

FEEDING THE NETWORK AS A PART OF COMPETITIVE STRATEGY ON THE NETWORK MARKETS

Szymon Mazurek

Abstract

Network externalities (network effect) are the primary source of the company value on the network market. A network effect means that each additional network node increases the value of the whole network received by each of its users or clients. Achieving of this effect is strictly related to the size of the network. Therefore, the success of a company on the network market is the result of the value of supplied goods and services, but the dynamics of the growth of a network. This paper shows the process of ‘network feeding’ as a part of competitive strategy suitable for the enterprises operating on the network market. Feeding the network is understood here as a range of activities, which lead to the fastest possible expansion of the network which is used for creating and delivering goods and services. Those activities are meant to overcome competition in the race for a critical mass of the network. Following network feeding strategies are analysed in the paper: USB Forum on the market of computer accessories, Tesla Motors on the market of electric cars and Spotify on the market for music streaming services.

Keywords: networks, network effect, network market, standards war, freemium

JEL Code: D26, L14, L21

Introduction

Network externalities (network effect) are the primary source of the company value on the network market. Network effect means that each additional network node increases the value of the whole network received by each of its users or clients. Achieving of this effect is strictly related to the size of the network. Therefore, the success of a company on the network market is often not the result of the value of supplied goods and services, but the dynamics of the growth of a network created or used by this enterprise. As a consequence, it may lead to the elimination of valuable solutions which gain on popularity slower than competitors who concentrate on building broad networks. The purpose of this article is to discuss – basing on

three case studies – the strategy of the network feeding designed to obtain an appropriate size of the network, on which a given business model is based, faster than the competition.

1. Networks and the network markets

The network, as a mathematical object, is a set of interconnected nodes – called vertices. The connections between the nodes – the edges, form a crucial element of the network, so the networks are often presented in the form of graphs. A group of unrelated elements is not a network. However, conveying this concept to the economic theory and the enterprise sciences requires a more detailed definition of the concepts of vertices and edges. The English language uses several words that carry the meaning of “network”: net/web and network. In the first case, it is usually about static objects or structures, for example, a fishing net. In the second case, it is about networks that do some kind of work. Thus, this term is associated with people, their organisations (such as companies) or infrastructure used by people (e.g. the railway network, a computer network and telephone network). The networks in the second sense should be considered as economically significant. The economic significance of the network becomes visible when it is possible to notice the network effect it generates. The economic analysis of the network structures uses the concept of the network effect (Katz and Shapiro 1994; Economides 1996) to describe the impact exerted by the networks on their participants and the environment. The network effect (network externality) means that every additional element of the network brings an excessive growth of value that the network gives to a single user/participant. The network effect manifests when the network reaches an appropriate size. This specific point in the development of the network (the specific size of the network) can be referred to as the critical mass (Rogers 2003; Economides and Himmelberg 1995; Baraldi 2012; Ruffle et al. 2015).

On the network markets (markets with economic structures of network character and related network effect) the competition between networks (the so-called systems (Katz and Shapiro 1994) or ecosystems) not individual participants dominates. The success of the ecosystem is mostly dependent on the dynamics of its development. The value or good it offers is of secondary importance. As a consequence, it may naturally lead to the elimination of valuable solutions that gain in popularity slower than others. Due to these characteristics of the network markets, one of the most profitable competitive strategies is network feeding.

2. Network feeding

Feeding of the network comprises all the market activities that result in increasing the size of the network. The dynamic growth of the network is supposed to bring quick attainment of the network's critical mass, as it is believed that reaching it reveals the network effect fully. The benefits of participation in the network or using the network good are at this point clearly visible to potential participants and consumers, which brings a rapid growth of interest in the network or the good. Then, the network enters the phase of the self-sustaining development, taking away, on the process, the participants from the rival networks. Therefore, the ultimate objective of the network feeding is to make the network develop faster than the competitors. In the business practice, network feeding can mean very different activities. A lot depends on the industry, in which the network functions, and on the network's character. In the following part of this article, three different cases will be analysed, in which the networks structures, external effects and network feeding processes have been noted.

2.1. Case study: Tesla, Inc.

Tesla, Inc. (formerly Tesla Motors, hereinafter: Tesla) is an American manufacturer of electric cars. In the recent years, the operations (and products) of Tesla have significantly changed the American and global car market. Usually, the model of financing and generating innovation characteristic for the start-ups from the Silicon Valley, rather than the automotive industry, is given as the main reason (Chen and Perez 2018; Moritz et al. 2015; Stringham et al. 2015).

Tesla wins the market with a new product – the electric car, which, in many aspects, loses compared to the traditional products (combustion vehicles), because even though innovative, it is still at a relatively early stage of development. It seems that Tesla identifies the real problem well – the properties of the electric cars give users a usefulness smaller than the usefulness of the combustion vehicles, mainly due to the absence of the complementary goods and services. This is evident in the example of the range reached by car. The range of 450 km on a full battery can be considered small compared to combustion cars, but mostly, this assessment depends on the density of the charging stations' network, and the time necessary to recharge the battery. The manufacturers of the combustion cars may not notice the issue of the complementary goods, as they have been operating on the mature market for years. Gas stations, tire changing stations, car repair shops – all these facilities are already available. Therefore, the only thing they need to focus on is to create the best cars possible. However, this approach does not work, when launching an entirely new concept of a vehicle on the market. Tesla seems to notice these network dependencies much better than the competition. Its strategy of entering

the market involves many activities that match the concept of network feeding: opening up of the patents, expansion of the charging network, and a non-standard approach to the establishment of the repair and maintenance network.

Tesla opened up its patents in 2014. In practice, this means that Tesla decided to share its solutions with the competition. This move may seem strange for the technological leader, but helping competitors, Tesla is counting on a more dynamic development of the whole sector, which will bring easier and cheaper access to the complementary goods and services. At the level of the business strategy, it comes down to finding a compromise by the company between a competitive fight and openness. The willingness to gain an advantage leads to a closure (knowledge and innovation flow between the company and the market environment is limited). In the context of the entire industry, this is supposed to ensure gaining a significant market share. On the other hand, in the case of the openness strategy, the aim is not the market share itself, but the value of this share resulting from the size of the entire market. Releasing the flow of knowledge and innovation between the company and its environment is supposed to bring such an effect that the entire sector will jointly increase the value of the market.

Another Tesla's activity is an expansion of the vehicle charging network. As already mentioned, the competitors on the market of combustion cars may focus on the product itself as the complimentary services already exist on the market. It is different in the case of the electric cars because the necessary infrastructure (at least in the first phase of product launching) does not exist. In this situation, the electric vehicle can be charged only from the owner's network, and combined with a small range, it gives a product that is only suitable for urban driving. To compensate the customers for the insufficient reach of their car and to reject arguments suggesting that it is not possible to set out on a long journey in the electric car, Tesla decided to invest in the network of charging stations itself. What is interesting is that in the first phase the planning of the location of those points was entirely subordinated to increasing the reach, and not to the availability of the stations. The idea behind it was to ensure that a long distance can be travelled without worrying about the battery status.

The charging stations are one of the more expensive investments of Tesla. The company must continuously increase their number with the growth of the car sales. Therefore, there are some signals of slow withdrawal from the expensive strategy of expanding the network of the charging stations with the use of Tesla's resources. In 2012, the full access of a Tesla's owner to the chargers, unrestricted by limits, was USD 1200. In 2016, Tesla began to impose restrictions. First, it introduced penalties for drivers, whose cars were left on the charging stations even though the battery was fully charged. In 2017, Tesla prohibited to use its

infrastructure to taxis, ride-sharing vehicles and government vehicles. Further, the customers, who bought cars after 15 January 2017, can consume only 400 kWh of electrical energy per year from the charging stations without additional fees (ca. 1600 km of reach).

Another problem that Tesla had to face when launching the electric car on the market was the absence of the repair and maintenance points. Partially, it was a consequence of the adopted strategy to sell directly without the participation of dealers. It is not typical in the automotive industry, because dealers provide the repair and maintenance services at the same time. Since the network of those points, and thus the availability of the complementary services, is one of the more essential elements of the sales offer, Tesla provided Tesla Ranger, a service which involves sending a technician with the necessary equipment to the customer at the place of car failure. In this way, the majority of defects was supposed to be repaired on the spot, and in the more severe situations, the car was towed to the closest repair centre for a flat-rate fee (regardless of the distance). The change in the approach proposed by Tesla (although forced in a way) may evidence a better understanding of the idea of the network structure, which the car repair and maintenance shops are, as it is not about the number of such shops, but about their availability. The concept of Tesla Ranger ensures availability almost without the need to create the infrastructure. Similarly to other network feeding methods used by Tesla, this one also requires high expenditure. In principle, these activities only generate costs, incurring of which is justified by the growing revenue from the primary product. Therefore, as in the case of the charging stations, after reaching a certain sales threshold (the product is no longer new and has many users), the company is slowly withdrawing from this form of supporting services.

2.2. Case study: USB-IF, Inc.

USB Implementers Forum, Inc. (hereinafter: USB-IF) is a non-profit organisation established to popularise and develop the commonly known USB standard used for communication between the computers and peripherals. It was founded by the technological companies, which were behind the creation of this solution. Nowadays, USB is a worldwide standard; that being the case, in order to better understand the phenomenon of network feeding, one needs to go back to the mid-1990s, when due to Ajay Bhatt from Intel – USB saw the daylight. At that time, various competing standards of communication between the peripherals and computers were in existence, so every computer had a number of different sockets. The introduction of a new, universal standard, although seemed a solution beneficial to everyone, was not easy at all.

The first issue concerned the cooperation between the entities operating on the market of the personal computers and peripherals. Any attempt to disseminate a new solution will

always encounter natural resistance. It is connected with an unwillingness to spend resources on a solution that is not popular, may not meet the expectations, and may never become a standard. The customers do not have any expectations in this respect, because they neither know the solution nor the benefits it offers. While the hardware manufacturers do not want to be ahead of the game, they are waiting for the technology to be implemented by the producers of the complementary goods. For USB, it meant that the computer manufacturers could argue that they do not see the point in equipping computers with the USB ports if the manufacturers of printers, mice, and keyboards have not supported this standard yet. On the other hand, the manufacturers of accessories could quickly reverse the situation, claiming that the initiative of the computer producers is needed first. Moreover, all of them could further argue that the operating systems do not support this new standard anyway, so they need to wait for the software producers. The presented dilemma is unresolvable if only one group of the market actors is in focus. That being so, the strategy of the network feeding must involve the parallel activity of different entities aimed at the development of a given market. Concerning USB, it happened at the source, because the solution proposed required the technical cooperation of many entities. The work on the new standard involved the representatives of the following sectors: personal computers (Compaq, IBM), peripherals (DEC), operating systems (Microsoft) and other hi-tech companies (Intel, NEC, Nortel). In this way, a consortium was founded, which was based on the cooperation of companies with different patents (often competitive) and joint actions of the complementary goods manufacturers.

The second issue concerned adopting the new standard by the end users. In order to decide to use a new technical standard, the users either need to see a clear advantage in it or cannot bear any costs of it (in other words, they must be technically prepared for it without deciding in this respect). Owing to the cooperation of the various technological partners, USB appeared on the market “smoothly” without the decision of the consumers. The users simply realised, at some point after having decided to buy a peripheral device with USB - that their computer has an appropriate port and the operating system is prepared to support this standard. It goes without saying that in this situation the costs of disseminating the new solution were covered mainly by the hardware manufacturers, who had to (in the transition period) equip computers with both the old and new communication standards. Naturally, users’ opinion of the new solution is of vital importance for its further popularisation, since usually, they have an option to use an alternative technology. As regards USB, such an alternative was FireWire, a standard developed by Apple. This company was invited to participate in the work on USB but was not interested in it at that time. When USB entered the market, FireWire offered

significantly better parameters of the data transfer speed, which might have made it a better solution in the eyes of the more demanding users. In spite of that, it proved insufficient to overcome USB favoured by a broader group of manufacturers. The costs of implementing both solutions in the peripheral devices were not insignificant. USB offered worse parameters but was cheaper, so using it in the low-cost components was more sensible.

Having launched USB 1.0 on the market, USB-IF did not cease the activities related to developing the new technology and reinforcing its market position. Subsequent versions (2.0 and 3.0) had parameters comparable to and better than FireWire, which finally was the cause of winning of the so-called war of standards (Shapiro and Varian 1999).

2.3. Case study: Spotify AB

Spotify AB is a Swedish company established in 2008 to provide the services of music streaming. It supplies an application for listening to any kind of music that is available in the library of more than 35 million songs (as of 2018). The business model employed by Spotify involves charging fees to the users for the application use and dividing the royalties payable to the music copyright holders proportionally (to put it simply) to the popularity of the songs.

In order to develop its business, Spotify has to ensure its popularity among the users (the more users, the more revenue from the fees), and the size of the music library (the more songs, the greater the value for the users). Regrettably, the network feeding, in this case, is quite a difficult task, because the expectations of both parties are conflicting. The copyright owners wish to receive the royalties as high as possible, and the users wish to pay for music listening as little as possible (or not at all). This problem is difficult to solve, which is evidenced by the fact that Spotify during 10 years of its development, despite the most significant market share, has failed to generate profit. In spite of everything, from the beginning of its operations, the company keeps taking activities, the aim of which is to increase the number of users, which is ultimately supposed to bring the profitability.

With regard to Spotify, the core of their network feeding activities involves the service provided in the freemium model. This concept presumes providing the base (limited) version of the service for free and charging fees for access to the full functionality (Kumar 2014; Martin 2012). This approach is fundamentally supposed to ensure the widespread popularity of the service. Furthermore, the aim of it is to convince the users and make them accustomed to accessing their favourite music in this form. For various reasons, many of them are thereafter ready to pay for the use of the full version or additional services (Wagner et al. 2014). At the

same time, the wide range of users has a positive effect on the creators, who decide to distribute their music via Spotify. After all, popularity is correlated with earnings of the artists.

For Spotify, the second essential element of the network feeding strategy is to ensure compatibility within the user network, since compatibility is a concept of vital importance for each network structure. It is not possible to establish relations between the network nodes if they are not mutually compatible. In this case, it is all about users listening to the music provided by Spotify. In order to expand the group of the users, who can potentially and easily join the Spotify network, the company provides a wide range of technical solutions to facilitate making use of the service. Music provided via Spotify can be played through the Web browser and mobile applications (for Android and iOS), on computers, TVs, in the cars and gaming consoles. What is more, the company cooperates with the manufacturers of the audio equipment encouraging them to integrate their products into the services of music streaming directly. As a consequence of a wide range of such activities, all in all, every user of a computer or a mobile or audio device is (technically) ready to use the services of the company.

For Spotify, similarly to the cases analysed above, the feeding of the network is an essential component of the business strategy, because the market of the streaming services witnesses a fierce rivalry between the competitors wishing to build the most massive user base. This stems from a reasonable belief that only one or several most significant players in the network market have a chance for profitability.

Conclusions

The three case studies presented in this article show how distinctly different the practical implementations of the network feeding concept can be. A lot depends on the industry, the type of the network to which a given business model applies, and the problems that a company must solve to build the network. Despite that, a few key observations can be made that are common for all the situations analysed.

Firstly, the feeding of the network is compulsory on the network market. The support provided to achieve an appropriate size of the network in the initial phase of its existence is a condition necessary to overcome the natural obstacles in the development of the business model. For Tesla, it means the reluctance of the investors to develop the network of the EV charging stations due to the absence of the electric cars, which consequently discourages the users from buying such vehicles. In the war of standards, it represents the reluctance to implement a new solution that has not been visible on the market yet; and in the case of Spotify,

the interdependence between of the number of listeners and the number of songs available for listening.

Secondly, network feeding is expensive. In many cases, it means the need to engage considerable financial resources in the activities that are supporting (though often complementary) to the principal product or service. This puts off the possibility to achieve profitability through a new business venture and requires the skill to acquire adequate financing in the first phase of the business.

Thirdly, the feeding of the network is an element of the competitive fight, because the purpose of it is the achievement of this critical mass faster than the competition. This comes down to gaining the position of the network market leader, which (what results from the network rules) will naturally take away the clients (users) from the competition, because they will join the network that offers the highest benefit, and which, due to the network effect, will be network that is the largest.

Fourthly, network feeding does not bring quick results. What is more, the positive effect of this investment is highly uncertain (due to the competitive fight), and additionally - it is not possible to specify how long it will take (estimating the critical size of the networks ex-ante on the new market is impossible). It is difficult to calculate what financial commitment is necessary, how long it will be necessary, and what level of such commitment is a safe level. Therefore, a lot depends on the faith of the company and its investors in the potential success, which means network monetisation put off for an unspecified period. This brings non-typical business situations, in which companies with a high market value (like Tesla or Spotify), are in a state of permanent unprofitableness, but are still able to obtain financing.

Fifthly, network feeding is a temporary strategy, and theoretically, it should be employed in the first phase of business development only, until the network (or market) with a stable size is established. The company, struggling for profitability, will be forced to limit the financing of activities that do not directly affect the revenues, and thus limit or change the form of activities that are feeding the network. Taking into account the considerations in the previous paragraph, it is difficult to estimate how long the phase of business development should take.

To sum up, the feeding of the network is a strategy of the competitive fight that requires a reasonably aggressive company orientation and acceptance of a high level of risk by the managerial staff and investors. At the same time, it is difficult to define a fixed range of activities that can be easily reproduced in different businesses and industries. Besides, this is not an approach that allows careful planning, because the ability to respond to the market situation plays a vital role here.

3. Publication bibliography

- Baraldi, A. L. (2012): The size of the critical mass as a function of the strength of network externalities: A mobile telephone estimation. The size of the critical mass as a function of the strength of network externalities: A mobile telephone estimation. In *Economics of Innovation and New Technology* 21 (4), pp. 373–396. DOI: 10.1080/10438599.2011.595920.
- Chen, Yurong; Perez, Yannick (2018): Business Model Design: Lessons Learned from Tesla Motors. Towards a Sustainable Economy: Paradoxes and Trends in Energy and Transportation: Springer. Available online at <https://hal.archives-ouvertes.fr/hal-01655959/document>.
- Economides, N. (1996): The economics of networks. The economics of networks. In *International Journal of Industrial Organization* 14 (6), pp. 673–699. DOI: 10.1016/0167-7187(96)01015-6.
- Economides, Nicholas; Himmelberg, Charles P. (1995): Critical Mass and Network Size with Application to the Us Fax Market. In *NYU Stern School of Business EC-95-11*.
- Katz, Michael L.; Shapiro, Carl (1994): Systems Competition and Network Effects. In *The Journal of Economic Perspectives* (2), p. 93.
- Kumar, Vineet (2014): Making "Freemium" Work. In *Harvard Business Review* 92 (5), pp. 27–29.
- Martin, Erik J. (2012): The Freemium Frenzy. In *EContent* 35 (9), p. 20.
- Moritz, M.; Redlich, T.; Krenz, P.; Buxbaum-Conradi, S.; Wulfsberg, J. P. (2015): Tesla Motors, Inc.: Pioneer towards a new strategic approach in the automobile industry along the open source movement? In *2015 Portland International Conference on Management of Engineering and Technology (PICMET)*, pp. 85–92. DOI: 10.1109/PICMET.2015.7273032.
- Rogers, Everett Mitchell (2003): Diffusion of innovations: New York [etc.] : Free Press, 2003; 5th ed.
- Ruffle, Bradley J.; Weiss, Avi; Etziony, Amir (2015): The role of critical mass in establishing a successful network market. An experimental investigation. In *Journal of Behavioral and Experimental Economics* 58, pp. 101–110. DOI: 10.1016/j.socec.2015.08.001.
- Shapiro, Carl; Varian, Hal R. (1999): The Art of Standards Wars. In *California Management Review* 41. DOI: 10.2307/41165984.
- Stringham, E. P.; Miller, J. K.; Clark, J. R. (2015): Overcoming barriers to entry in an established industry: Tesla motors. In *California Management Review* 57 (4), pp. 85–103. DOI: 10.1525/cmr.2015.57.4.85.
- Wagner, T. M.; Benlian, A.; Hess, T. (2014): Converting freemium customers from free to premium—the role of the perceived premium fit in the case of music as a service. In *Electronic Markets* 24 (4), pp. 259–268. DOI: 10.1007/s12525-014-0168-4.

Contact

Szymon Mazurek

Wrocław University of Economics

ul. Komandorska 118-120, 53-345 Wrocław, Poland

e-mail: szymon.mazurek@ue.wroc.pl