

# Risk Management for Clean Energy Startups in Germany

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M.A. DEVELOPMENT ECONOMICS AND INTERNATIONAL STUDIES

# About the study

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The study *Risk Management for Clean Energy Startups* is conducted in frame of the Master Thesis project in partial fulfillment of the requirements for the degree in Development Economics and International Studies at the Friedrich-Alexander-University Erlangen-Nuremberg

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# Abstract

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The adequate risk management can improve the performance expectation of the clean energy startups, which are currently underrepresented in Germany. The empirical results of the current study show that the financial risk, market risk and investment risk are perceived as the highest in the current sample. However, the practical risk management efforts are concentrated on the construction and operation risk, financial risk and team risk. The risks are ranked according to data submitted by the clean energy startups incorporated in Germany or seeking German market access. The survey included the questions about the probability and severity of consequences of 8 major risks of the clean energy startups. The survey participants perceive the consequences of expected risks higher than the risk probability. The study also shows the unfit of their risk perception and the existing risk transfer tools, which protect against the consequences of the risk occurrence. The participants use more risk mitigation tools reducing the risk probability. The improvement of the risk management for clean energy startups requires the sponsorship, better risk data and risk sharing schemes.

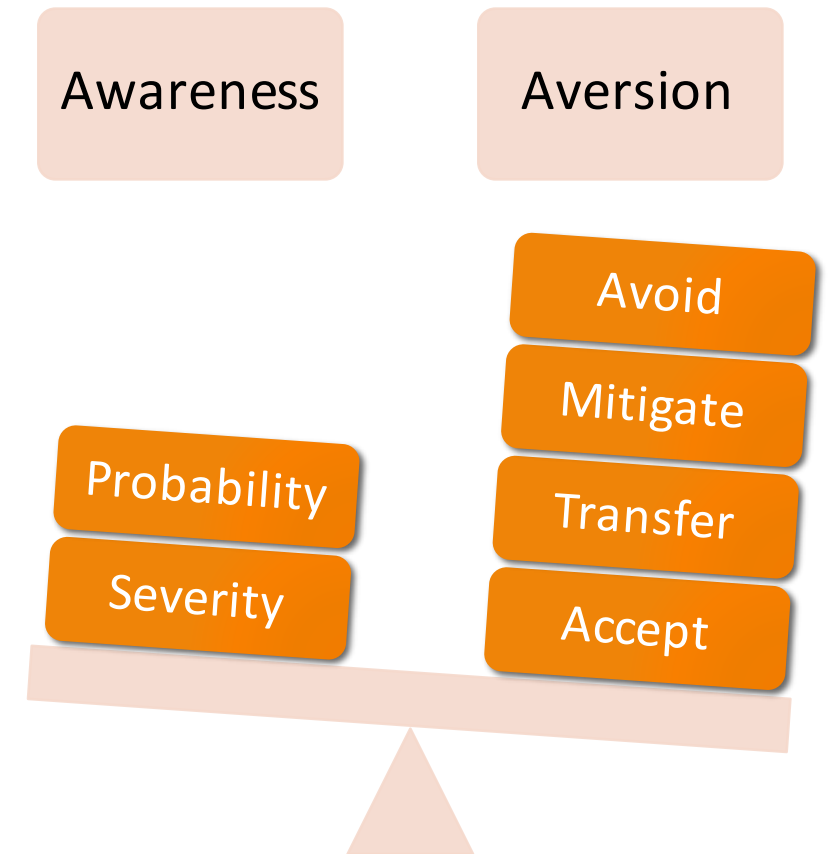
# Method

The method described by Boesmans and Willebrands (2017) helps to benchmark the potential entrepreneurial performance by introducing the categories of low awareness – low aversion startups, low awareness – high aversion startups, high awareness – high aversion startups and high awareness – low aversion startups.

**Table 1. Performance Expectation Matrix**

	LOW AVERSION	HIGH AVERSION
HIGH AWARENESS	Overestimated risks and disproportional risk management	Balanced or diversified risk management, high performance
LOW AWARENESS	Unbalanced or lacking risk management, low performance	Underestimated risks and disproportional risk management

*Source: Own representation based on Boermans and Willebrands (2017)*



# Risks Overview

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## Political

- Country risks
- Fiscal risks
- Regulatory risks

## Economic

- Market risks
- Financial risks
- Legal risks

## Social

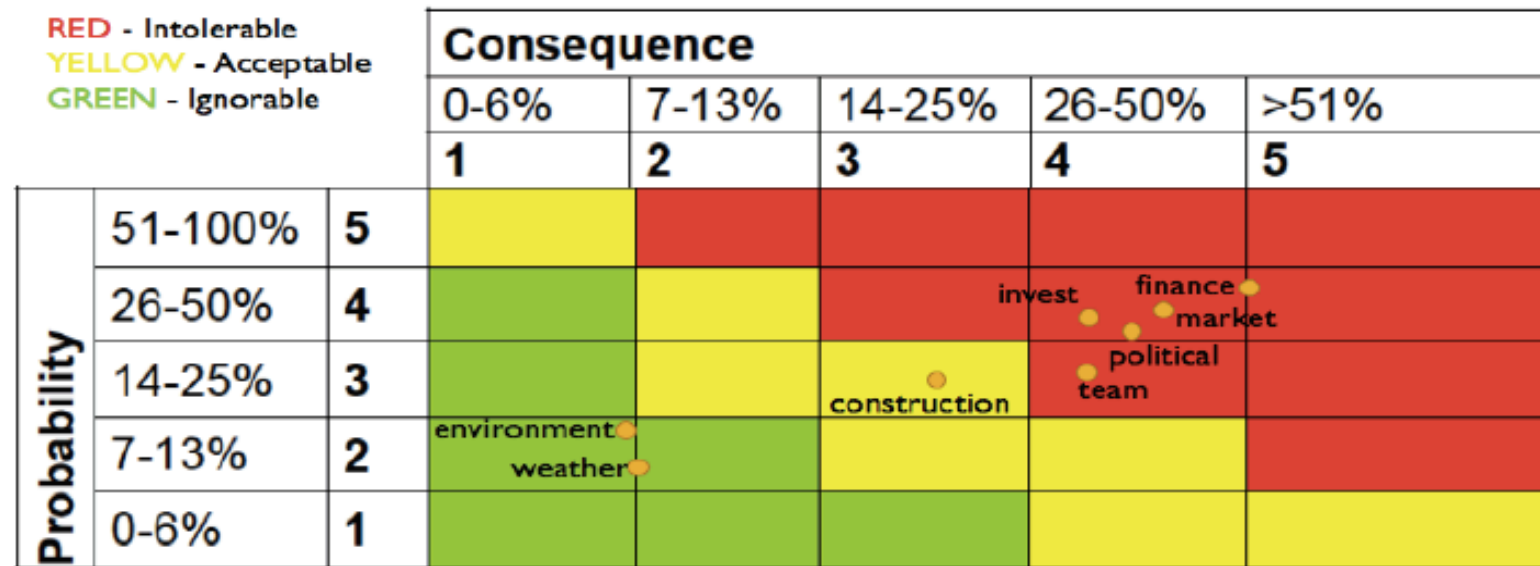
- Environmental risks
- Public risks
- Labor related risks

## Technical

- Construction risks
- Operation risks
- Weather related risks

# Risk Matrix: Survey Based

**Figure 3. Risk Matrix for Current Empirical Study**



*Source: Own representation based on Survey from July 2017*

# Conclusion 1: Higher Severity Perception Focus on the Mitigation Tools

## Appendix 16. Risk Evaluation Overview

a.

<i>Risk</i>	<i>Awareness</i>		<i>Aversion</i>	
	Probability median	Severity median	Mitigation used by current sample	Transfer used by current sample
<i>Political</i>	3 (14-25%)	4 (26-50%)	80%	20%
<i>Market</i>	4 (26-50%)	4 (26-50%)	97%	14%
<i>Financial</i>	4 (26-50%)	5 (51-100%)	64%	61%
<i>Investment</i>	4 (26-50%)	4 (26-50%)	67%	44%
<i>Environmental</i>	2 (7-13%)	1 (0-6%)	69%	36%
<i>Team</i>	3 (14-25%)	4 (26-50%)	83%	29%
<i>Construction</i>	2.5 (7-20%)	3 (14-25%)	94%	39%
<i>Weather</i>	0	0	31%	14%

# Conclusion 2: Awareness of Financial Risk but Aversion from Construction Risk

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## **b.** **Risk Ranking by Awareness and Aversion**

	<b>Awareness</b>	<b>Aversion</b>
1	financial risk	construction and operation risk
2	market, investment risks	financial risk
3	team, political risks	team risk
4	construction and operation risk	market, investment risks
5	environmental risk	environmental, political risks
6	weather related risk	weather related risk

The survey participants have a higher risk severity perception than the risk probability perception. Thus, the risk management strategy is expected to be more focused on the risk transfer tools. However, only the financial risk and environmental risk perceptions are supported by the adequate risk management measures. The other risks are managed mainly with the mitigation tools reducing the risk's probability. The reason for it could be the risk premium charged by third parties.

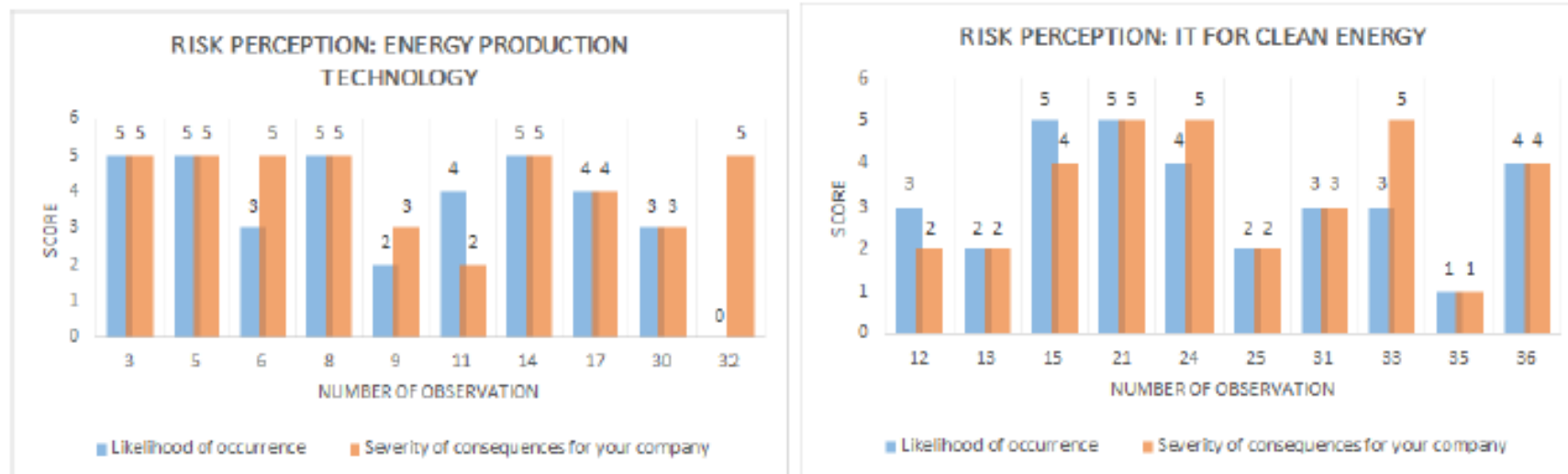
*Source: Own representation based on Survey from July 2017*



# Conclusion 3: Industrial Bias in Risk Perception

The energy production startups of the current sample have the risk awareness above the sample's average and above the IT for clean energy group. The exceptions are the awareness of financial risk, construction risk and team risk, which are perceived by the energy production startups below the sample's average.

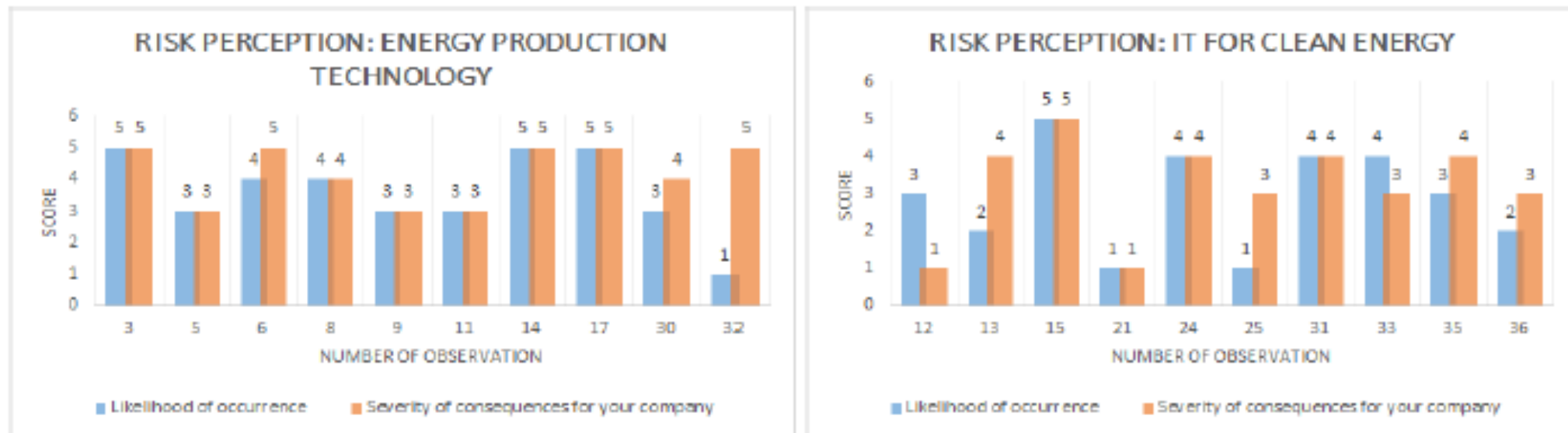
**Figure 7. Industry Profile: Political Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

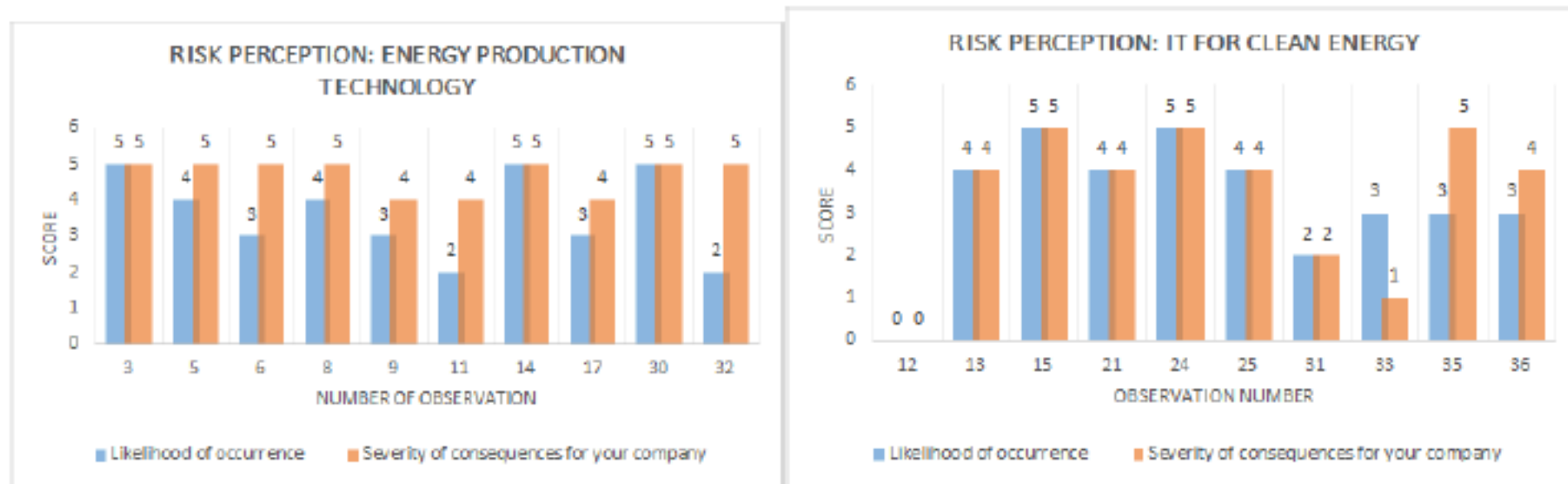
**Figure 11. Industry Profile: Market Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

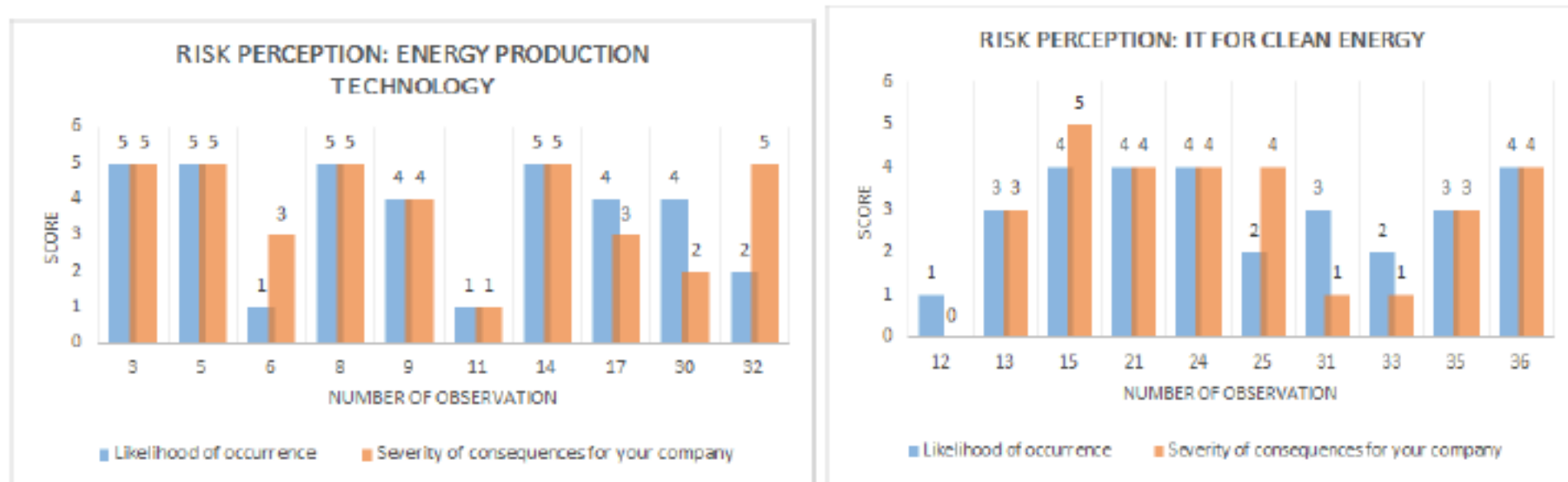
**Figure 15. Industry Profile: Financial Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

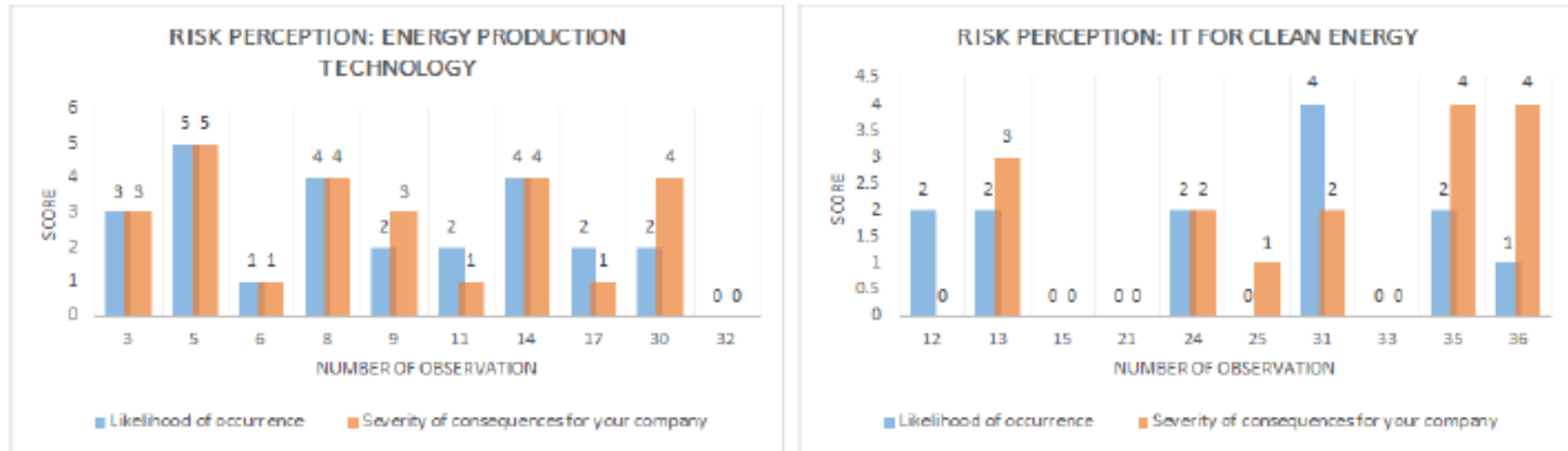
**Figure 19. Industry Profile: Investment Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

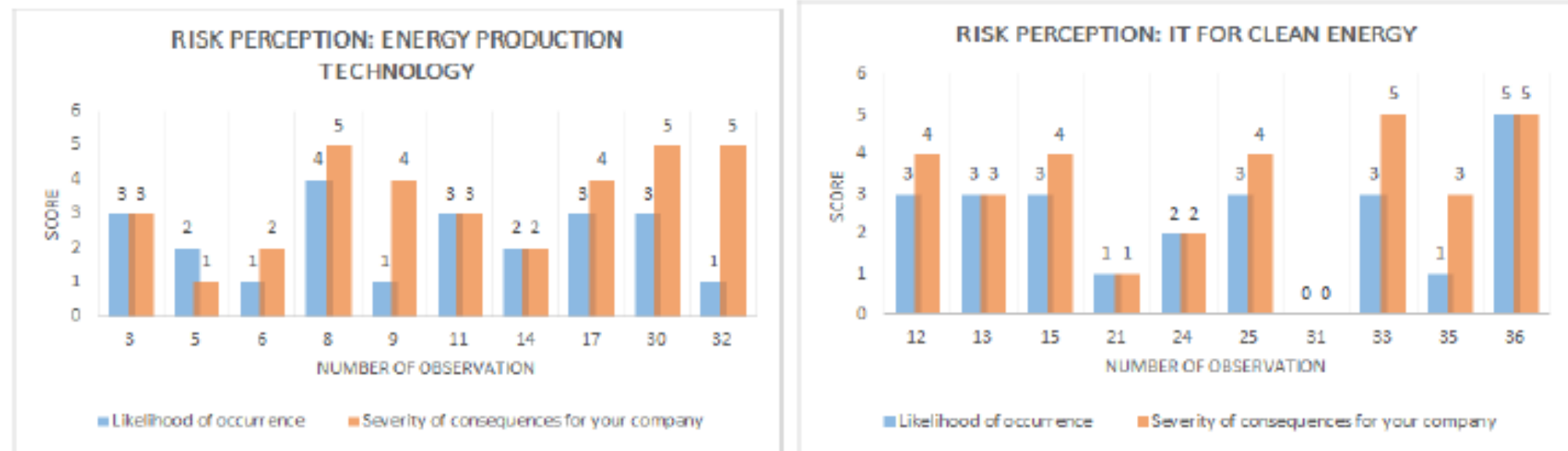
**Figure 23. Industry Profile: Environmental Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

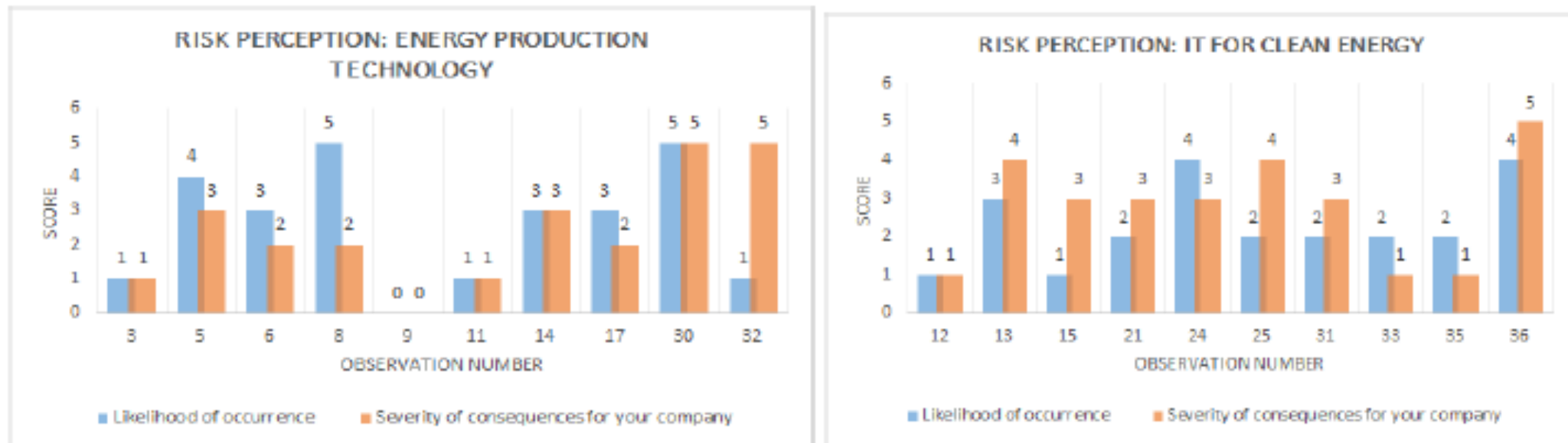
**Figure 27. Industry Profile: Team and Leadership Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

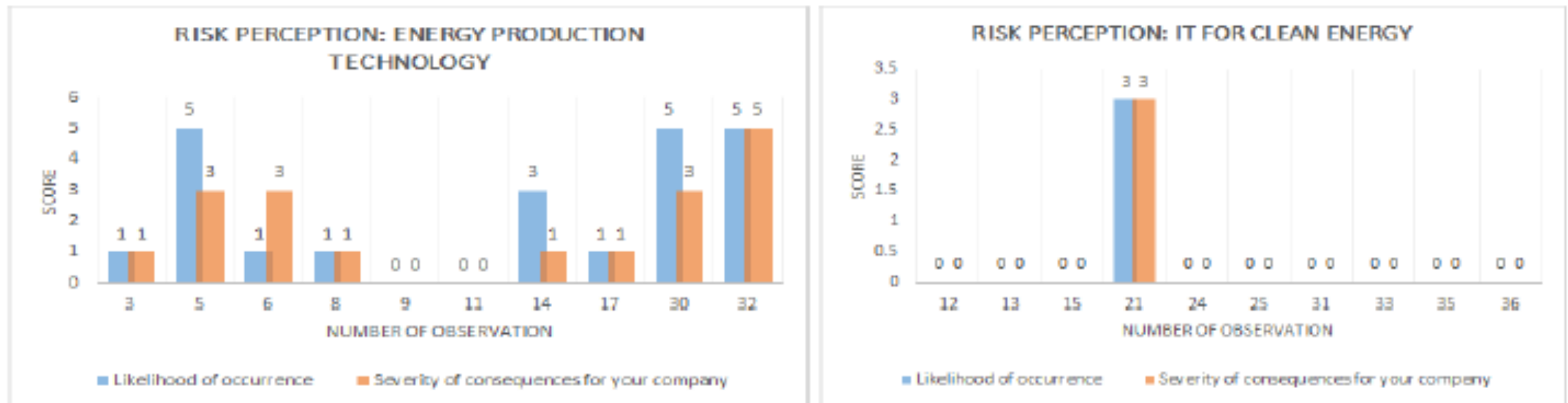
**Figure 31. Industry Profile: Construction and Operation Risk Awareness**



*Source: Own representation based on Survey from July 2017*

# Conclusion 3: Industrial Bias in Risk Perception

**Figure 35. Industry Profile: Weather Risk Awareness**



*Source: Own representation based on Survey from July 2017*



# Conclusions

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- The survey participants perceive the risk probability below its severity in average;
- The survey participants prefer the risk mitigation tools rather than the risk transfer tools;
- The survey participants show the highest risk awareness for financial risk but the highest risk aversion for the construction risk;
- There is an industrial bias of the risk awareness. The startups dealing with the energy production technologies perceive risks higher (in majority of cases) than the representatives of IT technologies;
- The risk mitigation tools are preferred over the risk severity tools because of risk premium.

# Contacts

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