

# Web-based Disaster Risk Assessment Tool Development for Japanese Small and Medium-Sized Enterprises

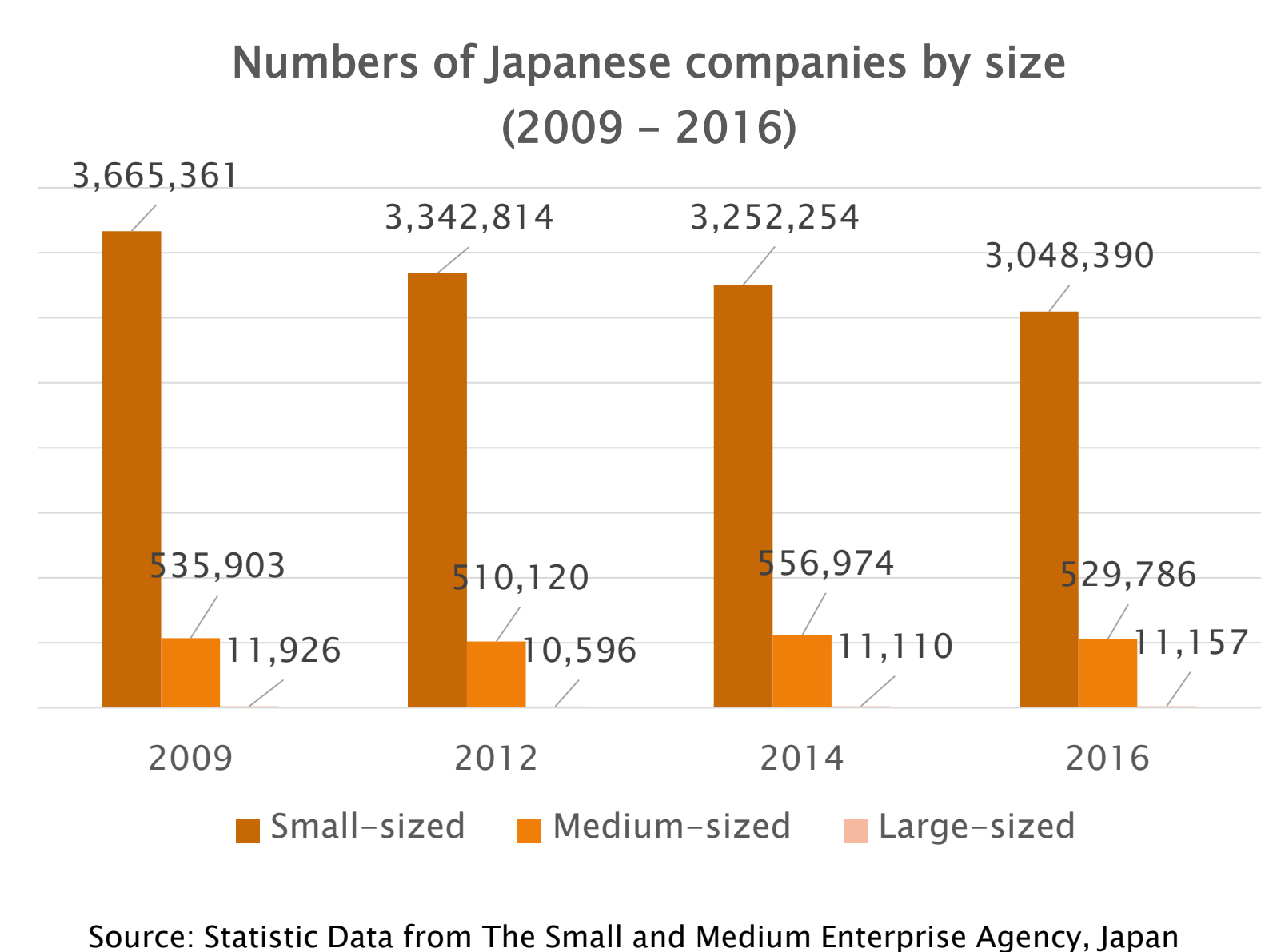
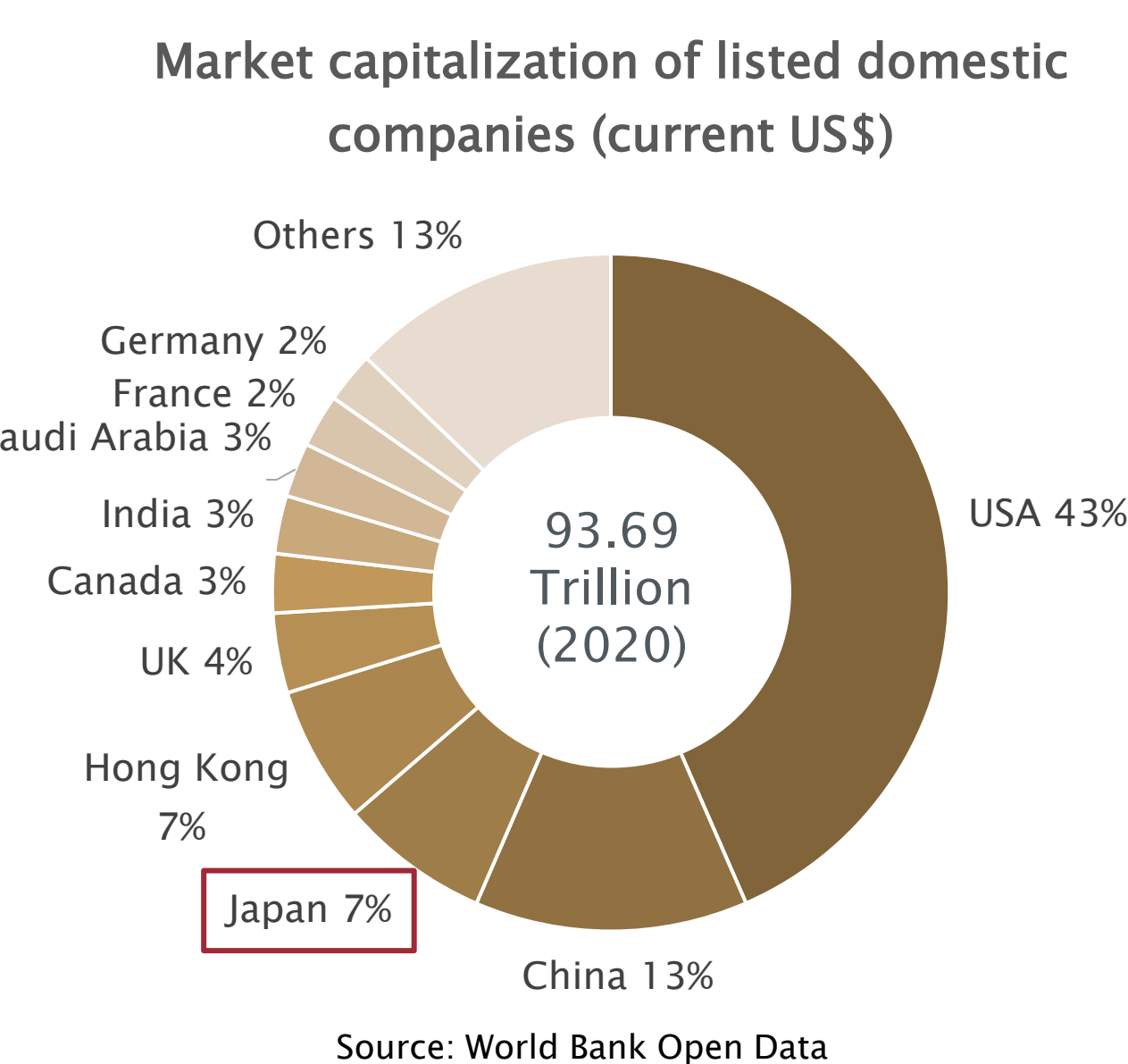
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## Background

- Japan is one of the most natural hazard-prone countries.
- It is also the country with the most corporate assets in the world.
- Approximately 90% of Japanese companies are small and medium-sized enterprises (SMEs).
- However, their business resilience may be very low due to the following reasons:
  - The rate of SMEs developing business continuity plans (BCPs) is considerably low,
  - Financial strategies are not prioritized in current BCPs,
  - The rate of SMEs purchasing disaster risk insurances remains low, and
  - A business interruption risk has not been well addressed.



## Research Question

Is it possible for SMEs to enhance their business resilience through introducing science technology for disaster risk reduction?

## Hypothesis

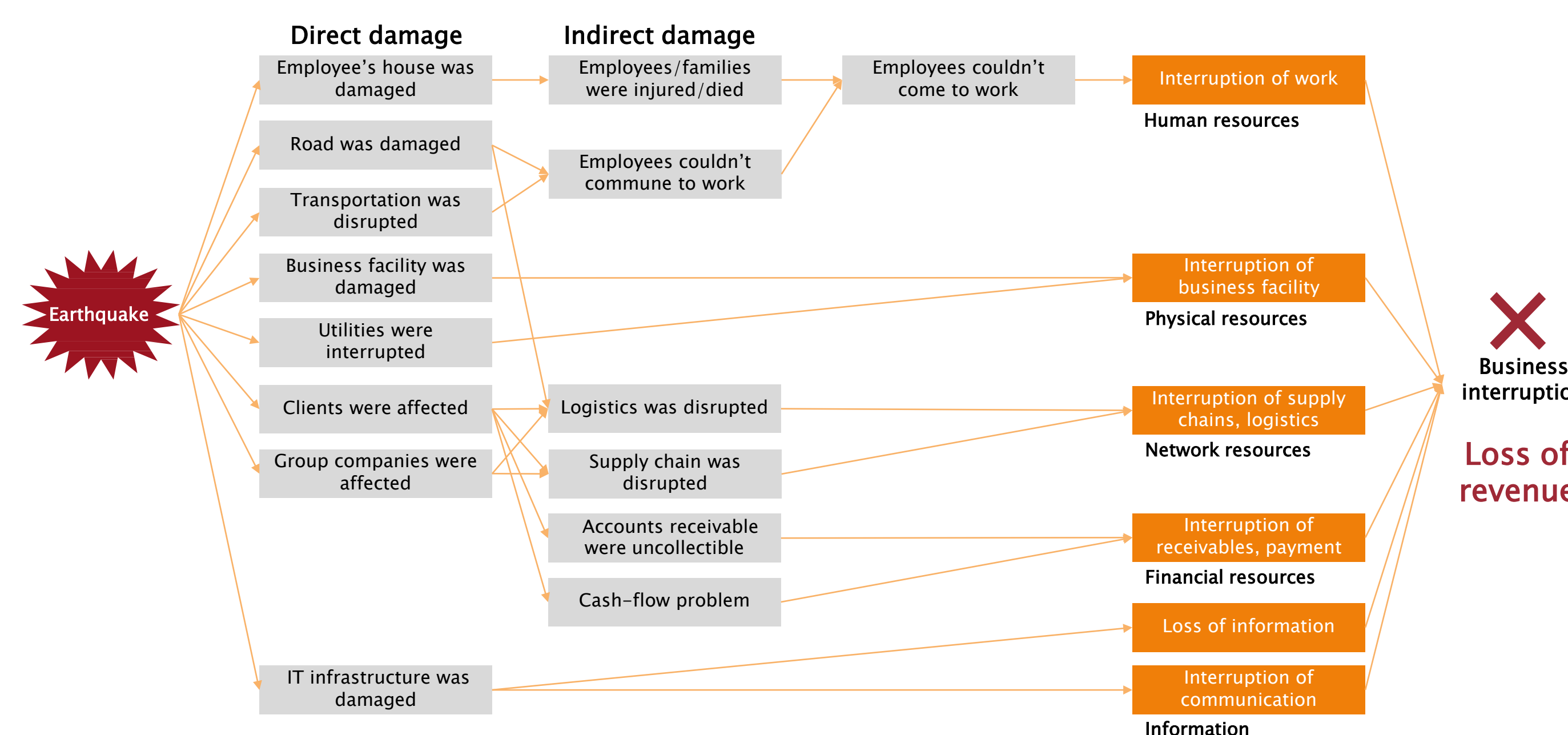
The introduction of a simplified disaster risk assessment tool will help improve risk awareness by SMEs, encourage these companies to adopt BC strategies and measures, and enhance their business resilience.

## Objective

This study aims to develop a web-based prototype tool for SMEs that can estimate a business interruption risk.

## What is the Business Interruption Risk?

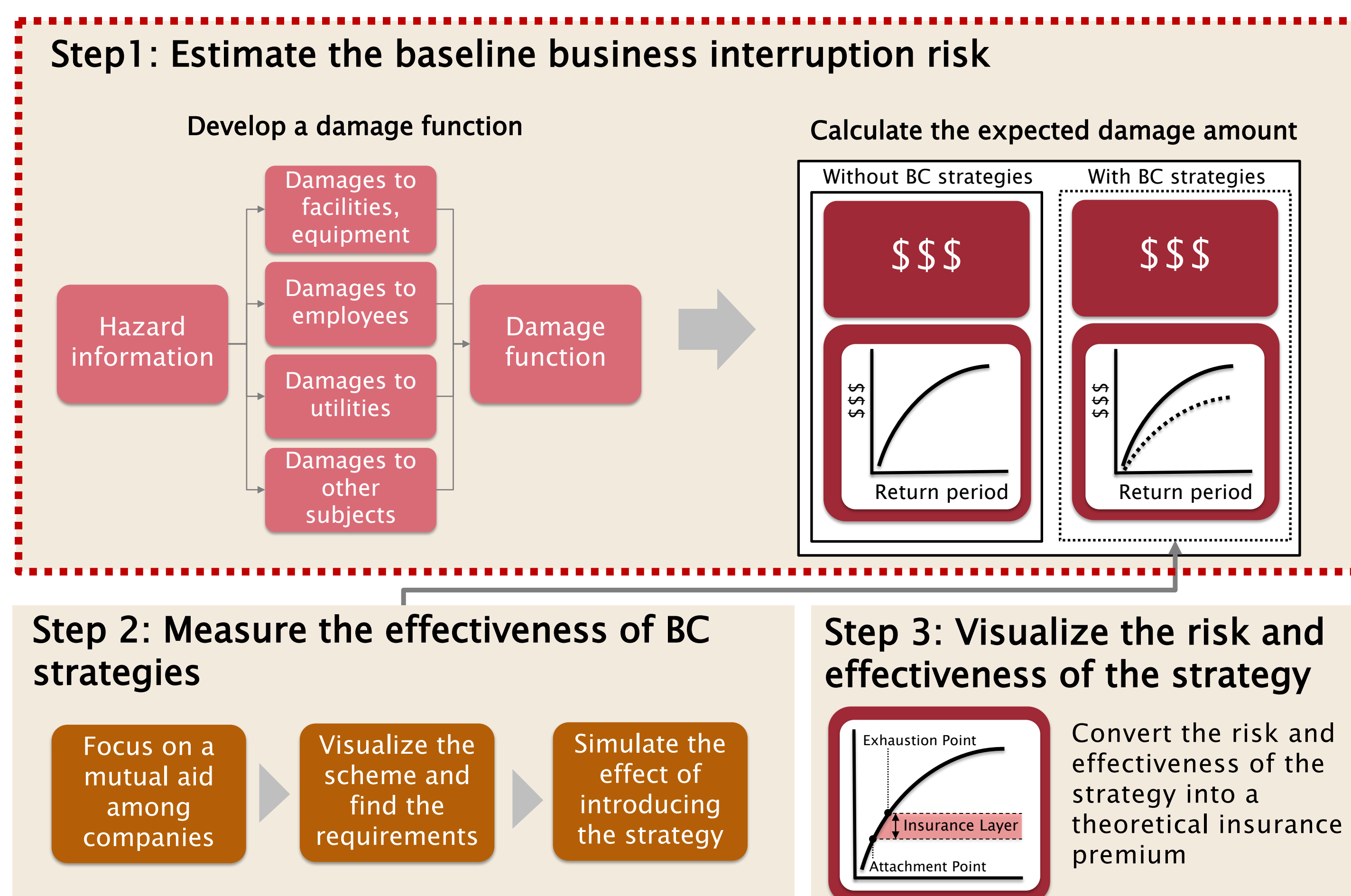
This study interprets business interruption as “the loss of revenue which can occur when business resources are limited due to direct and indirect damages caused by a natural hazard.”



## Conceptual Framework

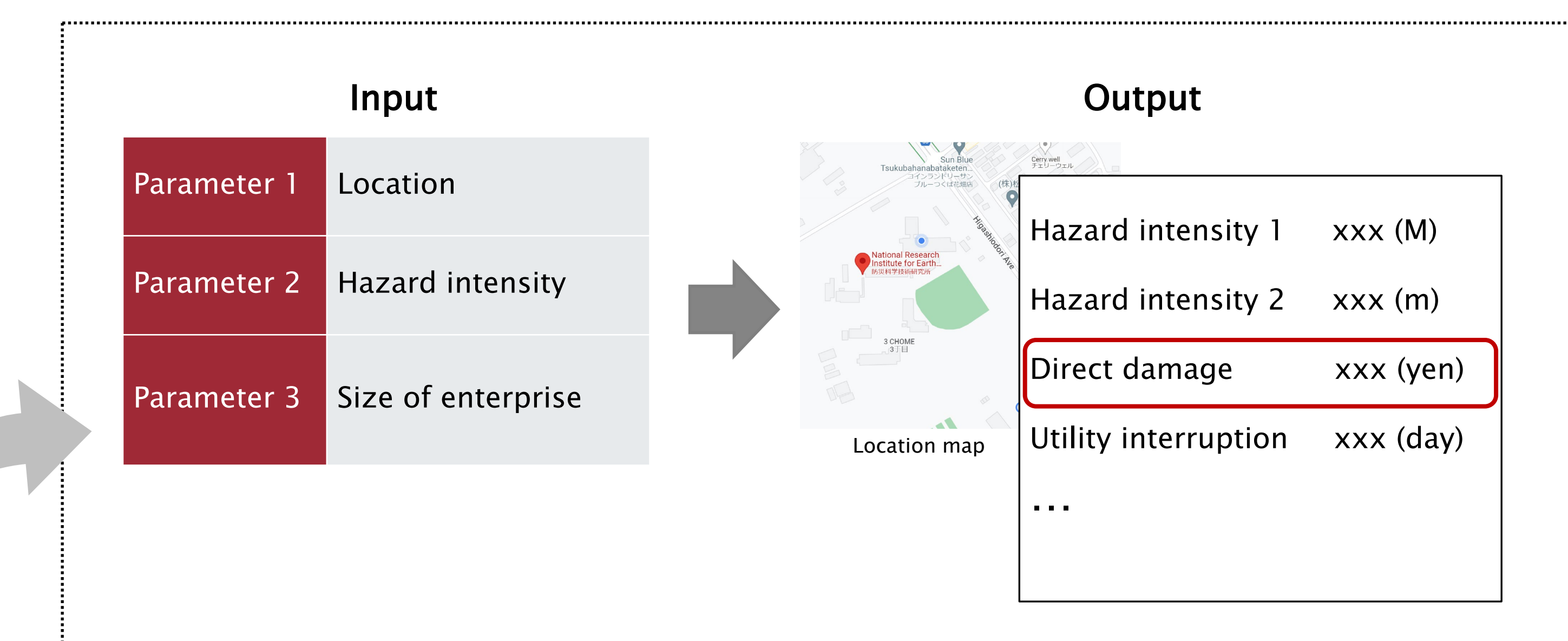
The tool for SMEs will consist of the following three features.

- Estimation of the baseline business interruption risk in value terms and the risk curve caused by an earthquake in which a damage function is developed based on the 2011 Great East Japan Earthquake,
- Effect measurement of introducing BC strategies focusing on a mutual aid among companies, and
- Visualization of the business interruption risk and effectiveness of BC strategies by converting them into a theoretical insurance premium.



## Prototype Tool Development

- Regarding Step 1 of the conceptual framework, this study has developed a function to estimate the damages to tangible fixed assets caused by earthquake-tsunami disasters, while the function for business interruption is still a work in progress.
- This damage function is based on hazard data from the 2011 Great East Japan Earthquake, and data about enterprise characteristics and the damages from approximately 7000 enterprises located in the Tohoku region.
- Based on the function, this study has developed a web-based tool for SMEs that can briefly estimate the loss on assets caused by earthquake-tsunami disasters including the upcoming Nankai Trough Earthquake in value terms.
- However, there are several limitations. For example, the existing tool may be unsuitable for an epicentral earthquake because the tool assumes a trench-type earthquake, using the damage function from the 2011 Great East Japan Earthquake.



## Verification

- This study has assessed the effectiveness of the existing tool by ensuring its introduction will encourage SMEs to conceive BC strategies.
- The study area is Amagasaki City of Hyogo Prefecture.
- A hearing survey has been conducted to managers from SMEs, the Registered Management Consultants and the city officers.
- The results showed that the introduction of the existing tool can generate an interactive dialogue between the users and us where they tend to progressively come up with some strategies.

