

**Success factors and barriers in university-industry cooperation:
Case study of radiation hardness testing services for microelectronic devices**

Master Thesis
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Abstract

A few decades ago universities started to go beyond their classical scope of education and research and invested effort in other forms of academic engagement that provide relevance for the society. This resulted mainly in research partnerships between university and industry, with the goal of fostering knowledge and technology transfer and thereby contributing to a higher performance of the national economy. However, challenges arose according to the uneven partners of this dyadic university-industry relationship and literature has focused on measures to effectively overcome these challenges. Only recently, some scholars have added a new perspective to the research by analyzing dyads between university and industry based on the concepts of social capital and relational capital. It has been found that social capital built up in relationships can help to facilitate knowledge transfer between the partners.

This thesis focuses on another form of academic engagement, whereby university acts as a service supplier, offering access to its unique high-tech testing capabilities for external paying industry customers. This study analyzes the use case of radiation hardness testing. This method is used by the industry to expose e.g. microelectronic devices to radiation generated by a particle accelerator, in order to test and validate the error rate before applying the devices to radiation environments that they are designed for. One prominent application is electronics implemented in satellites, where failures during the expected life time can lead to a loss of the mission.

A qualitative case study approach is used to perform an in-depth analysis of the relationship between the university acting as a service provider and its customer. The factors influencing this relationship and the mechanisms of interaction have been explored with a set of publicly funded irradiation facilities and customers from industry, respectively.

The findings of this study confirm that influencing factors derived from the social capital dimensions play an important role for the success of the relationship. The model that emerged from the data analysis describes the mechanisms with which the identified barriers and facilitators interact on the dyadic relation. Furthermore, examples are presented how the facilitators can be activated and the barriers can be mitigated. It is the first study combining the aspects of analyzing a service provision by university with the concept of social capital.

On the basis of the thesis results, recommendations can be derived for facilities that intend to start a service provision in the field of radiation hardness testing as well as for existing service providers. Further research could be attributed to a detailed analysis of the service price and its impact on the customer's decision for a certain facility. Additionally, the inclusion of North American facilities may help to acquire a wholistic picture of the market place.