

# Sustainability in Crisis: Towards Business Continuity in Small and Medium Enterprises

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**Abstract.** Small and Medium Enterprises (SMEs) epitomize a vital part in all developed and developing economies. SMEs being peculiar in nature and operations are often the most affected in case of an emergency or a crisis. Mostly, the scarcity of resources in respect to employees, time and capital make them more vulnerable to crisis. This article instantiates the need of risk assessment and disaster preparedness, and hence the utility of BCM in the context of SMEs as a viable option. It further establishes the technological foundation of a comprehensive BCM realization for SMEs.

## Introduction

The industrial revolution changed the whole economic paradigm; evolving the household workshops into corporations and production units, and giving rise to the taxonomy of enterprises with a classification of big, small, medium, meso and micro enterprises, respectively. All sorts of enterprises are valid and essential but SMEs are crucial for a progressive economy. As claimed by European Commission (2017), SMEs are the backbone of Europe's economy. They represent 99% of all businesses and have created around 85% of new jobs in Europe during the past 5 years. SMEs are often global leaders within their

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numerous niche markets (so-called 'hidden champions' by Simon, 2007) (Ludwig et al., 2018).

The European Commission (2017) defines SME as an organization with less than 250 employees and less than a (or equal to) 50 million turnover. Ingirige, Jones & Proverbs (2008) concluded that, SME sector suffers the most in times of a crisis and are the least prepared of all the organisations. Crises are undeniable realities and with the ever increasing digitalization, high reliability on IT and energy infrastructures, and the challenges imposed by global economies, SMEs have become more vulnerable. Sullivan-Taylor & Branicki (2011), demand more strategic and proactive approach to manage the threats and actuality of extreme events for SMEs. According to ISO 22301, Business continuity management (BCM) is the holistic management process which emphasizes the need for a well-defined incident response structure (Tangen et al., 2012). But BCM is mostly opted for big companies and is under-represented in SMEs (Kaufhold et al., 2018). This research article addresses the challenge of adapting BCM for SMEs, and put forward a work in progress towards more sustainable SMEs.

## Literature review & research Gap

Tierney (2014) explained that disasters (or crisis) do not follow preordained scripts. Since crisis management in SMEs often does not address the respective vulnerability of the company, it has become consequential to extend the realms of BCM to SMEs. Approximately 45% of US and European SMEs have no business continuity concept (Thiel & Thiel, 2010). Federal Emergency Management Agency (FEMA) claims that more than 40% of businesses never reopen after a disaster (Scott, 2016). Lack of resources, limited finance, inefficient and delayed business continuity and recovery processes appear to be the biggest constraints for SMEs in adapting to BCM ((Saleem et al., 2008), (Kirchhoff, 1994)).

The realization of BCM for SMEs in a technological paradigm is even more challenging. The reasons are several: SMEs are too different in structure that it is infeasible to provide with a generalized solution fitting the needs of all the SMEs (Dahlberg & Guay, 2015). Furthermore, the main obstacle in the development of computing environments is to provide the right information to the right person, at the right time and place (Fischer, 2012). A dashboard can be a viable solution for the realization of BCM, as an inlet to detailed information, if needed ((Kaufhold, et al., 2018), (Nascimento et al., 2016), (Andrienko & Andrienko, 2007), (Canós et al., 2010)). Support to the decision making process was also included in executive dashboards (Zagorecki et al., 2012).

(Executive) Dashboards are not a new concept but they are mainly focused on the visualization from civil crisis management perspective in the form of control room apparatus and less or not focused on SMEs. But BCM is not just an information visualization process, it also requires collaboration between multiple stakeholders in order to create and execute the Business Continuity Plan (BCP). Therefore, we propose a solution in the form of a BCM suite; as a technological

aid not just for the top level emergency manager but also for the bottom up management, employees and other stakeholders.

## Methodological approach & contributions

Stakeholders participation is a key to sustainable design (Meurer et al., 2018), therefore qualitative interviews and surveys are done in "Kontikat" project. At this stage of my Ph.D, I am co-developing the BCM suite (with a student assistant named Simon Gruseck), based on the information from the empirical pre-studies with SMEs but also the literature on matter. The proposed BCM suite (as shown in Fig. 1) is to be realized with a service oriented architecture & evolutionary design and it mainly constitutes of three major architectural components: (1) a collaborative visualization (C&V), (2) a BCP creator (BCPc) and (3) a decision support system (DSS).

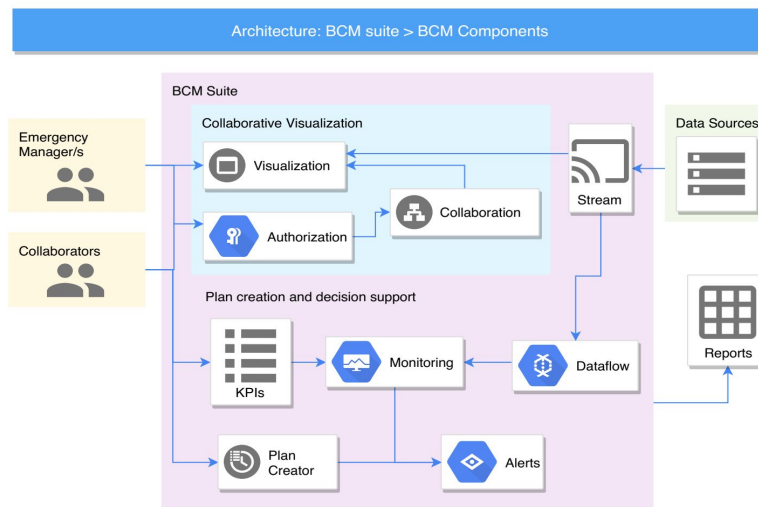


Figure 1. The overall proposed architecture demonstrating the interaction and collaboration between different components of the infrastructure.

As a first step in evolutionary development, C&V portal is being developed. The emergency manager can add the collaborators for concurrent information sharing and plan execution. They can select data for visualization from an agglomeration of various data sources, hence can customize their preferential view settings. The visualization also enables the user to reach for more detailed information, if required. The prototype implementation of the C&V portal is currently realized with an open source visualization framework open.Dash (Open.Inc).

The next step will be the development of the BCPc. The BCPc will aid the user to plan for an individual or collaborative task. It will provide a variety of planning options ranging from Gantt Charts, Load chart, to Risk Maps, Decision Trees etc. The emergency manager can identify the inter-relationship between the processes

and validate an effective plan ensuring the security of process, people and product. Finally, the DSS is to be implemented which works with visualization and planning services respectively. Emergency team needs to identify the key performance indicators (KPIs) and the data sources which will be monitored by these KPIs. KPIs measure the different aspects of an organization's condition. The triggers will detect the anomalies on the basis of KPIs and generate alert for the emergency team to act in time. KPIs are also used to generate the post crisis and process evaluation reports.

### Further considerations

The proposed architecture is primarily forced on disaster preparedness which is a pre-crisis concern. It does not hold a strong foundation for in-crisis usability. Apart from identified risks as alerts, situation awareness can be a useful approach for crisis handling. I have kept it as an open concern for future consideration.

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