

A Simple Scenario-based Qualitative Model for Assessing Start-up Risks

Y. Ayse B. Nordal

Undervisningsbygg Oslo, KF 0605, Oslo, Norway

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Abstract: ISO 31000:2018 Risk Management Guidelines and COSO:2017 Enterprise Risk Management framework have two important and common characteristics. Firstly, they connect risks with business objectives. Secondly, they define risks as potential events that represent both positive and negative deviations from the expected. When a start-up company assesses its risks, the readily available source often consists of a blog-post on entrepreneurship that defines for instance 5, 10 or 15 potential events, which may represent negative consequences for its growth and development. Only some of these sources offer a classification of the risks so that the given start-up can see whether these risks are spread on different areas/dimensions or if they are accumulated in a few areas. To date, there are no easily available models which visualize the focus areas that the start-up ought to give priority to and treat with actions. This paper aims to contribute to solve the above-mentioned challenges by introducing a scenario-based model, which takes into account risks as well as opportunities in accordance with ISO 31000:2018. The model defines 4 complex risk dimensions/focus areas, each of them consisting of 10 elements and 60 potential scenarios. The scenarios are ranked in accordance with the degree of contribution to a start-up's risks and opportunities. The results of the scenario analysis are summarized through the use of a likelihood barometer. The barometer visualises whether the start-up's risks and opportunities are concentrated on one risk dimension, or whether these are spread on several dimensions. Thereafter, a traditional risk matrix is used to evaluate and rank the risks and opportunities which represent the highest negative and positive contributions to the start-up's failure or success.

1 INTRODUCTION

Start-ups tend to experience specific challenges when they assess their risks and opportunities, especially at the beginning of their venture:

1. They have limited benefits from the use of a traditional risk matrix. This is due to a lack of information, which would enable them to set up a reliable likelihood scale for potential events. They have neither statistical data nor experience data to create a probability distribution of the potential events, or to attach frequencies or probabilities to a potential event.

As Leveson states "One problem in assessing likelihood is that little real information is available about the future, especially at the beginning of the development process, when decisions about where to focus efforts are made." (Leveson, 2019). "(...) Methods like market research, decision trees/ what- if analysis will help to tackle this uncertainty to some extent" (Nordal, 2015). However, a meaningful

likelihood scale, which could have been used in a risk matrix, is not easily accessible.

2. Start-ups have limited resources and their priority is to know where to set proactive controls to hinder the likelihood of potential negative events and to promote the positive ones. This necessitates a creative process, which may build on a scenario analysis since: "In complex settings, scenarios can be used to identify a wide range of risks, rather than existing or obvious risks. Therefore, a problem-based scenario may not start with a single issue (...) but aim to identify all the relevant problems. The act of scenario building opens up possibilities in a creative manner, both with what might happen and what can be done to prevent or promote those outcomes based on whether they are viewed as harmful or beneficial" (Jones, 2010).

The most harmful and most beneficial scenarios will be given priority in action-settings.

3. Start-ups have limited resources to implement sophisticated risk assessment processes. Organizing

workshops for identifying risks, using computerized solutions to analyze them, keeping risk registers and formal reports may not be achievable for start-ups, at least at the very beginning. On the other hand, start-ups have a unique quality: “Having articulated their business intent and emphasized the customer connection, leaders give their people freedom within a framework—the liberty to operate within well-delineated boundaries—as well as opportunities to influence key decisions, such as which strategies to pursue or products to develop” (Gulati, 2019).

The risk management process of a start-up should be customized and scaled to this reality. A likelihood barometer may be a suitable tool in this regard. This, as it allows for a creative process of evaluating the scenarios and developing strategies to handle them.

2 MATERIALS AND METHODS

2.1 Materials

Risk management guidelines by the International Organization for Standardization (ISO, 2018) has a novel contribution to the definition of risks. Same as in the 2009 issue, it defines *risk* as the effect of uncertainty on objectives. However, in note 1 to said definition a new element was introduced, as follows: “An effect is a deviation from the expected. It can be positive, negative or *both*, and can address, create or result in opportunities and threats” (ISO, 2018).

This paper introduces a likelihood barometer that employs said risk definition. The barometer includes 4 major start-up risk dimensions. Each of these consists of 10 elements. Each element can materialize as 6 different scenarios which affect the uncertainty in positive or negative direction.

2.2 Methods

2.2.1 The Creation of a Likelihood Barometer

The paper follows the classical tradition that a risk may be expressed as:

$$R = L * C \quad (1)$$

where L is likelihood and C is consequence (impact). It is assumed that a start-up is exposed to 4 major risk dimensions. These are:

(D1): Market access

(D2): Product characteristics

(D3): Line & support functions

(D4): Contracts and commitments

Further, it is assumed that every risk dimension consists of 10 elements each. Every element may be described by 6 scenarios which can have:

HN: High negative effect (3)

MN: Moderate negative effect (2)

LN: Low negative effect (1)

LP: Low positive effect (-1)

MP: Moderate positive effect (-2)

HP: High positive effect (-3)

On the risk element in question. A negative effect will involve risks and a positive effect will involve opportunities. These dimensions and elements are presented in Table 1.

As seen in Table 1 “compliance with ethical and legal standards” is one of the ten elements in the risk dimension “product characteristics”. This element can contribute to risks or to opportunities, depending on the prevailing scenario which represents the start-up’s reality.

Table 2 describes such possible scenarios and how they are expected to affect risks and opportunities.

In the first scenario, the start-up delivers a product/service, which may be in breach of existing laws and regulations or is questioned based on the ethical standards of society. An example may be a computer game, which has discriminatory content or a toy with toxic materials. This scenario will create high risk in the product dimension.

The second scenario does not represent a legal or ethical violation, but lack of knowledge or lack of assurance of compliance. It is assumed that such lack of assurance may create moderate risk

In the third scenario, some interest groups are critical to the product. A product, which uses fur or leather, may be a relevant example.

In the fourth scenario, the product complies with laws and regulations and with the general ethical standards of the society. This may mean a slight opportunity, but not a competitive advantage. The product or service delivers in accordance with the expectations of the society.

In the fifth scenario, several interest groups in the society support the use of the product from an ethical point of view. The use of raw materials stemming from the underdeveloped countries, an environmental focus or universal design can be possible reasons for such support.

The sixth scenario describes the greatest opportunity. Here, the product has the support of many interest groups as well as the media and

Table 1: Risk Dimensions and Elements.

| MARKET ACCESS | PRODUCT CHARACTERISTICS | LINE & SUPPORT FUNCTIONS | CONTRACTS & COMMITMENTS |
|--|--|--|---|
| Dependency on a single product | Compliance with ethical and legal standards | Organization structure | Flexibility and terms of the office space solution |
| Access to complementary product market | Compliance with environmental targets | Dependence on specialized work force | Flexibility and terms of the leasing agreements |
| Existence of substitutes on the market | Degree of innovation embedded in the product | Entrepreneurial experience | Financial strength |
| Access to several customer income segments | Universal design | Knowledge about industry standards | Liquidity |
| Possibility to offer maintenance services to own product | Product security | Understanding the context | Environmental commitments |
| Possibility to sell again (repeat sales) | Access to raw materials | Supplier and sub-contractor operations | Legal commitments, product warranties and other liabilities |
| Patents and protection rights | Price and terms | Competition on human resources | Support and grant schemes |
| The product is relevant only for the luxury product market | Production process features and complexity | Outsourced activities | Quality commitments to customers |
| Access to international markets | Technical requirements and constraints | Cost structure | The control system |
| Availability of multiple market channels | Market readiness | Payment schemes | Commitments re. certifications |

Table 2: Choosing the Representative Scenario in Each Element.

| HN (3) | MN (2) | LN (1) | LP (-1) | MP (-2) | HP (-3) |
|--|---|---|---|---|---|
| The product's compliance with ethical standards or laws & regulations may be questioned due to specific reasons. | The product's compliance with all relevant laws and regulations is not evaluated. | Some groups in the society may be critical to the use of the product for ethical reasons. | The product complies with all laws and general ethical standards. | Several interest groups support the use of the product from an ethical point of view. | Regulators, media and many interest groups support the use of the product from a legal and ethical point of view. |

regulators.

The likelihood barometer model requires that the given start-up identifies its representative scenarios and the scenarios' effect on risks and opportunities for *all* elements, in *each* risk dimension.

Table 3 provided below illustrates the identification of representative scenarios for all elements.

In the theoretical example provided above the start-up is given two important and relevant signals:

- The market access dimension represents more

risks than opportunities and should be

- given priority when the start-up defines its policies and plans its actions
- 5 prevailing scenarios create high risks and deserve attention when proactive controls are going to be defined

Table 3: Representative Scenarios for All Elements in a Dimension.

| | HN (3) | MN (2) | LN (1) | LP (-1) | MP (-2) | HP (-3) |
|---|-----------|-----------|-----------|------------|------------|------------|
| 1. Dependency on a single product | X | | | | | |
| 2. Access to complementary product market | X | | | | | |
| 3. Existence of substitutes on the market | | | | X | | |
| 4. Access to several customer income segments | | | | X | | |
| 5. Possibility to offer maintenance services to own product | X | | | | | |
| 6. Possibility to sell again (repeat sells) | | X | | | | |
| 7. Patents and protection of rights | | X | | | | |
| 8. The product is relevant only for the luxury product market | | | | | X | |
| 9. Access to international markets | X | | | | | |
| 10. Availability of multiple market channels | X | | | | | |
| Sum | 5 | 2 | 0 | 2 | 1 | 0 |

The last step in the creation of the likelihood barometer is to set up the complete picture for all dimensions which are defined in Table 1. The total likelihood picture for the given start-up is defined in Table 4.

The start-up’s likelihood barometer visualizes the information, which is found in Figure 1.

The likelihood barometer in the example provided above indicates the following:

- The dimension “Product Characteristics” is the start-up’s strength. The prevailing scenarios indicate opportunities, which may be utilized and optimized. Thus, the start-up should focus on strengthening existing opportunities in this dimension
- The scenarios attached to “Line and support functions” represent “Low risk”. If these risks are treated correctly, they may contribute to the success of the start-up
- The start-up should treat the “Market access” and “Contracts and commitments” dimensions

proactively, introducing control actions to hinder that these scenarios are actualized or reduce their duration

2.2.2 Setting up Impact Criteria

Likelihood is only one aspect of risk. This paper and its underlying model express risk as a product of likelihood and consequences (impact). Thus, in the next step the paper seeks solutions to the following issues:

- Setting up criteria for impact (consequences)
- Extracting information from the multi-dimensional likelihood barometer for further use in a risk matrix

This paper’s underlying model employs impact criteria used by many prior studies (Curtis P & Carey M, 2012). The easiest approach with 3 impact types and 3 impact levels are defined. The following impact types are assumed to be relevant and significant for a start-up:

Table 4: The total likelihood profile.

| Likelihood profile -Totals | HN (3) | MN (2) | LN (1) | LP (-1) | MP (-2) | HP (-3) |
|----------------------------|-----------|-----------|-----------|------------|------------|------------|
| Market Access | 5 | 2 | 0 | 2 | 1 | 0 |
| Product Characteristics | 1 | 2 | 1 | 3 | 3 | 0 |
| Line & Support functions | 0 | 2 | 5 | 2 | 1 | 0 |
| Contracts & Commitments | 4 | 1 | 2 | 1 | 2 | 0 |
| Totals | 10 | 7 | 8 | 8 | 7 | 0 |



Figure 1: The likelihood barometer.

- Financial consequences
- Media coverage
- Talent attraction

Table 5 shows the impact (consequence) matrix for the start-up example provided above. The consequences presented in the figure is related to a specific time period, for instance a year or a planning period:

Table 5: The impact (consequence) criteria.

| Consequence/Level | Criteria |
|-------------------|---|
| HN (3) | <ul style="list-style-type: none"> • Extra costs, more than 20 % of the budget • Negative comments in the media, more than 20 news articles • Staff turnover, more than 15 % |
| MN (2) | <ul style="list-style-type: none"> • Extra costs, 10-20% of the budget • Negative comments in the media, 10-20 news articles • Staff turnover, 5-15 % |
| LN (1) | <ul style="list-style-type: none"> • Extra costs, less than 10 % of the budget • Negative comments in the media, less than 10 news articles |

| | |
|------------|---|
| | <ul style="list-style-type: none"> • Staff turnover less than 5 % |
| LP (-1) | <ul style="list-style-type: none"> • Extra income, less than 10 % of the budget • Positive comments in the media, less than 10 news articles • Less than 20 applications to vacant positions |
| MP (-2) | <ul style="list-style-type: none"> • Extra income, 10-20 % of the budget • Positive comments in media, 10-20 news articles • 20-50 applications to a vacant position |
| HP (-3) | <ul style="list-style-type: none"> • Extra income, more than 20 % of the budget • Positive comments in the media, more than 20 news articles • More than 50 applications to a vacant position. |

2.2.3 Visualizing the Results through a Simple Risk Matrix

Three assumptions are made in order to transfer information from a multi-dimensional likelihood barometer into a two-dimensional risk matrix.

Table 6 gives an overview of these assumptions. In the table, the concept “dimension” refers to the four dimensions, which are described in Table 1, i.e.:

“Market access”, “Product characteristics”, “Line & support functions” and “Contracts & commitments”. The concept “representative elements” refers to the highest total number of elements, which are described in each row of the

likelihood profile. This number reflects the underlying scenarios, which are assumed to be relevant in the given dimension.

3 RESULTS

Table 7 includes information from the likelihood barometer in accordance with assumptions shown in Table 6. We assume that the start-up has evaluated the impact (consequence) - figures in accordance with Table 5 and chose the values shown in column 3 of Table 7. Based on these figures, the start-up’s risk matrix is derived as follows:

Table 6: Assumptions about likelihood.

| Assumptions | Criteria |
|--------------|---|
| Assumption 1 | The highest number in the likelihood profile decides the ranking of likelihood, i.e. whether risks or opportunities are likely and whether the likelihood is low, medium or high |
| Assumption 2 | If the likelihood profile has two or more equal numbers as either the highest number in the same dimension, all indicating risks or opportunities, then the consequence figures will decide the final ranking of the risks/opportunities. If the consequence figures are also the same, then the results indicate a border case where attached scenarios in both categories require attention. |
| Assumption 3 | If the likelihood barometer has two or more equal numbers in opposite directions then the results indicate a case, which is mentioned in ISO 31000, “a deviation from the expected, positive, negative and <i>both</i> ”. |

Table 7: Likelihood, consequence (impact) and risk.

| Dimension | Likelihood value | Consequence (Impact) level in accordance with Table 5 | Risk= L*C |
|----------------------------|---|---|--------------|
| Market Risks | 3: Highest number is 5. 5 elements refer to category HN. | 2 | 6 |
| Product Characteristics | Category LP and category MP have equal numbers. 3 elements refer to each. -1: 3 refers to category LP -2: 3 refers to category MP | -1 -1 | -1 -2 |
| Line and Support Functions | 1: Highest number 5 refers to category LN | 2 | 2 |
| Contracts & Commitments | 3: Highest number | 3 | 9 |

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