



Delft University of Technology

Achieving technology dominance for startups: illustrative evidence of the importance of establishing inter-organizational networks

Scholten, VE; van de Kaa, G

DOI

[10.12735/jbm.v5i1p01](https://doi.org/10.12735/jbm.v5i1p01)

Publication date

2016

Document Version

Final published version

Published in

Journal of Business and Management

Citation (APA)

Scholten, VE., & van de Kaa, G. (2016). Achieving technology dominance for startups: illustrative evidence of the importance of establishing inter-organizational networks. *Journal of Business and Management*, 5(1). <https://doi.org/10.12735/jbm.v5i1p01>

Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.

Achieving Technology Dominance for Startups: Illustrative Evidence of the Importance of Establishing Inter-Organizational Networks

Victor Scholten¹ & Geerten van de Kaa^{1*}

¹ Values, Technology, and Innovation, Delft University of Technology, The Netherlands

* Correspondence: Geerten van de Kaa, Values, Technology, and Innovation, Delft University of Technology, Jaffalaan 5, Delft, 2600 The Netherlands. Tel: 31.15.2783678; E-mail: g.vandekaa@tudelft.nl

Received: September 16, 2015 Accepted: November 27, 2015 Online Published: April 5, 2016

DOI: 10.12735/jbm.v5i1p01 URL: <http://dx.doi.org/10.12735/jbm.v5i1p01>

Copyright © V. Scholten & G. van de Kaa **

Abstract

In this paper we study the influence of the network of actors on the chances that a start-up will be successful in commercializing a platform. Scholars that study platform wars have conducted multiple studies of factors that influence platform dominance where the focus lies on factors that can be influenced by the firm (firm-level factors) and factors that are given in specific industries which can hardly be influenced by firms (environmental factors). Few studies have included views from platforms and entrepreneurship to understand the successful commercialization of new platform. A common research approach in both fields of platforms and entrepreneurship is network analyses. In this paper we conceptualize how entrepreneurs can apply network strategies to successfully commercialize their new products in an emerging market in the first phases of the technology dominance process. We illustrate our ideas by means of several examples.

JEL Classifications: L11, L22

Keywords: high-technology start-ups, entrepreneurial marketing, new product development, technology dominance

1. Introduction

While most start-ups find it difficult to survive the first couple of years of their existence, some entrepreneurs only spent a small amount of time during the start-up phase and quickly grow into a

** This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International

License (<http://creativecommons.org/licenses/by/4.0/>). 

Licensee: [Science and Education Centre of North America](#)

How to cite this paper: Scholten, V., & Van de Kaa, G. (2016). Achieving technology dominance for startups: Illustrative evidence of the importance of establishing inter-organizational networks. *Journal of Business and Management*, 5(1), 1-7. <http://dx.doi.org/10.12735/jbm.v5i1p01>

successful large company. For example, Larry Page and Sergey Brin started their company Google in 1999 in the incubation center at Palo Alto. They remained there for only a couple of months but soon they had to move to a bigger location leaving other starting entrepreneurs behind. In the years that followed, the market share of their search engine increased rapidly. Since 2004 it is the dominant search engine handling over 80 percent of all search requests on the Internet, leaving other search engines far behind. Essentially, it has set the market platform for search engines. Although this case is more an exception than a rule, it inspired us to raise the fundamental question how start-ups establish a dominant platform. Thus, the purpose of the paper is to explore how start-ups establish a dominant platform.

We draw on existing literature that analyses platform dominance and translate that to the case of a start-up. Our focal point lies on the influence of the position of a start up in a social network on its chances of achieving dominance with its technology. In this paper we investigate how new start-ups develop, mobilize and make use of their social network in order to develop a product for an emerging market.

The purpose of this research is to contribute to the ongoing research on factors for platform dominance ([Gallagher, 2012](#); [Gallagher & Park, 2002](#); [Schilling, 2002](#); [Sheremata, 2004](#); [Suarez, 2004](#); [Van de Kaa, 2009](#); [Van de Kaa & De Vries, 2015](#); [Van de Kaa, Greeven, & van Puijenbroek, 2013](#); [Van de Kaa, Rezaei, Kamp, & De Winter, 2014](#); [Van de Kaa, De Vries, & Van den Ende, 2015](#); [Van de Kaa, Van Heck, De Vries, Van den Ende, & Rezaei, 2014](#)) and the research on the networking activities of entrepreneurial start-ups ([Scholten, Omta, Kemp, & Elfring, 2015](#); [Stuart & Sorensen, 2007](#)) and organizations facilitating the emergence of technology-based start-ups ([Rasmussen & Borch, 2010](#); [Trott, Scholten, & Hartmann, 2008](#)). We examine the components of Suarez's technology dominance framework. We recognize the value of this model and bring a start-up view into the model. We also recognize that startups lack the required assets to fight platform wars and we provide a solution for this in the form of the application of network strategies.

The paper proceeds as follows. First, we review the literature on platform wars. Second, we illustrate how startups have been successful in the past in establishing platform dominance. Subsequently, we conclude that startups can gain access to the required assets by forming essential relations with other stakeholders.

2. Start-ups and Product Dominance in Emerging Markets

Suarez (2004) builds on the technology management stream and develops a model of product dominance for incumbents. We build on this work and extend the model to the field of start-up ventures in emergent fields. We conceptualize that start-ups need to mobilize networks to compensate for their lack of critical resources in the early stages of product development.

2.1. Platform Dominance

Scholars that study platform wars draw on both industrial economics and strategic management to explain the outcome of these battles. They argue that stakeholders that are active in such platform wars possess important complementary assets which can be utilized in order to increase installed base and thus platform dominance. These include for example financial assets which may be used to recoup losses during the initial stage of the battles; if stakeholders enter early this may be useful. Other assets include reputation and credibility and production capacity. Strategies include marketing through e.g. pre-announcements and licensing. It is argued in this respect that the proper applications of these strategies and resources leads to an increase in installed base under the influence of network effects ([Suarez 2004](#), [Schilling 1998](#)). Suarez continues and argues that the importance of different strategies and resources for platform dominance varies during the phases of the technology life cycle ([Suarez, 2004](#)) and a framework for understanding the process by which a

platform achieves dominance when battling against other platforms is developed. The framework includes different factors that affect the final outcome of a platform war – e.g. technological superiority, firm resources, market mechanisms, etc. It proposes that the importance of these factors differs depending upon the stage in the technology life cycle. Five stages are distinguished. We focus on the first stages from initial idea to the first introduction of a commercial product. The first stage, R&D buildup, begins with a pioneering firm doing applied R&D aimed at commercializing a new technology, multiple firms follow and multiple technological trajectories exist in parallel. Reputation is an important asset in this stage since it will provide access for firms to good researchers. Also, the regime of appropriability plays a role in this stage. If it is tight and competitors cannot easily imitate the new technology the focal firm will have the time needed to develop the new technology. This environmental factor seems to be especially important for entrepreneurs since these types of actors need time to accumulate the needed reputation and credibility. By acquiring essential intellectual property rights, these firms may attain a dominant market position (Bekkers, Duysters, & Verspagen, 2002) and through this dominant position they may amass the necessary reputation and credibility. Unfortunately, few markets are characterized by a tight appropriability regime and hence firms (and entrepreneurs) will need to turn to strategy to stave off imitators (Teece, 1986). The second stage, technological feasibility begins with the appearance of a first working prototype. At this moment a decision for a technological trajectory has been made. If the working prototype is technologically superior to the other prototypes it may well lead to an early winning technology. In this stage a form of marketing, pre-announcements, becomes an important strategic tool to influence future installed base. The third stage begins with the launch of a first commercial product. It is at this moment that market factors become especially important. Also, at this stage, relations with manufacturers of complementary goods will become more important. The more complementary goods are available to the user, the higher the potential installed base (Schilling, 2002).

Suarez (2004) emphasizes the importance of a firm's complementary assets in the early stages of the technology life cycle where firms can use their reputation to attract researchers that have expertise in the particular new technology. However, these experts are expensive and thus financial resources are needed. Clearly, an entrepreneurial start-up lacks these resources and for these new companies other factors may be more important. However, entrepreneurial start-ups can gain access to resources through establishing relations with partners that possess these resources. The primary reason for collaborating with these partners is to increase the market power and indirectly the entrepreneur's credibility and reputation. In technology management, some studies draw upon social network literature. In social network literature it is argued that the performance of actors in either product development or firm success depends on their embeddedness in technological and social networks (Burt, 1992; Coleman, 1988; Granovetter, 1973). Technology management studies that draw from social network literature focus on the influence of characteristics of networks of end users on the chances those technologies are adopted by these end users. Suarez (2005) for instance studied the role of strong ties in technology selection and Davis (1991) studied the influence of a firm's position in a network of other firms on the chances that it adopts a certain practice. Other studies study the influence of networks of firms on the chances that a technology that these firms promote achieves dominance. Vanhaverbeke (2001) has studied the formation of inter-organizational networks around proprietary RISC designs and Axelrod, Mitchell, Thomas, Bennett, and Bruderer (1995) relates a firm's incentive to join a platform setting alliance to the size and composition of the alliance.

3. Illustrative Examples

A variety of ICT-based start-ups and communities have shown to be able to achieve market dominance and set the platform for their technology using a network approach. A clear example is

the security functions of Apache web server software. Because the customers were very heterogeneous, the startup behind Apache adopted a market approach based on a standard software product, which was developed using open source software and was accommodated with toolkits for user innovation (Franke & Von Hippel, 2003). The toolkit provided skilled users with the possibility to modify the platform to their own needs which had a significant impact on the satisfaction of users and the success of the software as a platform for web server software (Franke & Von Hippel, 2003). The case shows how the start up behind Apache is using its network of users and chooses for a strategic decision in providing a toolkit for skilled users to help innovate and adapt the standard software product. Drupal and WordPress also adopted this strategy. Drupal and WordPress were both first released in 2003 and used the toolkit strategy to obtain market entry to the market of content management software. Both companies were able to attract programmers from established companies such as Apple and IBM to work with their toolkit and accordingly were attractive alternatives for heterogeneous data storage and analyses such as in bioinformatics (Papanicolaou & Heckel, 2010), where the Bioinformatic Server Framework Drupal is running on the background with Tripal as front-end for the Generic Model Organism Database tool-kit (GMOD; <http://gmod.org>) (Sanderson *et al.*, 2013). The GMOD consortium emerged from functional genomics model organism communities and has developed a standard set of open source software for handling, primarily, genomic.

Also in the gaming industry we witnessed start-ups such as Zynga, which developed games for Facebook. Zynga started with 'Texas Hold'Em Poker' that later was renamed as 'Zynga Poker' but its well-known production was 'FarmVille', released in 2009. Also Rovio, the company that developed Angry Birds and established in 2003, relied strongly on an existing platform of users which could act as a network to quickly distribute the product. Rovio had already developed a variety of computer games for third parties and at the beginning of 2009 it was close to bankruptcy. But in spring 2009 it developed the first steps towards the game Angry Birds which appealed to millions of users in just over a couple of months and in its first year after release it was the number-one paid app on iTunes in 68 countries (Cheshire, 2011). Both games were using an existing platform to quickly gain market share and set a dominant platform for a new approach of game design. Important aspect of these platforms was that it tapped into networks of users, e.g. gamers that invite friends to join and play together. The new platform these games introduced was different from traditional games, which were expensive to build because of their sophisticated graphics and sounds (Shin & Shin, 2011). The new online game approach is that "friends of players are not buy just resources for the player, but also for the game developer, who relies on the insipid, viral aspects of a design to ensure system replication" (Shin & Shin, 2011, p. 854).

These examples show how start-up companies in ICT, while having few resources, do rely on networks of users and existing platforms and adopt strategic maneuvers to quickly generate market share and develop a new platform for their technology or business model. They were able to enter emerging markets where incumbents were not very successful initially. The examples furthermore show that the factors important during the early phases of the development of a dominant design seem to be different from those that are put forward by Suarez (Suarez, 2004) which are largely based on how incumbent firms develop a dominant design.

4. Discussion and Conclusion

In the first phase, Suarez expects large firms to allocate resources to build up R&D. Because new ventures lack the resources needed to obtain credibility among the end-users of their products in the market, new entrepreneurial start-ups will adopt a network strategy to mobilize reputable network contacts that can endorse the new technology and feasibility of the product solution in the market. In the second phase, new entrepreneurial start-ups try to improve the technological feasibility of the

new product. Insight knowledge and acceptance among the end-users is needed. Partners are important to conduct fieldwork that is needed to understand and comply with the market requirements in the eyes of the end-users. Hereby, new entrepreneurial start-ups can attempt to convince end-users that their technology meets the set of rules and procedures common in the field. In addition new entrepreneurial firms lack the technological superiority, which is more often available with large incumbents (Suarez, 2004). Many times, start-ups solve the absence of technological superiority by establishing relationships with highly regarded organizations in the field. In the third phase, when entrepreneurial firms try to enter the market they can rely on the strong ties that have been built with partners in the first phase. The partners that initially helped to gain the interest of end-users are important to scale-up the production quickly and thereby pre-empt the market for competitors. Thus, it appears that in all stages entrepreneurial start-ups can gain access to required assets by applying network strategies that give them access to collaborations.

The study has several limitations. First, it draws on a relative small set of examples of start-ups that were successful in achieving technology dominance in emerging markets. Although the examples provide insight into the networking strategies of new entrepreneurial start-ups to achieve technology dominance, future research may benefit from studying a broader set of start-ups that are successful but also less successful in their search for technology dominance. Second, the study uses secondary data however, more fine grained data based on interviews and in-depth case study development would benefit the understanding of the interaction between networking and the building of technology dominance. This inductive research might result in hypotheses which can be tested using various methods such as experiments or surveys. However, this research has opened an interesting research avenue by investigating how new entrepreneurial start-ups use their network to obtain legitimization in the environmental context and eventually claim technological dominance. Although this paper is conceptual in nature, it can contribute to our knowledge if propositions and testable hypotheses could be formulated. Future research may benefit from analyzing multiple cases of new entrepreneurial start-ups that enter an emerging market and thereby are successful at setting a platform for that particular industry.

References

- [1] Axelrod, R., Mitchell, W., Thomas, R. E., Bennett, D. S., & Bruderer, E. (1995). Coalition formation in standard-setting alliances. *Management Science*, 41(9), 1493-1508. doi:10.1287/mnsc.41.9.1493
- [2] Bekkers, R., Duysters, G., & Verspagen, B. (2002). Intellectual property rights, strategic technology agreements and market structure: The case of GSM. *Research Policy*, 31(7), 1141-1161. doi:10.1016/S0048-7333(01)00189-5
- [3] Burt, R. S. (1992). *Structural holes: The social structure of competition*. Cambridge, MA.: Harvard University Press.
- [4] Cheshire, T. (2011). *In depth: How Rovio made Angry Birds a winner (and what's next)*. Retrieved January 10, 2015 from <http://www.wired.co.uk/magazine/archive/2011/04/features/how-rovio-made-angry-birds-a-winner>.
- [5] Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94(Supplement), S95-S120.
- [6] Davis, G. F. (1991). Agents without principles? The spread of the poison pill through the intercorporate network. *Administrative Science Quarterly*, 36(4), 583-613.
- [7] Franke, N., & von Hippel, E. (2003). Satisfying heterogeneous user needs via innovation toolkits: The case of Apache security software. *Research Policy*, 32(7), 1199-1215. doi:10.1016/S0048-7333(03)00049-0

- [8] Gallagher, S. R. (2012). The battle of the blue laser DVDs: The significance of corporate strategy in standards battles. *Technovation*, 32(2), 90-98. doi:10.1016/j.technovation.2011.10.004
- [9] Gallagher, S. R., & Park, S. H. (2002). Innovation and competition in standard-based industries: A historical analysis of the U.S. home video game market. *IEEE Transactions on Engineering Management*, 49(1), 67-82.
- [10] Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- [11] Papanicolaou, A., & Heckel, D. G. (2010). The GMOD Drupal bioinformatic server framework. *Bioinformatics*, 26(24), 3119–3124. doi: 10.1093/bioinformatics/btq599
- [12] Rasmussen, E., & Borch, O. J. (2010). University capabilities in facilitating entrepreneurship: A longitudinal study of spin-off ventures at mid-range universities. *Research Policy*, 39(5), 602-612. doi:10.1016/j.respol.2010.02.002
- [13] Sanderson, L.-A., Ficklin, S. P., Cheng, C.-H., Jung, S., Feltus, F. A., Bett, K. E., & Main, D. (2013). Tripal v1.1: A standards-based toolkit for construction of online genetic and genomic databases. *Database*, bat075. doi:10.1093/database/bat075
- [14] Schilling, M. A. (1998). Technological lockout: An integrative model of the economic and strategic factors driving technology success and failure. *Academy of Management Review*, 23(2), 267-284.
- [15] Schilling, M. A. (2002). Technology success and failure in winner-take-all markets: The impact of learning orientation, timing, and network externalities. *Academy of Management Journal*, 45(2), 387-398.
- [16] Scholten, V., Omta, O., Kemp, R., & Elfring, T. (2015). Bridging ties and the role of research and start-up experience on the early growth of Dutch academic spin-offs. *Technovation*, 45-46, 40-51. doi:10.1016/j.technovation.2015.05.001
- [17] Sheremata, W. A. (2004). Competing through innovation in network markets: Strategies for challengers. *Academy of Management Review*, 29(3), 359-377. doi:10.5465/AMR.2004.13670986
- [18] Shin, D.-H., & Shin, Y.-J. (2011). Why do people play social network games? *Computers in Human Behavior*, 27(2), 852–861. doi:10.1016/j.chb.2010.11.010
- [19] Stuart, T. E., & Sorenson, O. (2007). Strategic networks and entrepreneurial ventures. *Strategic Entrepreneurship Journal*, 1(3-4), 211-227. doi: 10.1002/sej.18
- [20] Suarez, F. F. (2004). Battles for technological dominance: An integrative framework. *Research Policy*, 33(2), 271-286. doi:10.1016/j.respol.2003.07.001
- [21] Suarez, F. F. (2005). Network effects revisited: The role of strong ties in technology selection. *Academy of Management Journal*, 48(4), 710-720. doi:10.5465/AMJ.2005.17843947
- [22] Teece, D. J. (1986). Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy*, 15(6), 285-305. doi:10.1016/0048-7333(86)90027-2
- [23] Trott, P., Scholten, V. E., & Hartmann, D. (2008). *How university incubators may be overprotective and hindering the success of the young firm: Findings from a preliminary study*. Paper presented at the IEEE International, Engineering Management Conference, Estoril, Portugal. doi:10.1109/IEMCE.2008.4617984
- [24] Van de Kaa, G. (2009). *Standards battles for complex systems: Empirical research on the home network*. Rotterdam: Erasmus Research Institute of Management.

- [25] Van de Kaa, G., & De Vries, H. J. (2015). Factors for winning format battles: A comparative case study. *Technological Forecasting and Social Change*, 91, 222-235. doi:[10.1016/j.techfore.2014.02.019](https://doi.org/10.1016/j.techfore.2014.02.019)
- [26] Van de Kaa, G., De Vries, H. J., & Van den Ende, J. (2015). Strategies in network industries: The importance of inter-organisational networks, complementary goods, and commitment. *Technology Analysis & Strategic Management*, 27(1), 73-86. doi:[10.1080/09537325.2014.951320](https://doi.org/10.1080/09537325.2014.951320)
- [27] Van de Kaa, G., Greeven, M., & van Puijenbroek, G. (2013). Standards battles in China: Opening up the black-box of the Chinese government. *Technology Analysis & Strategic Management*, 25(5), 567-581. doi:[10.1080/09537325.2013.785511](https://doi.org/10.1080/09537325.2013.785511)
- [28] Van de Kaa, G., Rezaei, J., Kamp, L., & De Winter, A. (2014). Photovoltaic technology selection: A Fuzzy MCDM approach. *Renewable and Sustainable Energy Reviews*, 32, 662–670. doi:[10.1016/j.rser.2014.01.044](https://doi.org/10.1016/j.rser.2014.01.044)
- [29] Van de Kaa, G., Van Heck, E., De Vries, H. J., Van den Ende, J., & Rezaei, J. (2014). Supporting decision making in technology standards battles based on a fuzzy analytic hierarchy process. *IEEE Transactions on Engineering Management*, 61(2), 336-348. doi:[10.1109/TEM.2013.2292579](https://doi.org/10.1109/TEM.2013.2292579)
- [30] Vanhaverbeke, W., & Noorderhaven, N. G. (2001). Competition between alliance blocks: The case of the RISC microprocessor technology. *Organization Studies*, 22(1), 1-30. doi:[10.1177/017084060102200101](https://doi.org/10.1177/017084060102200101)

