

# Financing High-Tech Startups

Robin P. G. Tech

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Using Productive Signaling to Efficiently  
Overcome the Liability of Complexity

 Springer

Robin P. G. Tech  
Alexander von Humboldt Institute for  
Internet and Society  
Berlin, Germany

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# Dedication

To my grandparents who taught me the  
meaning of this word.

*Anna and Heinz Schäfer:*

You made this happen.

# Foreword

The role high-tech startups play for the advancement of developed economies is of major importance. Where would we be today if not for innovative startups such as Braun (that revolutionized home appliances), ABB (that defined modern generators and robots), and Apple (that shaped much of the way we use computers)? A frequent bottleneck for high-tech startups, however, is a lack of financing due to their complexity.

In this book, Robin Tech examines such complexity and shows how it leads to information asymmetries and transaction costs between the investor and the startup. He depicts how this in turn leads to uncertainty on the part of investors and ultimately to frequent negative financing decisions. Since early-stage high-tech startups are particularly complex, they bear a peculiar liability that Mr. Tech calls the liability of complexity. To examine this effect, Mr. Tech embeds the analysis of high-tech startups into the greater discourse of complex products and systems analysis and synthesizes theories of new institutional and behavioral economics. He then uses quantitative and qualitative data to derive mitigation strategies to overcome the liability of complexity—particularly through signaling. His complexity-signal framework will greatly support entrepreneurs to pinpoint complexity factors that affect investors’ decision making the most and to identify signal sets to militate adverse effects.

The question of how to finance innovative and complex startups in particular and complex systems in general is highly relevant in practice and has received too little attention. Mr. Tech’s work helps to better understand the underlying concepts of high-tech startup financing and develops hands-on strategies to overcome the liability of complexity.

We hope that the startup entrepreneurs as well as investors will also find this work valuable in their daily work of attracting and allocating financial assets. Startups are important drivers of the economy’s future competitive advantage. May the force be with them!

Berlin, Germany  
St. Gallen, Switzerland

Thomas Schildhauer  
Oliver Gassmann

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# List of Abbreviations

BA	Business angel
BE	Behavioral economics
BVDS	Bundesverband Deutsche Startups/German Startups Association
CAPM	Capital asset pricing model
CPT	Cumulative prospect theory
CVC	Corporate venture capital(ist)
DSM	Deutscher Startup Monitor/German Startup Monitor
EMH	Efficient market hypothesis
FFF	Friends, family, fools
GE	German entrepreneur
GHM	Grossman–Hart–Moore model of property rights
GI	German investor
HIIG	Alexander von Humboldt Institute for Internet and Society
IPO	Initial public offering
IoT	Internet of things
IIoT	Industrial Internet of things
KPI	Key performance indicator
MVP	Minimum viable product
NIE	New institutional economics
NVCA	National Venture Capital Association
OECD	Organisation for Economic Co-operation and Development
PA	Principal agent
PWC	PricewaterhouseCoopers
TCE	Transaction cost economics
USE	US entrepreneur
USI	US investor
VC	Venture capital(ist)
WACC	Weighted average cost of capital

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