missed it, but what is the name of the organization, of the company?	
3.4	R3	Oh, sure. The organization is called CPPE for short. So, it's Canadian Petroleum Processing Equipment Inc.	
3.5	DP	Thank you. Therefore, what is the scope of business continuity within your company? If you can explain it more in detail.	
3.6	R3	Yes, okay. So, the scope of business continuity in the organization, it entails a lot of manual and some automated things since our company is still small. So, you know, we have a lot of... we have people who are in charge of our business continuity and deal with our files and emails and data. So that side is easy. On the people side, because we're not a big team. We're a team of as I said again, 10 people. So, being a team of 10 people, you have to be aware of what you do, and you also have to be able to backfill one or two other people. So, I know how to do the job stuff to other people well. And so, if for some reason, COVID has been a big problem for us, so, you know, we've been working remotely, but we've had staff who've fallen to COVID like I did, I got COVID I think about a month ago, like just very mild, right? So, all of a sudden, you're out of the office for like, a couple of weeks and projects are expected to keep executing. So, on the human resources people side, we backfill people. So, the scope of our business continuity is not only on the IT side but also on the human recourses. On the data side we have systems that automatically sync up with other systems, you know, so if one goes down, I know that I can just point to another one and that one will be the mirror copy of this one. So, we have... you know, we have Windows Server, we have virtual machines... We have technologies for making sure that everything runs smoothly inside the office. We move some stuff to the cloud. We have more to move to the cloud. So, we have Network Attached Storage NAS, we have a Synology NAS. So, a Synology NAS we have one of the offices, and it's about yay big with like six drive bays, six NAS drives, and... they're so smart now like the thing is Linux, it's embedded and it automatically emails me if the drive is sick, and all I have to do is I have extra drives in there. I just say okay, well turn this one off and turn that one on and you're good to go. We have an identical unit that actually sits in my home in Toronto, so it seems stuck to that. We have an automated backup to an Amazon s3 bucket. So, the Amazon s3 bucket is my... is my like my last chance backup. So, if both	SC, DRT, B

		NAS devices fail or server fails you know the whole office burns down. Everything is sitting out in the cloud, and I believe Arizona. If that data centre burns down, then we're in trouble. So, that's that's what business continuity means to me. So, despite my scope. I tried to check a few times that our business continuity on the people side will be fairly good and that on the data side we're not going to lose stuff.	
3.7	ET	You mentioned that you get some notification on your phone if your drive is sick, can you talk a little bit more about how that works? And also, can you explain a little bit more in which BC processes do you use automation and for how long would you say that you have been using automation?	
3.8	R3	Yeah, so I get a notification that the driver is sick or something else is wrong within the system and as I said... I... I get a notification on where the problem is and how...what can I do about this problem, let's say I get some suggestions. So, let me go even further, in terms of how automation has changed over the years... so I'll give you the abstract. For example, we used to do our email...our email was hosted in house on what was it called Exchange Server. Which was not a good way to do something. So, you know, people's email sometimes wouldn't go and so I have to be the IT guy all the time. You know: "hey, why didn't my email go to, let me go check." So, we ended up outsourcing that to Google. So, we use Google workspace like you're probably doing. So, I have six companies that run under one roof. And so, I just told you about one of them. But we have six different domains. So, six different Google workspace things. I've got six different business entities with different data requirements, but they're all on that NAS and they're all in the backup online... So, I would say. It's email. So, with email we outsourced to Google. So, because we outsource to Google for our Google workspace, you know, our our Google Drive, or docs or sheets, all our emails, or engineering files, by the way, are mirrored from our NAS also to Google Drive. So, we had unlimited space on Google Drive. So, I just took 200 gigabytes of files and I pointed them to that as well.	DRT, B
3.9	ET	Thank you about the explanation. The BC processes as we have read in the literature, they are divided in seven step which are the project initiation that has to do more with taking approval from the senior managers and the risk assessment, the business impact analysis, the BC planning, design and development, BCP creation, and the BCP testing and updating. From all of these steps, where do you think that do you mostly use automation?	
3.10	R3	So, I think, I think every now and then definitely, we, we double check. So... you know, it's not enough that you're backing things	SC, DRT,

		up every now and then you have to restore so you have to make sure that your backup is actually working. And so that, to me, is the more critical part again, because we're a smaller company, we're a smaller engineering company. A lot of those processes are more for like a Microsoft, Cisco. You know, they have teams and teams that live and breathe out every day. They're pigeonholed like that's their function, that's their one function... But for us, you know, when we, when we do project execution, our engineering files, our Gantt charts are, you know, everything we go by, is split up between either the server drives that we have at work in the office that are mirrored to a bunch of different places, or Google Drive or email. So, we kind of share the responsibility, the risks with the companies that we're getting services from... So, we have we have a guaranteed uptime with that. But going back to your question, so based on your literature review I would say risk assessment... it's actually quite easy because I'm the only technical one. All of the other engineers they just do the engineering, like they're mechanical engineers, electrical, chemical. So, they rely on me to make the IT and business continuity decisions. And so far, it's worked out well. Like I give them three options. I say: "Hey, guys, what are we trying to do? Like what's, what's our need?" And I can go overkill. I can do something, moderate or I can go you know, low. And so, I'm very transparent with them and I tell them the risks. And then we find a budget we find somewhere that's like a middle ground, where we're not going to lose data and it's going to serve as well. And recently because of the pandemic like we had to buy $1,000 VPN from Texas I had before I moved to Germany, I think I had a week to ship an appliance from Texas to our office, so that we could all go remote and use VPN. So going back to your question again, I would say... it's mostly in the first steps of risk assessment and business impact analysis, with the Linux notifications as I previously mentioned and... and... back-ups. So, yeah... we don't want our business to go down (!!).	RA, BIA
3.11	DP	Yes, exactly. So, what level of automation do you use in your BC processes? Because you also previously mentioned that you get some suggestions in case of risk and then you choose from those. So, what level would you say? Based on our literature we came across eight different levels which are manual control (L1), decision proposal stage (L2), human decision select stage (L3), computer decision select stage (L4), computer execution and human information stage (L5), computer execution and on call human information stage (L6), computer execution and voluntarily information stage (L7), and finally autonomous control stage (L8).	
3.12	R3	All right... I would say level three, human decision select stage... A lot of the stuff again that we do is... like business development	L3, SC,

		is very emaily and using the phone, you know, like we don't have a Salesforce running we don't have an ERP or a CRM, although we probably should put one in place. So, it's just relationships with decision makers. And so that's how we get our projects. So, to give you an idea, we have something I think we have... We have a couple of big projects right now. And I think they arrange together they're about 50 or 60 million US dollar. And so, for a company of 10 people, you know, that's a lot of work to do. And then we have a staff of 50 to 75 technicians and engineers. Right now, we're on site. A lot of the stuff we do is construction. So, it's welding, it's installing and things like that. So, the stuff that goes from the fabrication shop to this site, so I came from a very IT background, and it's so in terms of... a lot of the stuff that we do is sitting behind the computer and using apps, right like using engineering apps and math apps to figure out things. At the end of the day, what we're protecting is the data behind that so I can buy the computers again, I can buy the licences for the apps again, but then we have to load the data back into all those. So, we don't have computers making decisions for us, but we have computers that make suggestions for us. However, I would say that the focus of our business continuity is backups. We just have to be really smart with our backups. And, again, it's our backup for email and Google Drive, which is all handled by Google. So, we have we have a higher tier that we subscribe to. And then our file server, which is backed up to an Amazon s3 bucket, and to another NAS and identical NAS with a bigger capacity off site.	DRT, B
3.13	ET	So, from what I've understood, you don't have a software that you use for the BCM.	
3.14	R3	Right, we don't have any specific software. So basically, we do a lot of we do a lot of redundant backups. So, we have, you know, Server, Microsoft server 2012 backup software. And then the rest of it is on the Synology NAS. So, it's built in, it's a Linux, it's Linux stuff that we have a web browser that we pull up and then you know an admin console. And I set up a whole bunch of settings, and then it just does it. And then every now and then I check to make sure it's working.	BCS, DRT, B
3.15	DP	Thank you. Therefore, I understood that you are using disaster recovery technologies, right?	
3.16	R3	Disaster recovery, right disaster recovery. Exactly, exactly. Yeah. And by the way, we've been burned before. So, before like 10 years ago, all our stuff was sitting on an 80-gigabyte drive on one computer that somebody calls a server, and all of a sudden that drive broke one day, and we lost a lot of stuff like the backup that we had was from a couple of months. before.	DRT, B

		So, it was a disaster. And that was the input that caused us to decide to spend more on business continuity. So, something failed, unfortunately, and so we also do this ISO process every year ISO 9001. And it's a very simple thing but... but part of that we've set up policies and procedures for our our data like our records. And so, we do preventative maintenance during the year, so that it never comes to losing a hard drive, losing data.	
3.17	DP	So, you answer exactly our next question. You said that you have had a disruption in the past, an event, but if you have this plan based on disaster recovery technologies, maybe this could have been prevented, right?	
3.18	R3	Yeah. Yeah. It's the same as you know, I mean, you focus at work and at the same time, you're in school right now. It's like, the simple thing is you work on a paper all weekend and then you lose the paper, this is what it's like to not have a business continuity plan at all. You know, your thesis, you know, I mean, it's... it's nerve racking and costly and time consuming because now you have to go to your client which is your professor, and you have to ask for more time to do it again, if they believe you.	SC, DRT
3.19	ET	What were the effects on your business, when this situation happened?	
3.20	R3	Well, thankfully, when it happened, it was only old data. So, it was old project data. It wasn't the stuff we were currently working on. Engineers have a tendency of doing the easy thing. The easy thing is making a folder on your desktop and save all your files, and what you're working on locally. So thankfully, our folks were lazy, and they were working locally on their computer. So, when we lost all that, it was the archives that we lost. Anyway, so because it wasn't an ongoing project. We didn't really put much time to rebuilding it. So, we put together what we could, and we just kept going from there, but if it was an ongoing project, we would have lost a lot of money and probably clients as well. But luckily it wasn't an ongoing project(!!). All of these weren't completed, like the stuff that was on the hard drive was archived and files, so they were already completed. So, but that will that woke us up (!!) because we realised all of a sudden, like we were in shock. We're in shock that: "Oh, my God, if this had actually been a project we're working on right now." Yeah, we would be down we would have downtime and then we would have to scramble and figure out like, you know, what's, where? It would have been a disaster.	DRT, B
3.21	DP	Thank you. As you mentioned in the beginning, the automation has helped you during the COVID 19 pandemic. However, we wanted to know more if you have experienced any other	

		situation that the use of automation in the business continuity processes has helped or is helping?	
3.22	R3	Yeah. So, for us business continuity in a pandemic... so, when the pandemic started, I moved here to Germany and for a visit and I stayed longer, and my colleagues had to work from home. And so, you know, when you're working on a family business, like I have, you know... My father is very old school. My father is a senior engineer and he's very old school that everybody has to come to work here in the office every day. You know, my father could almost be Greek (!!). So basically, you know, it was very hard for him to shift his mentality that: "oh my god, I can't be at work today and I can't see what everybody's doing." So, I would say that a challenge with business continuity would be project initiation... meaning... meaning that it's hard to make the people above you see why...why it's important, why should it be done. And so, you know, we put we put zoom together, we put the MS teams together. I think I bought a subscription for like almost anything out there just to see what would work we use Google meet. We found the face to face was very important. But in terms of the business continuity, that's when we implemented the VPN. So, we had put together some shaky VPN before, but we realised we needed a rock-solid VPN. So, like I said, I ordered with like a fast delivery, this thing called open VPN, which is like industry standard VPN, and I'm using it from here right now actually, from from where am I. So, VPN was the first thing we put in. And then the next thing you realise is okay, well, we have the VPN, the VPN is slow. We have a lot of big engineering files, so they're not two megabytes 200 megabytes. Actually, they're like they're like 200 to 600 megabytes, sometimes the files so you can't move that file on a VPN, you have to have another access to it. And that's when we decided, hey, let's increase our Google Drive space. And we'll just point this to Google Drive as well. So, whatever we're working on gets mirrored to Google Drive. So, all of our engineers on their laptops, I mean, you guys have used this. You have the app on your laptop. If you open it up, it's thinking in real time, so it's essentially locally on your computer. So, it's quick to open so that was that was the other thing. So, business continuity for us means now that you're removed from the office, can you keep working as if you were in the office? So, business continuity has helped us to save data and also during the pandemic with a business continuity plan to help to restore the work quicker.	PI, SC, AW, DRT, CH, B
3.23	ET	You mentioned that you, as a company are beginners in investing on business continuity. However, do you see your company in... in the near term having more support for building more detailed business continuity plans like an automated software?	

3.24	R3	Probably(!!). I think both of you have started me thinking about that(!!). So, we're always thinking about the risk prevention, and it actually comes up every year. We have a... we have a management meeting, where we actually present you know, like KPI or OKRs, like things we've hit things, we've missed. And our risk plans usually entail the countries we work with, you know, the politics of the countries we work with, our finances but in there we talked about, you know, data backups and whatnot, but it's been pretty simplistic till now. So, probably will add a category there as well.	SC, BCS
3.25	ET	Since you also work with different countries, and all these things you just mentioned are done manually. Do you think that it takes you a lot of time also to schedule the meeting with people from different countries? Since you are thinking of implementing an automated software, don't you think that it would be less time consuming that processes for you?	
3.26	R3	Oh, sure, sure. I'm sure I'm sure they say that there's is an app for everything. I definitely consider it right now. Right now, just to give you an example. So, all of our data sits in Toronto, right? So, it's collected from our sites, our work sites, and it automatically goes to Toronto, so we only have to comply with Canadian law. And US law when it comes to exporting.	BCS
3.27	ET	Don't you have other databases just in case an incident happens in the database in Toronto, for example?	
3.28	R3	We were using one app. It was sort of our internal sort of Salesforce, it was our internal sort of ERP slash CRM, and actually wrote it I wrote the code. So, I wrote the code eight years ago, and I haven't touched the code maybe in about four years. And then it went down. And we've been doing things manually with Google Sheets, like I mean, I love Google Sheets. So, we've been doing a lot of stuff in Google Sheets, but it's probably time to get that back app up and running. Again. And if I do it was connected to a MySQL database. So, I would probably move it to a Google Cloud or GCP or an AWS and once you have it in there, then your database redundancy is there.	
3.29	DP	Why did you stop using the app? Did it have some disadvantages?	
3.30	R3	I accidentally broke it (!!). I mentioned that every so often I put the IT hat on. So, I went, and I deleted a partition on our server, and I had a good reason to do it. And then something happened somebody was talking to me… I deleted the wrong partition. So, I actually deleted the partition that had the APPS database in the app and everything. So that went down. And then I found the	BCS, CH

		backup of it. But by the time I found the backup, I thought, let's do it in Google Sheets for now. And let me rethink how we did. So, the reason we put that app in place. I was very naive and young, and I thought I can do better than a Salesforce or whatever. And we don't have to pay I think the licence fee was just so high. We don't. We don't really use all the features. We don't have to pay that much. So let me write a quick app with what we do. We just wanted to keep track of projects. And assign responsibility. So, it's essentially what like OKRs require right now like objectives and key results.	
3.31	ET	Okay, so the app was, as you said, really expensive, but what the advantages would you say that it had?	
3.32	R3	Well, the app that we wanted to buy was expensive. The app that I created was just my time. I wrote... I wrote the code myself. It was in PHP, HTML, CSS, JavaScript and MySQL database. So, it was a really simple app running on a computer. Sorry, to your question.	CH
3.33	ET	I wanted to know a little bit more about the way that the the app could help. How was it helpful for your company?	
3.34	R3	The way I came about the app. It was sort of like a user centric design. Basically, I was sitting with a couple of my engineers and one of them showed me said: "You know, I learned this from my boss." Like in his in his notebook every morning he would like to write the data highlighted in yellow. And then underneath he would put the tasks for the day. And then he would bring the tasks from the previous page that you hadn't done at bring them to today. And so, I thought, well, you can you can make an Excel list or whatnot, and you just keep like bringing stuff forward and whatnot. And then it got me thinking and I was like… You know what I can, I can make a list. So, I made a list. I made a To Do app, and that To Do app. I started learning more about project management was taking my foundations of project management back then. And I thought okay, great. Well, it's nice that every task has like somebody responsible, you know, you can't have two people responsible for something because then you can't get a commitment... So, I added that so essentially, my roadmap was just whatever I felt like I started adding and and you know, these two poor guys were like my guinea pigs and and I started using it as well and stuff that wasn't working. I would borrow from like Facebook and like, you know, Twitter and different things. I thought were cool. I thought, you know, message stream. Let's make a threaded mission stream for a project that way. If I have an update, I can like type it in and then somebody else also working on it with be concede as well. So great, so it was a very one man show. So.....Yeah... So,	AW

		it helped with efficiency and with the way that everybody could be coherent with each other.	
3.35	DP	Oh, that's really nice.	
3.36	R3	That's yeah, actually, it helped me because everybody refused to use it after a point. They're like, oh, this is just one more thing. I have to do like people, you'll come across that you'll come across people that if you give them one more thing to do, they're like: "No, that's not part of my that's not part of my job responsibility." What I ended up doing was, I was following all the emails and every morning I would, whatever updates were coming in for projects, I would update it in my app. And then I would print up the summary of those brings the meeting. And then you know, we'd be like, okay, what's going on? And this happened, like, this is the latest, this is the latest that I have. This is the history. This is the latest, so I'd have like a chronological sort of bullet points that I can refer to. So anyway, that led to OKRs. So, we went from that to OKRs. So that's why I haven't been back to update my app yet.	CH
3.37	DP	Thank you, going back a little. This disaster recovery automated technologies that you're using the backups, the data, the local and remote backups you have, what is the impact that they have in your organization?	
3.38	R3	You know, for me, if, if nobody notices that something bad happened, it's a good day. So, I would prefer people. You know, while they're going through their workflow, they noticed that everything's working and so the stuff we put in place like the VPN, the mirroring to Google Drive, the mirroring to an s3 bucket just in case for backups. And on on the s3 bucket, it actually saves up to 60 copies of each file. So, if you touch up a file, you know, 60 times the same day, it will save 60 versions of that in the s3 bucket. Not so much in Google Drive at other places. But anyway, so the impact has been our goal was: Can everybody work from home the same way they're working from the office with without missing a step? So basically, it benefits the life of every employee. Basically, I mean, I'm that employee. So, I have stuff to work on and I want to make sure that as soon as I click it, it opens. You know, because if I have to wait for it, if I have to go make coffee come back or, or if I click on it, it goes oh can open file file is corrupt, you know that I gotta go hunting for a backup and things like that. So that those are a lot of the cases of cases that you want to avoid. So, for us, it was just a simple problem. You know, we have to go remote like after when COVID started, and we sent our team home. We realised that okay, we're not going to be able to come back now we have to get more serious about it. So, we started adding stuff	DRT, B

		slowly. So, the VPN was the first thing mirroring to Google Drive was the next thing. I had an engineer tell me: "Oh, he said, I'm working on the file on my computer". I said: "Well, are you are you saving that back to the server just in case somebody else needs to grab a copy of it?" He's like: "Well, no, it's too slow." So then... then I thought, okay, let's have our budget for Google Drive and, and mirror it and see how that goes. And so, I told him: "Hey, open it off the Google Drive" and the first time it was slow. But once you do it, your app realises oh, I need to catch this because he's using it, so I'll just keep bringing the local version. So... the impact has been... the effect has been... it was a rough start. But now people trust that our data is secure and the backups work.	
3.39	DP	Thank you.	
3.40	R3	I want to add something more. Before you asked me about the fault tolerance, disaster recovery, disaster tolerance technologies in business continuity. In terms of fault tolerance, and disaster recovery, you know, pretty, pretty simple. Our tolerance... I can tolerate the phone's going down like our phones, we have voice over IP phones, I can tolerate the phone's going down, because I know I can call somebody, and they'll get the phones back up again. But our level of tolerance for our data... it depends on what we lose. We have accounting files, we have accounting backup, so it depends on... you know, whose data we lost. It's super important to them. It might not be accounting data, might not be important to my engineer, but their engineering files are.	DRT, B
3.41	ET	Do you think it's important to have these automated fault tolerance, disaster recovery and disaster tolerance technologies?	
3.42	R3	I think these days yeah, I mean, you know, you could be running. I know a guy here in Hamburg. He runs to flower shops, so he has two franchises. And he was showing me like the level of stuff he hasn't. If you had asked somebody who runs a flower shop or a coffee shop, like maybe 15 years ago, the most complicated thing was the cash register, you know, and right now, he was showing me, for example, a system where like...even he has, you know, this disaster recovery technologies in place, provided by the franchise company that services him. I think... I think for every business it's important. I don't think anybody can afford especially with the pressures of COVID and, you know, businesses, either making money or losing money... It was one of those things. It's like... it's like fire insurance. You're like, well, I'm never going to have a fire. If they don't, if they don't mandate that you have to have it, you know, you opt out or dental insurance or... Well, you guys don't understand that stuff	DRT, B

		here, I guess. But in in North America, you know, we have health issues like in the US, you have to buy your health insurance if your company doesn't provide it for you. And a lot of people go without health insurance. They're like I'm never gonna get sick. So, disaster recovery technologies for me is is your computer ever gonna get sick? Is your hard drive ever gonna get sick? Is network ever gonna go down? Is your data centre or office gonna burn down? So, it's like, a lot of this stuff that you put in place is just that extra insurance. That I can afford for this stuff to go down. Like for us, we're in the middle of again, multimillion dollar projects. There are other things I want to be yelled at, not, you know, your data went down and now we don't have it anymore. We have to rebuild it.	
3.43	ET	Yeah. Thank you.	
3.44	R3	Simple... simple example for you. If Lund University all of a sudden, everything gets wiped out, they lose all the student grades and then tell you we have no proof that you guys studied here for the last year and a bit.	
3.45	ET	What would happen if the same thing had happened in your company, if you didn't have this, l fault tolerance or disaster recovery automated technologies? What do you think would be the consequences into your company?	
3.46	R3	Well, sure. So, the concept so that's how we were operating for the first couple of years. And so, this company has been around for about 20 years. And I would say maybe the first 10 years, it was like that, you know, we had a friend of the family who was the IT guy, and I was not there, and we had a friend of the family who came around. He told my father: "Oh yeah, you have computers. Yeah, we can put them on a network." And that was about it. And there was one computer that was spare and just sort of this the server it was like the Windows XP box with the folder share. That was their server. And yeah, I mean, they were doing business. They were getting clients, but at some point, my father, for example, who runs the company, he didn't realise he didn't want to spend more... like you spend more on your home, your car, your lifestyle... your computer you are like: "Oh it's working." So, I think that's sort of the old school mentality. The New School is yes, it's working. But the same way I have car insurance that if anything happens to the car, I cannot be without a car. You know, North America is not like Europe. It's not like you can just hop on a bus or a train or whatever. They don't come on time. If I tried to get from my home to my office, it takes me 15 minutes by car. It'll take me like three hours if I try to go by bus because they don't connect well, like public transit doesn't work in North America by design. They want to force you to	AW, CH

		buy cars. So that's pretty important. So same thing. So, the way we try to explain it is with analogies like that. For me investing in business continuity is like investing for the long term.	
3.47	ET	That is a good point, thank you.	
3.48	R3	Yeah, this investment that you're doing is so that we don't show up one day and go: "oh, the computers don't work. We can't do our work." And that becomes costly because you're getting people to work with you. And so, for every day of downtime, you have to calculate your overhead for example, for our office staff right now. I think our office overhead is about $80,000 a month, just our office. So that's the overhead so you can break it down to the day and find out. Actually, it's more than that. Probably closer to 200,000. So, you can break it down per day to find out how much am I losing per day if people just go home and they can't work?	AW, B
3.49	DP	Yeah, that would be very costly. Thank you very much.	
3.50	R3	No worries. Sure. I will share one more thing with you. So, when I was when I was working when I was an employee, like at IBM, I never thought about this stuff. You know, somebody paid me my salary. I showed up at nine o'clock in the morning and stayed until five o'clock in the afternoon. I just got my stuff done. I didn't have to worry about budgets profit and loss. I didn't have to worry about if I'm sitting around idle or something doesn't work. How much is it costing the company? But I think if you take that entrepreneur step and launch something, then you start losing sleep at night wondering about that stuff. You're like, oh, I don't have enough work for people to work on today or if stuff goes down. What do I do?	AW
3.51	DP	Yeah, it's really important.	
3.52	R3	So, if you guys can educate me on like the BC software stuff you're talking about, you know, or even later, I'd love to consider that actually incorporate BC into our into our yearly ISO process.	
3.53	ET	Yeah, we can share them with you when we finish our research, and you can check them out.	
3.54	R3	That's great. Yeah, tell me tell me what you recommend. But like I said, you know, every business has a different scope of work. Our scope of work is different than a lot of other businesses.	SC

3.55	DP	Do you think that business continuity importance changes from industry to industry, or no?	
3.56	R3	I think the thing you mentioned before... their level of tolerance... what areas of their business are more riskier than others. So, for us, for an ongoing project, basically our data, we have data retention requirements, so I think our accounting and tax files we have to actually keep for six years. Our engineering files we try to keep for at least 12 months to three years, because that's the warranty period of our equipment. So, if the customer comes back, we have to have something to reference. But I mean, we totally exceed the three years, but that was the minimum that we set.	SC, B
3.57	DP	Okay, thank you.	
3.58	R3	From the from the tax side, I think in taxes actually have more data retention policies. So, when I mentioned the six years, in Canada, we have something called the CRA Canadian Revenue Agency, and in the US, we have the IRS internal revenue services. So, both of them can call us one day and say, we don't have this, can you send us this again? And if we don't find it, they're like, well, you don't have it. We don't have it. So go ahead and pay $80,000. We think that's how much you owed. So yeah... all in all, I would say automation, has helped a lot... Yeah, and all our papers are scanned in PDFs, so two of our lawyers told us that nowadays a PDF in Canada is the same as having a physical document. So, we have a storage closet downstairs. We have two that have boxes and boxes of papers. But as much as we can, we've tried to retain the digital copies and get rid of the paper as much as we can. So, for that actually as for you so we don't do it. We have a shredder, but we have companies in our building that you know there's a truck that pulls up. There's a guy that comes in, they take the documents outside to what looks like a woodchipper like it's an industrial sized shredder. And that's how they dispose their documents.	B
3.59	ET	Yeah, they're not needed anymore. Everything is done online, automatically.	
3.60	R3	Yeah exactly, but you'd be surprised at how much stuff people print. Like I still print a lot of stuff and I try to stop myself. You know, I still like I do everything on my iPad, but I still prefer like a physical copy that I can. I have highlighters like here ready to go to like start highlighting underlining stuff.	
3.61	DP	Thank you very much. We will transcribe our audio and we will give you the transcription back to approve it.	

3.62	R3	Okay, no worries. So, I hope I hope you have what you need. Any other questions you have? I know we're a smaller company. So, some of them might not be as fully implemented as the larger ones you have but I think everybody's need is for... like the tools we use I just I just need our tools not to go down. If we lose a phone. We lose the physical Voice over IP phones we have... everybody has a mobile phone, we have WhatsApp, we have signal we have, you know MS teams, and everything running on our phones and zoom. So, we have degrees of things that can go down before it starts to really impact us.	FTT, DRT, DTT
3.63	DP	Our research scope wants to describe the effects of automation of the business continuity for all the companies. Big and small sized companies... It is really important to know how the small companies are implementing automation in their business continuity.	
3.64	R3	Yeah, yeah, roughly, I think, I think pretty in play we probably spent about I mean to set up a new employee we probably spend about $6,000 in terms of like laptop desk, you know, monitors and whatnot, and comfortable chair. But then it's the software licences on top of that and now it's the making sure that if the tools we've given that employee, the cell phone, the laptop, that those don't go down, that if they do we can just replace the hardware very quickly, whether it's the phone or whether it's the you know, Android or iOS or the laptop and just be back up and running as quick as possible.	
3.65	ET	Yeah, that's important. It can have many impacts, as you said, it costs a lot because you have to take into consideration that you have to pay the employees for the day off...	
3.66	R3	It costs more per day of downtime, that actually replacing their laptop or replacing their phone.	
3.67	DP	Yeah. Thank you very much.	
3.68	R3	Okay, ladies, if you have anything more for me, if not, I let you go.	
3.69	ET	This was everything. Thank you so much for your time. Really appreciate it. And have a nice day.	
3.70	R3	Yeah, no worries. Thank you. Good luck with your thesis. Good luck with this project.	

Appendix D - Interview 4

Organization: Ikano Bank
Position: Lead Product Owner
Date: 2022-04-28
Interview length: 33:32 minutes
Language: English
Participants: Interviewee 4 (R4), Emine Tatari (ET), Despoina Patsavou (DP)

Row	Person	Interview Questions and Answers	Code
4.1	DP	Firstly, I wanted to start by asking you what is your role within the organization and how is this role related to business continuity?	
4.2	R4	Yes, so at the moment I work as a lead product owner. And my main role as a lead product owner is to make sure that we have a well-organized and prioritized back load for several development teams, which will then implement the features that have been discussed and refined within this backlog. As part of my role, I would say that I am a stakeholder for business continuity activities. Even though I do not take part directly in the implementation of this business continuity measurements, I have to make sure that the activities related to business continuity have been placed within the backlog and that will be taken in a quarterly basis by the different teams.	
4.3	ET	That's good to know. Thank you. I also wanted to ask about the name of the company.	
4.4	R4	Yes, it's Ikano bank.	
4.5	DP	Thank you. So, what is the scope of business continuity within your organization?	
4.6	R4	I am not 100% sure of the whole scope of business continuity in the organization. I think it covers several departments. I don't know how many of them I think, perhaps most of them, but where I work... where I work, which is the IT development department, we take business continuity across the whole department. And for us, it's very important as we are a highly regulated industry as a bank, and we work in several markets, and therefore each market has its own regulatory entity when it comes to banking. And it's... our own bank's license is tied to these regulations from these entities and for example, in Sweden, we have finances for Conan, which is an entity that regulates banking industry here, and they have different requirements when it comes	SC

		to business continuity acuities. And therefore, we have to comply with those requirements. So, I would say that pretty much it has to be considered by most of the departments across organization.	
4.7	ET	And you said that you work within the IT department. So, you mainly have knowledge on that department for the business continuity. But I was wondering for what kind of crisis do you usually build business continuity plans?	
4.8	R4	Right. So, within IT development we are responsible for basically every single system that supports business processes and the products for our customers... So, we have to make sure that every single product that we work with, and that the core functions of the bank are up and running, that we have key measurements in place in case of a disaster. So, yeah, I would say that, for the core functions of the bank, we will be there supporting, or we will be the main responsibles, basically for making sure that we have the right measures in place.	SC
4.9	DP	Thank you. So, how long have you been implementing business continuity into your organization?	
4.10	R4	Hmm... how long? I don't know (!!). The bank had business continuity processes since the day that I have started...Yeah, as I said before, since it's a bank they have been working with these activities for a while, I assume, but since I started it was considered already. So, I assume for many years ago.	
4.11	R4	Thank you. Through our literature, we came across seven BC processes which are the project initiation, risk assessment, business impact analysis, business continuity plan design and development, business continuity plan creation, business continuity plan testing, and business continuity plan maintaining and updating. Which one of these processes do you do in the IT department? And also, how do you or the teams that work with BC ensure the proper implementation of these processes?	
4.12	ET	So, I wouldn't say that we have like a plan process with start and an end. And for us, it's like this cycle, where we have to work with lifecycle management and so on. So, we didn't have a series of steps, but instead, we cover phases that repeats after a specific cycle, where, from what you mentioned, some of the things are included. You have an initial analysis, impact of the risks and then you have a plan and... a systems design of how this is going to be the development, implementation, testing and then you go all over again, in case there are new regulations or in case we have new requirements, from internal stakeholders and so on. And it's not a specific group that is working with this, but we	RA, BIA, DD, CR, TES, SC

		have the responsibilities are decentralized across the different materials... and each team has a specific function for for these phases. So, it's not a single responsible, but everyone working with applications consistency in the organization needs to be aware of this.	
4.13	DP	Okay, thank you.	
4.14	ET	Thank you. Also, do you think there is something really important that the company needs to take into consideration before they start the project initiation of BC planning?	
4.15	R4	So... at the moment, we do not need to work with projects anymore, we work with products, and everything that we do is related to the products that we offer to the customers and each product, even though there are some things that are connected to other products, each product has a responsibility to make sure that... that we have a plan in place in terms of business continuity. And sometimes these products have specific areas which overlaps and therefore they need to compete in alignment. But in general, it's the responsibility of each product to make sure that they have the right measurements in place.	SC
4.16	ET	Okay, thank you. Also, do you use automation in any of your BC processes? And if so, in which other processes do you use automation?	
4.17	R4	So, we have several levels when it comes to the products that we support within IT development, and you have the application layer and then you have the platform layer, the infrastructure layer and in each of these ones you can apply different techniques to make assistance, resilience, apply self-recovery... to have self-recovery, efficiency and so on. So yes, we do have automation... until a certain level, I would say... let's say for example, it comes to the application layer if in case one application it's... it's been overloaded or at some point it crashes, then we have a specific way to make sure that we have the self-recovery for those applications to come back and be up and running automatically. Now, you can have that within one specific server or no and then we go to the next level, which is the platform which means that now this application is to I don't know if I should go into too much details but what we handle our applications in containers which are managed by a container orchestrator, which is called Kubernetes. And this software, what basically does is to make sure that we have self-recovery at the application level, but also the infrastructure level in case that application goes down and it's... it will come up and it'll bring it up almost immediately. But also, at the same time if we have a specific virtual machine or a specific computer that goes down that	FTT, DRT, DTT, BCS, B

		crashes because of a fire or a specific disaster, then we will make sure that it transfers everything to another virtual machine in a different physical location. For example, at the moment we have replication of the servers within the Frankfurt region. Where we handle availability zones, which are about 180 kilometres away from each other. So different... You have three different availability zones, that has servers that are separated 180 kilometres. So, when one server goes down, or if it's something happened, electricity shokens happen in some specific availability zone, it will immediately recover in a different one. Until that layer or into that level, we have automation but then there's... there's even a bigger order called scale when it comes to disaster recovery, or the Frankfurt region goes down like say a nuclear attack or whatever. Then we have a different region which is Ireland's. And for that, we will need to apply more manual activities to make sure that we transfer all our applications from the final footprint into the Ireland region and so on. So, there's different majors for for it.	
4.18	ET	Okay, thank you! Going back to the automation layers that you also talked now, we have also come across some different layers in the literature review that start from manual control, then it is decision proposal stage, human decision select stage, computer decision select stage, computer execution and human information stage, computer execution and on call human information stage, computer execution and voluntary information stage and autonomous control stage. Based on this, what level would you say that you use in different phases of your lifecycle.	
4.19	R4	Right. So, it's like full... fully autonomous in terms of a specific region. So, if a problem happens within the application layer, then it will be automatically by itself. It doesn't require any manual intervention to to make sure that the application is recovered. So, it's... it's fully autonomous in terms of a specific region. But then if we have to move things, so if a whole region goes down, then we need to apply... I can't remember exactly the name of the layer that you said but it's... it has to be some sort of manual intervention there. For us to make sure that all our applications are up and running again.	L8, L3, B
4.20	DP	So maybe human decision select? That the computer does something in an autonomous way, but is the human that selects the decision that the computer needs to take?	
4.21	R4	Right.	L3
4.22	ET	Previously you mentioned that you have this lifecycle. And you also said that the different level of autonomy that you are using are based on the case or the disaster that happens as well as the	

		region where it happens, right? But does the autonomy also change from one phase of the lifecycle to the other?	
4.23	R4	Yeah, so I would say that the automation that happens, covers, basically most of the steps of the lifecycle when we have to do something in an automated manner, so it takes care of everything. Basically, we didn't have to do nothing but of course, for... for a much, much bigger disaster that will require us to move from from Frankfurt, for example to Ireland, then, we do need to... we do have specific teams working in a specific plan, implementation, testing, and so on and so on.	L8, PI, RA, BIA, DD, CR, TES, MU, B
4.24	DP	So, as you said, you're using a business continuity software, but do you only use the software or do you also have other automated tools that you use?	
4.25	R4	So, it's a container orchestration software. I don't know if it's considered as a business continuity plan, but it is a business continuity management software, but it takes care of many many of the activities that are required for us to make sure that we have a certain resilience in sort of recovery activities from our applications.	BCS, B
4.26	DP	And what has the affects in your organization been from the use of this software, both positive and negative?	
4.27	R4	Yeah, I mean, it depends on the degree of the incident... for for smaller incidents, it has helped us a lot... So, we didn't have to do anything. And sometimes the issue is resolved even before we realized that there was an incident. But so far, we haven't experienced bigger disruptions yet, while I have been working here so I cannot tell how much it will... it will help us in the case of much, much bigger disaster. But at the moment, it's been working well.	BCS, B
4.28	ET	Okay. Also, there are other automated technologies, like fault tolerance technologies, disaster recovery technologies and disaster tolerance technologies that are independent of the software. Do you use any of these type of technologies except the software?	
4.29	R4	Yeah, so... as I was saying before the software that we use, our container orchestrator takes care of these kinds of things as well. Not for everything like backups because those kinds of things are done differently with autonomous processes, and we use other tools, but everything related to the three layers: application, platform and infrastructure... the container orchestrator is taking care of self-recovery at all levels, application infrastructure, and so on.	FTT, DRT, DTT

4.30	DP	So, in which of the business continuity processes has automation had the greatest impact on your business?	
4.31	ET	Because you said that you have different phases of the lifecycle, and we were wondering, maybe in one of the phases, this automation was more important, for example, maybe in risk assessment or maybe in project initiation or in other phases that you are using? Or do you think that the importance is the same everywhere?	
4.32	R4	So, for example, when it comes to the design, and how do we want the systems to behave in case of potential incidents... I would say somewhere between the planning and the design of the solution, right. So, you establish certain rules in... in this container orchestrator, where you tell the software that in case there is an issue in case there is an incident in this availability zone. So, then what's gonna happen is you're going to make sure that assistants are recovering in this availability zone B, or C. So, you define those specific rules in the software. So, when it comes to the design of the business continuous plan, then it helped us a lot. And then of course, the implementation itself. We didn't have to do anything because once you defined roles, there's nothing to implement, the software will build the implementation for you. And once it's up and running, then you basically have to trust that software will do its work. As I said before, if something happened, it will take care of the issue, even before we get to know that there was an incident.	BCS, DD, CR, B
4.33	DP	Okay. As you previously mentioned there had been small disruptions that the software has helped with. Can you describe any of the disruptions and how the software helped? For example, during COVID-19?	
4.34	R4	I wouldn't say that there's been... that there's any link to the pandemic. We haven't experienced... any specific disruption or any special disruption in the pandemic. So, I would say that the the support that we have been receiving from this tool it's been before during and after. Even though we are still during the pandemic (!!). Yeah so, it's nothing specific during the COVID-19.	SC, BCS
4.35	ET	Okay. So basically, you don't think that the software had any effect in keeping your business running during the pandemic?	
4.36	R4	Yeah, because it's been something that's been affected mostly... perhaps the amount of... it's nothing that it has been affecting our systems, perhaps it's something that has been affected the business, in terms of like the number of customers that we have had, the number of purchases and so on.	SC

4.37	DP	That's nice. That means that the company was really well prepared before, so your business continuity plans are established, good and solid.	
4.38	R4	Right, right. A different thing would be like for example, when... we have a war and then what would happen if the war starts in Europe. That might be a better example to test your business continue plan maturity and check if your system would still remain up and running. Could be something that people could have asked to... if you would have a presence in Ukraine or in Russia, for example, where there were many disruptions and then how did you manage that to... to make sure that your phases are still up and running, but we we do not have... or we are not presence nor in Ukraine nor in Russia. So, we have not experienced those disruptions yet.	SC
4.39	ET	Okay. So, since you have not experienced any major disruptions, do you think that the automation in business continuity actually has an impact on sustaining your your business running or not?	
4.40	R4	I think automation in general is important for business continuity, but for different things, different processes in the organization. Now, if we talk about business continuity, automation is going to be something that will help you a lot if something happens. Perhaps not much in terms of how much work it will save you, but I think mostly it will help you to avoid manual errors or human errors which are very common. So, it could be that automation help us with a few hours of activities, and if in case a disruptions happen, without automation, we would not be able to do it in a matter of hours, but the issue there... the most ...the most beneficial thing of automation is that it will make sure that there is no, any human errors which can happen when you under stress because you have to recover from a disaster. And then if you're doing manual activities, someone can just like get confused and input the wrong passwords, or keys or certificating. And then that will create even more problems that will make your reaction time longer. So, I think that that's that's the most important part of of having things automated.	BCS, B
4.41	DP	Thank you! But do you think every one that is working with automation has knowledge about the software?	
4.42	R4	No, not really. As I was saying before... applications are... Yeah... we're having applications in different levels, people in the development teams, usually they work in an application level. But then, teams that are working on infrastructure level are the ones hosting this container orchestrator software. They're	BCS, AW, B, CH

		the ones making sure that the software is updated, upgraded, and up and running all the time. So, for someone who is working in building a web application, or database or whatever, they are just doing their job, put their applications in a container and then hand over those containers to the people who are working at infrastructure level. So, for... for people building applications is almost transparent about this software. But anyways, they still need to know how the applications are going to behave in case of a specific disruption. So, even though the software helps to self-recover, from from instance, and so on, within the application as development teams have to make sure they have rules within applications... that will be triggered to launch in an instance... it's going on.	
4.43	ET	Thank you. What do you think that has worked well with automation in the different BC phases and what do you think it hasn't?	
4.44	R4	I personally did not see disadvantages of the tool we have been using. Yeah, I don't see any disadvantages (!!).	BCS, B
4.45	DP	Do you think in the future something will change related to the automation of business continuity?	
4.46	R4	I... I doubt it will go to higher level of automation because the more you automate, the more resilience... the more... the more resilience the application has the more costly it becomes. So, for example, I was explaining, right, that we have three different availability zones, where if one goes down, then 180 kilometres away, there's a different data centre that will make sure things recover. So, there you have already like three different zones that replicate the different application you have, therefore you have three times the cost as if you would have all in one availability zone. Now if you would have... if you would want to replicate that in a different region, then you have to increase more the costs. So, the more resilient your application is, the more costly it becomes. And then you have to have a good balance between how much risk you want to take and how much tolerance you want to have. So, in our case, we are well prepared, and we understand that... if we are going to... if a bigger incident occurs, we will have to perform some manual activities and we are willing to take that risk, compared to the cost that will take us to have everything fully automated. Bigger, bigger, much bigger companies like Google and Facebook, they would perhaps want to have full end to end automation when it comes to business continuity because they do have the money for it.	BCS, CH

4.47	ET	But don't you think also this was a challenge in the beginning, when your organization firstly started to implement the software?	
4.48	R4	Yeah, I would say cost is one of the main barriers for simple companies to implement this business continuity software... to implement business continuity in general. So, as a small... smaller companies would have harder time to take these measurements, as they still growing, they perhaps didn't have the right budget, they must be... most... mostly worried about getting new customers, getting new products and so on.	BCS, CH
4.49	ET	If you did not have this software and a disaster happened, do you think the consequences will be much higher than the cost to actually buy the software?	
4.50	R4	Yeah, I mean, that again... for us, it will be much higher of course, because as... as a bank we have to make sure that our core operations are up and running, even if a disaster happens. That's part of our banking license and then the regulations that have been imposed by different regulatory entities in different markets. And perhaps that's not the same for a smaller company that is a start-up, like it's just... has started one or two years back. They might think that is too costly for them and therefore if something happens, it's okay for them to be one or two days without operations and then come putting their applications up and running again. But for us, it's not the case.	SC, BCS
4.51	ET	Do you think you're going to lose your clients or what will happen if you close?	
4.52	R4	Well... that depends on which clients... they might want to... If you will be a client and you realize you cannot have access to your bank account, would you change your bank or not? So, it's the reputation that it's... that you will lose if you have those kinds of disruptions basically and even though you will keep some clients... still, you will lose some. So, the potential of the organization will not be the same. It will be on the news and... so the bigger the companies that the harder it becomes to recover from from those kinds of incidents.	SC, BCS, B
4.53	ET	Yes. Thank you very much. That was really helpful.	
4.54	DP	Thank you, a lot. So, we will transcribe the recording, and we will send you the transcription to read it so that you can confirm that it is what we discussed here.	
4.55	R4	Okay, sure.	
4.56	ET	Have a nice day.	

4.57	R4	You too. Bye.	

Appendix E - Interview 5

Organization: Deloitte
Position: Manager
Date: 2022-04-29
Interview length: 41:45 minutes
Language: English
Participants: Interviewee 5 (R5), Emine Tatari (ET), Despoina Patsavou (DP)

Row	Person	Interview Questions and Answers	Code
5.1	ET	So, we first wanted to know a little bit about your role within Deloitte. What does your role include and how it is related to business continuity?	
5.2	R5	I'm pretty new to Deloitte, I joined Deloitte in December 2021. Usually onboarding manager it's a bit more difficult. So, the role it's still shaping from this perspective. From a business continuity perspective... in IT, you think of high availability and how long the system has to be online, from the Enterprise Architecture however, you need to think more than that, from the business strategy perspective and also from the human capital perspective. Does that answer your question?	SC
5.3	ET	Are you involved into the business continuity processes?	
5.4	R5	Here at Deloitte not yet on the business continuity topic, however, it is a strong selling point if you want to build the case for specific offers. Basically, business continuity offers you the possibility to raise the awareness and then provide the solution, which is a nice setting approach, I would say.	SC
5.5	DP	So, do you have previous work experience with business continuity?	
5.6	R5	Yes. Yes, because I was somewhere from 2015, I was a technical application owner for the global contact centre platform of Oracle from an IT perspective and keeping the platform working all the time. We had an SLA of four nines, that was the target per year basically, because that was the entry point for Oracle support phone calls, and Oracle does do 40% of its revenue from support. Therefore, if the contact centre platform will be down, then the important customers could not call in to ask for support. Therefore, there might be some losses because of that. So, I was technical obligation owner and then I had to do, design and implement, again, high availability platform in OCI. Back then was	BCS, B

		the new Oracle cloud infrastructure product basically to showcase the product and also prove that it can host the application that week. It was actually a platform, an ecosystem of 30 applications in six regions over the world and again, it had five nines availability score. From this perspective of IT business, it's called BCP. Business continuity planning from an IT perspective. Yes, I had the experience, from a business perspective it's something that I'm building knowledge on my own. Basically, I occasionally provide ideas for that, but I haven't done it. I can say, fully done it at work. It's one thing that I can tell you is the fact that you'll never stop learning in this.	
5.7	DP	Thank you. It was really helpful what you mentioned the BC planning. What is the scope of that in your organization?	
5.8	R5	The scope... one second, let me open my presentation, which I think you found on LinkedIn on this which I did it for fun in 2019. It's a business scope, driven scope. So, you have to think what happens in case my platform, my product is not available, basically. What are the losses? That I'm going.... What's the business impact? If... if the platform is not working? Therefore, you need to have a BCP business continuity plan in place in order to basically know how to do, know what to do, basically. In case a platform goes down, and that's the DR. The calculations on the business impact and other procedures that we have in place is a total that represents the BCP. Give... just give me a second because I can... it helps when you have some slides on the ground and I have a very nice diagram. This is why I started writing at one point because it's nice to give something back. So, a business continuity plan would consist of the following. So, you have risk assessment, the one that I was stating that we have to calculate what happens the business impact in case your platform product isn't available. And then you calculate the business impact analysis... and BCP programme assessment and that will give you a good idea on how much it makes sense to spend basically on your high availability system, because actually high availability and gear can all be achieved but the bigger you aim, the more you're going to spend especially in Cloud for example. In... on prem it was the same. And then we are talking about the integration of the BCP with IT where you have to have a design basically in accordance with IT strategy design. And in the design, you take care of processes and procedures depending on the methodology that you use, for example, MIM Major Incident Management was and how it's one previously in practice... at Oracle, emergency response and MIM team basically how do you organize that. Then the technology solution technology solution the disaster recovery, which is compounded by the... from the high availability system, and also procedures and the plans in order to restore the initial system.	SC, RA, BIA, DD, BCS

5.9	DP	How do you ensure the proper implementation of these processes that you just described, and which one do you think is the most important phase of the process?	
5.10	R5	All are important. All are equally important. I don't believe in good and bad (!!). Joking. They're all important, but it depends where you want to focus on and you have to... in my perspective, you have to rely on the capabilities of the technologies, basically, and its futures. And knowing the technology very well the technology solution and then create good disaster recovery plans on top of that and exercise them. The best practice is at least once a quarter. I've seen organization who do it once every year or every half a year. But if you don't test your disaster recovery plans, they'll never be... won't be sure about the effectiveness, make sense.	PI, RA, BIA, DD, CR, TES, MU, BCS
5.11	ET	Before you start working on the BC processes, do you take some things into consideration in order to initiate these projects like are there any factors to consider?	
5.12	R5	Yes, so this is what I usually say that every project has a very simple, three steps. Take the business requirements, translate them into technical requirements and then drive the solution in order to meet the original business requirements of the customer. And here the business requirements that are out of the business prioritization phase we talked in the beginning risk assessment, business impact and so on, are RTO and RPO. RTO its recovery time objective RPO is the recovery point objective so from when back in time you want to recover if your RTO is zero and RPO is zero which is the hardest to achieve it means you are going to need an active active system basically in which production and DR work in parallel and they both serve us production and DR in the same time and if one goes down the other one comes in, more standard... Well, you could have a cluster of systems but let's not overcomplicate it. Then if however, if your RTO is 24 hours, let's say. I've seen organization in the new public sector they said, well, this is data used by our analytics team, by data scientists. We don't need it up and running all the time. If it's off for 24 hours, it's good enough if we lose data for one day, nobody dies and therefore you take a different approach in 24 hours. Theoretically, if automation is well put in place, you will be able to reconstruct the entire system from scratch in cloud.	PI, RA, BIA, SC, BCS, B
5.13	ET	You just mentioned automation and I was wondering in which of these BC processes that you also explain is automation mostly used or do you use it in all of the phases equally?	

5.14	R5	So, automation, I use it in the technology part in the technology solution basically. And it depends on the type of DAR so that I want to build if it's an active active then theoretically I don't use automation. I use automation only for deployment but not for me formatting the DAR solution because everything runs all the time. If its active back or if it's a cold DR basically, then... and you have an active site and the backup site, then you could use automation in order to do the failover from the primary to secondary. Or, again, automation could be used in the case that I was just saying if your RTO and RPO allows you to do that you could simply automate through IaC, the entire infrastructure deployment and configuration management in the cloud. Basically. And... in... I wouldn't say 30 minutes. But let's say in an hour or two, you will be able to recreate everything from scratch, just from API calls basically, through TerraForm, a configuration management tool like Ansible or something else. You still need a data basically the backup.	BCS, B
5.15	ET	You just said that automation helps you recover really quickly. But what level of automation are you using for the BC processes because from the literature that you have read, we have noticed that there are eight different levels of automation, starting from the manual control to decision proposal stage to human decision selection stage, computer decision select stage, computer execution and human information stage, computer execution and on call information stage, computer execution and voluntarily information as well as autonomous control stage.	
5.16	R5	I understand it. However, in practice, you don't have that many choices most of the times. So, the autonomous one I haven't ever seen it working, at least in my experience. That's the goal to go to and you would have AI and machine learning basically... help you improve and do predictive actions in order for you not even to go into... to be in a position to use the business continuity plan. However, I was talking about automation from the perspective of provisioning and configuring your environment basically. And from that perspective, with the current tools and IaC, it's called the infrastructure as code in cloud. You can basically provision and configure your environment as long as you have a data backup. You can have it back online, let's say in an hour or two. No matter how big. I can tell you one example we were in during a deployment. And unfortunately, someone deployed the wrong TerraForm code and erased all the databases completely. Luckily, the database engineer was a 50 something years engineer lots of experience and he had a very good backup put in place basically, was very experienced and he was able to recover in half of day... we weren't even in production if we were in production, well imagine that all the configurations that the previous consultants have ever done and all the work of, let's say	L8, BCS, B, CH

		three months would have been lost if we didn't have a backup in place and a way to recover. And that's it basically.	
5.17	DP	Have you used any specific business continuity software or any different kind of tools for your BCP?	
5.18	R5	The thing is, if you look at it only from a tooling perspective, I think you'll miss 80% of the point. So, a tool is as good as the processes used to utilise that tool. And then you have the people and the organization that use the processes and the tool, if you don't look it from the holistic perspective and the tool by itself is done doesn't know what to do anything. AI tries to disrupt that, and they say, well, the machine can learn, a model can be trained, that's machine learning is the highest state of AI, can be trained and basically it will know what to do. However, from again practice experience of others, not mine, but I've learned that even the AI and machine learning is as good as the data you provide you train it on, basically. And it needs constant retraining. You can't assume that it's not associated that you set it and forget it. So, from this perspective, looking only at the tool, I think it's the wrong thing to do. So, I can tell you a couple of products there are Veeam actually, they have very good products on this. And there are others who do replication, and so on. There are multiple of those on the market, including in the cloud.	AW, BCS, CH
5.19	ET	These are all different software's, right?	
5.20	R5	Yes, these are different software's to do that, but the software is not enough. The takeaway is this the software is not enough, for a software, a tool, you need the procedures. So, process. You need the people to know what to do basically and the organization to manage those people.	AW, BCS, CH
5.21	ET	Okay, thank you. With the usage of these tools and the software altogether, what do you think their main effects has been on the BCM?	
5.22	R5	The tools actually can help you a lot in order to reduce your cost basically, of your your overall solution because yes, you invest in the tool but in the end if it's a lot easier to manage and if it's a lot more effective, then it means you are going to spend less on the lower high availability system. Makes sense?	BCS, B
5.23	DP	Yes.	
5.24	ET	Yeah. And also, you said that you integrate altogether the software with the tools. Can you mention some of these tools that you use?	

5.25	R5	First of all, for example, a golden rule that I use, at least for databases let's say, especially the older ones in traditional databases, is to always use the vendor supported tools. If it's not in the list of vendors supported tools, I don't use it. Why? Because if something breaks and there is a support ticket for support to help me then they say okay, use then a tool that is not supported. We can do nothing about it. And your options are in there basically. So, I'm trying to use for each and every system, what the vendor recommends, basically. And there are multiple ways. If you look at Cassandra clusters, for example, they have their own replicating model around and it simply works you just have to configure a cluster. For others you use load balancing, a lot and various roles built within load balancing because it gives you the scalability and plus one and that also increases the high availability for... you can read I think in my blog all of these because I listed them there. I tried to synthetize what I knew at that point. Did I answer your question?	BCS
5.26	DP	Yes, yes you did. Do you classify these kinds of tools in fault tolerance, disaster recovery or disaster tolerance technologies or do you think that their purposes are integrated?	
5.27	R5	I wouldn't categorise them like that basically. Well, again, from my personal perspective, and I'll only say that no matter who listens. Disaster Recovery can't be seen only as technology and as a software solution, basically. DR is not only and perhaps this concept will help you understand. DR is not only the tool or the setup. DR also means also the processes and the policies and the processes that you have around it.	BCS
5.28	DP	Okay, thank you. So, back to a more general question. Which of the processes that you use automation has had the greatest impact on the business and how?	
5.29	R5	This picture will help you; it's all slightly created. It will load, it shows you all the components of the business continuity plan and how to create it. It pretty much summarises everything that I've said so far.	
5.30	ET	And do you think that automation in any of these steps is more important than the other steps?	
5.31	R5	Well try to think differently, where you can apply automation here? Let's make it a seminar (!!)	
5.32	ET	We think we can apply it in all, why not (!!)?	
5.33	DP	Not in everything (!!).	

5.34	DP	Yeah, with the data we have read and heard that maybe it can help like the business impact analysis.	
5.35	ET	So, you apply it in the IT integration, BC plan design, strategy design?	
5.36	R5	Can you do it in a risk assessment? I think you need a human for that. Or business impact analysis? We're not there yet. You can apply to the technology basically. Yes, yes.	RA, BIA
5.37	DP	Okay. So, have you experienced any disruptions that could have been prevented with the use of automation in the BC?	
5.38	R5	Always. So, I think I've done 13 years of IT operations in total, and before moving to Germany, it was the global scale. The only way you can actually get to those higher very high availability scores is to always monitor and try to prevent if you're in reactive mode and try to fix it once it's broken, It's already too late. Basically, you already lose, lose high availability. Therefore yes, you can automate your low grids and back... several years back, for example, because I had to look at the status page of sessions or number of servers. I simply wrote a PowerShell script to do that for me all the time and send me an email in in in case something wrong happened, therefore, I didn't have to look on the page every five minutes.	BCS, FTT, DRT, DTT, B
5.39	ET	Did it save you time?	
5.40	R5	Yes.	BCS, B
5.41	ET	Yeah, so you said that basically automation in BC has helped in every disruption. So, you think that it's really important the automation into BC for sustaining normal operations of your business, right?	
5.42	R5	Yes. And I am actually a lot okay. To be frank, I'm bored of doing repetitive tasks. I prefer to automate it and well occupy my mind with something more interesting, basically. And therefore, everything that's a repetitive task, even if it's used for day-to-day work or for trying to prevent something bad to happen, can be automated and why not? In my, in my view, if you don't do it, you're already wasting resources. And I see my previous company was hiring people. And basically, that's not scalable that much and it comes with a very terrible business model, because it's no longer the way of doing things. But even so, I can tell you an example I recently read for back, let's say, four years. ago, I think Google for YouTube, they had to do the content moderation, basically to decide which video stays. And of	BCS, B

		course, it's Google, they have the best AI possible solution that so on, and still although that helped a lot, it wasn't enough. And they hired 10,000 content moderators in a few months, just to be able to to keep up with the content that was uploaded on the platform. And that happens in other in New York Times did the same for example, for reviews. Done on the comments... done on the online newspaper, basically. And, of course, in the end automation helps you to... if I put it in a nutshell, oversimplify it, to accomplish more with less... it is more technology, accomplish more and with less people.	
5.43	DP	So, as you said, automation has worked well. But do you think every employee is prepared to work with automation in the business continuity?	
5.44	R5	I don't know. I don't want to sound harsh but basically, I know the cultural change is difficult for some of them. However, business is business. If the, the... if that's the strategic direction and they are not aligned with it, I can tell you an old say I learned from all the old.... Well, he was a senior director in Oracle, and he said the following: "Oracle, it's a benevolent dictatorship. You do what you're told, or you're free to go(!!)." So, in the end is not the choice. And however, I wouldn't be that directing. I wouldn't take that approach. I would... The better way of trying to sell this because in the end you're selling the idea to people is to say: "Look, dear colleagues, if you use this tool, you actually finish your job in half of day instead of two days and you have a day off". Let's say.	AW, BCS, CH
5.45	ET	So, you think that the greatest challenge has been selling the idea and people accepting it in their culture. But despite that, has there been other challenges for automation in business continuity?	
5.46	R5	Well, every point in the figures that I showed you, it's a challenge, depends on who you're talking with. Basically, at a very high-level people might not understand, for example, what are business week's car and what what are the implications? However, there are other people who simply don't have the larger picture, so they don't understand it. And somehow you need to communicate. To make sure that the communication happens both top-down, and top-down means let's say from CEO to C level to VP to director, managers and team members, and also bottom up because they need to have a voice to in today's world, and good ideas can come actually from the people the person sitting there on the production floor in the factory, because well, he's the expert (!!).	AW, CH

5.47	DP	Thank you. Do you think that the levels of automation in business continuity will change even further over time?	
5.48	R5	Yep, I wrote a blog about this, about robots which very few people understand. I was trying to imagine 2050 for example. And I think, progressively, each and every job will be replaced. But perhaps, we as humans will go back to say 10,000 years ago, and actually most of our history before that, because 200,000 years until society was created. Let's say, we lived in caves and 80% of our time was socialising while 20% of all the time was hunting for a while. In the future, perhaps we'll work less and have a better life more time to spend with family personally, I don't have one but for those friends. Well for me books (!!).	L8, PI, RA, BIA, DD, CR, TES, MU, B
5.49	DP	Thank you. In which case can robots in business continuity take your position?	
5.50	R5	What you can expect from the robot, from my perspective is that it will do the same job at least to today, repeatably and with more more accuracy basically. And if the... if you think of the price lines and how much the price of the technology costs, versus your time to do that, basically there there is a sweet point where it makes more sense to have the robot than doing it with people, therefore robots without any intelligence, right progressivity will replace every every manual task, right? However, currently in development, there are AI models and machine learning. These are a bit further into the future because they can also learn and take decisions into some extent, based on the models that are trained to do and progressively they will replace many things. I can tell you including in the business decisions. Right now, in Amazon, for example, for determining the stock of a warehouse, the decisions are all taken automatically for the AI solution and human no longer well, it's very hard to contradict that AI. But they didn't start it from that, they started... they had AI to help and then they started receiving suggestions progressively from it, and in the end, they performed the model, make it perform that well that they fully rely on it. Therefore, you no longer need the... let's say market know how of the people and their experience in order to do predictions on how many phones you need to have in your warehouse, let's say. Make sense?	L8, PI, RA, BIA, DD, CR, TES, MU, B
5.51	ET	Yes. You also said about the automation of business continuity, that you have backups, and you can solve the problems really quickly. But does these automated technology tools or software's, do they suggest you with some solutions or do they sometimes solve the problem themselves and then you're just notified. How does automation work in these kinds of technologies?	

5.52	R5	Well, it works how it's programmed to work (!!). So, you have the specifications of the tool and the white paper and it's exactly like the instructions of using it and it tells you how it works. It depends on what it does it. To be frank on complex applications... means that having storage backup, it's enough you need to do something at application layer too. Most applications have their own mechanism, the enterprise applications, those that are sold to enterprise customers have their own ways of recovering, of scaling and so on. There are features that were required by an enterprise business and you just need to set... to know how to set them and to utilise them.	BCS
5.53	ET	So, you set them, and they do all the work?	
5.54	R5	And you test them, don't forget what I said in the beginning because no matter how good your tools are, if you don't test your procedures, the best practice in DR is to test it, as I said once a quarter. You can do it less often than that but with additional risks. A DR from my perspective, a DR without a testing plan is not a DR because you won't be sure if it will work when you need it to work.	BCS, CH
5.55	DP	Yes. Okay. And a final question since we currently live in COVID 19 epidemic. Have you experienced any situation during Covid- 19 that the use of this business continuity automation has helped you?	
5.56	R5	Well, not really, because the pandemic was more about people working from home instead of people being in the office. While the systems... they're still where, they are basically, and they still work the same. They don't, they don't have a pandemic. They have viruses, different kinds of viruses, but let's not get into that discussion (!!). Okay. Therefore, the pandemic was mostly about... during the digitalization trend, basically determining and making managers, senior managers and what companies understand that they need to automate more, or they need to rely less on people because people get sick people can be in the office, people have personal problems, right. And I think if you try to understand, please follow up on my blog with the robots basically. Because I think this mind shift will... it's actually the starting point of a completely industry change and everything would progress, will become robotized. But you needed this mind shift, and the pandemic helped a lot because it'll raise the awareness on the problem and technology and automation is a solution and now, we are on the road basically to make it happen, to deliver that solution.	AW
5.57	DP	Thank you. That's everything.	

5.58	ET	Thank you so much for your time. We will also send you the transcript of the interview so that you can approve it.	
5.59	R5	Sure. I can do that.	
5.60	DP	Thank you again. Bye!	
5.61	ET	Bye!	
5.62	R5	Take care!	

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