

# Preface

## Risk Management—Context and Rationale

In the Global Competitiveness Report 2012–2013 of the World Economic Forum, Israel ranked third in the world for its innovative ability, but only 89th for the achievements of its students in mathematics and science (The Global Competitiveness Report, 2012–2013). In light of these findings, the need arises to improve STEM education in Israel.

One way to improve the performance of education systems is by the implementation of risk management process. Risk management principles can be applied to any organization regardless its size, activity, or sector (ISO Guide73, 2009). However, so far it has not been carried out for national education systems. The following questions are raised: Can risk management be implemented for national education systems? If it can, how? If not, why?

In this Brief, we attempt to answer these questions, illustrating the need and methodology for such a process. Specifically, we focus on risk management of STEM education in Israel. This topic is worth examination for two main reasons. First, the increased attention the STEM subjects get recently world-wide due to the realization that these subjects are needed for both individuals' and nations' wealth, prosperity, and ongoing development and growth (see, e.g., Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future, 2010). Second, specifically, with respect to Israel, the STEM subjects form the basis for its hi-tech sector, which is one of Israel's key economic engines; therefore, STEM education should be treated as a strategic risk.

We lay out the implementation of a risk management method for the identification of the challenges of STEM education in Israel and for outlining a response plan for coping with these challenges. We also assert the present common acknowledgment that education should not concern only the education sector, but rather all sectors should be involved in its promotion in general and the promotion

of STEM education in particular. Therefore, we suggest that this Brief is relevant for anyone who is interested in STEM education, from all sectors—government and local authorities (the first sector), industry (the second sector), and nonprofit NGOs, including academia (the third sector).

## Brief Organization

The Brief is organized as follows.

Chapter 1 describes education systems in the world in the context of STEM education, addressing characteristics of successful education systems. As we shall see, some of the accepted characteristics of successful education systems are considered also in the industry as characteristics that foster successful organizations.

Chapter 2 presents four basic concepts of strategic analysis—a strategic analysis model, SWOT analysis, Delphi method and risk management—as they are used in the business sector, as well as their adaptation for the analysis of the case of STEM education.

Chapter 3 reviews the domain of STEM education in Israel, including a historical overview, current reforms, and contemporary trends and emphasis. It also describes the research process that guided the risk management process, presented in this Brief.

Chapter 4 describes the risk identification process of STEM education in Israel by SWOT analysis. It outlines seven risk categories of 43 risk factors, based on the analysis of bureaucratic-professional conflicts and barriers in implementing changes in education systems.

Chapter 5 presents the rating of the 43 risk factors of STEM education in Israel identified in Phase A (Chap. 4). These risk factors were rated by three levels of severity (high, medium, and low) (Mikes and Kaplan 2014). This phase also emphasizes *strategic risks* which endanger the objectives of the organization in general and in our case—the objectives of STEM education.

Chapter 6 lays out a response plan for the strategic risks. Thirteen courses of action are proposed: Five actions are internal to the education system and eight courses of action involve cross-sector cooperation with stakeholders from all sectors in Israel.

Chapter 7 presents our reflection on the Israeli case and lays out several meta-guidelines how to tackle risks with which education systems face. We highlight guidelines, such as diversity and inclusion as well as the use of knowledge generated outside the education field.

Haifa, Israel

Anat Even Zahav  
Orit Hazzan

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Even-Zahav, A.; Hazzan, O.

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