Supporting efficient platform designs through the use of simple rules

A study identifying and classifying simple rules in multi-sided platforms derived from existing literature

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ABSTRACT

The creation of economic value has shifted during the last decades from individual contributions by single firms to the integration of customer knowledge to the cocreation of value in complex service ecosystems. Service platforms have emerged as a dominant model and represent the center of an ecosystem of different actors. Building a business platform is a challenging process and a large amount of complicated strategic decisions have to be made in a short amount of time, while simultaneously processing a great number of information. In order to simplify these complicated decisions, this paper proposes the use of simple rules. Current literature lacks a comprehensive list of simple rules. The purpose of this report is to provide a comprehensive collection of simple rules sorted by type of platform, stage of development and type of rule. The main research question in this report is formulated as follows: "*How can simple rules support multi-sided platforms in becoming the dominant platform in their corresponding development stage, role or type of platform?".* This report starts with a theoretical framework to provide definitions of multi-sided platforms and simple rules based on the works of Sull & Eisenhardt (2015) and concludes with a collection of simple rules derived from the literature available. It also provides implications for future research, limitations in using simple rules and criteria for evaluating the strength of simple rules.

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1. Introduction

1.1 Foundation for the research

The creation of economic value has shifted during the last decades from individual contributions by single firms to the integration of customer knowledge to the cocreation of value in complex service ecosystems. (Hein et al., 2019). For the latter, service platforms have emerged as a dominant model (Lusch & Nambisan, 2015). Platforms represent the center of an ecosystem of different actors and take advantage of network externalities by facilitating supply and demand.

According to Gawer (2014), two types of platforms can be distinguished. Internal platforms are defined as a set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products. External platforms are products, services or technologies that are developed by one or several firms and serve as foundation upon which other firms can build complementary products, services or technologies. Instead of a single dominant platform design, multiple platform designs exist for various situations and each design has its own strengths and weaknesses.

One-sided platforms facilitate the connection between the users who form one distinctive group of consumers on the platform, only exhibit same-side network effects and have interchangeable roles (Damsgaard & Staykova, 2015)

A multi-sided platform is distinct from a one-sided platform. Rather than attracting one distinct group of users, a multi-sided platform attracts multiple groups of users and demands counter value for the customers. (Staykova & Damsgaard, 2014)

Prominent examples of multi-sided service platforms include Apple's App Store and social media platforms such as Facebook. In these examples, complementors provide the majority of complementary products or services – applications in the case of the App Store and content in the case of Facebook.

1.2 Objective

Building a business platform is a challenging process and a large amount of complicated strategic decisions have to be made in a short amount of time, while needing to process a lot of possibly imperative information. (Kim & Yoo, 2019) In order to simplify these complicated decisions, we propose the use of simple rules. Simple rules are defined as "shortcut strategies that save time and effort by focusing our attention and simplifying how we think" (Eisenhardt, 2015).

Currently, there is no comprehensive list of simple rules and no classification of simple rules by platform type, role or stage of development. Formulating the right simple rules can be time-consuming since no list of simple rules can be retrieved from existing literature. This report aims to gather simple rules from reports provided to the researcher. Additionally, additional simple rules are gathered from further literature regarding multi-sided platforms.

After the simple rules have been gathered and listed, the simple rules will be classified according to type, development stage and by subject. Furthermore, the simple rules gathered will be evaluated according to criteria formulated by Sull & Eisenhardt.

This paper summarizes the concepts of multi-sided platforms and simple rules which are further explained in chapter 2. As mentioned above, building and leading a platform can be a difficult process that requires quick decision-making and complex information procession. Simple rules might help managers to do this more effectively (Sull & Eisenhardt, 2015). However, literature regarding the use of simple rules in building multi-sided platforms is absent. The goal of this paper is to understand what the purpose is of simple rules, what rules are available in existing literature and how these rules can be applied to the development and leadership of multi-sided platforms.

1.3 Research question

The following research question is formulated: "How can simple rules support multi-sided platforms in becoming the dominant platform in their corresponding development stage, role or type of platform?

To answer this question, the following sub-questions have been formulated:

1. What are business platforms?
   - 1.1 What types of business platforms exist?
   - 1.2 What is the difference between the various types of platforms?
   - 1.3 What categories exist for business platforms?
   - 1.4 What strategies exist to become a platform leader?
   - 1.5 What stages of business platform development exist?
   - 1.6 What roles do platforms fulfill?
2. What are simple rules?
   - 2.1 What are the types of simple rules?
   - 2.2 How should new simple rules be crafted?
   - 2.3 How can simple rules be evaluated?
3. What simple rules can be detected in the business platforming literature?
   - 3.1 What methods are used to classify the identified simple rules?
   - 3.2 What simple rules can be defined from this literature?
4. What simple rules from existing literature can help in the development of multi-sided platforms?

2. Theoretical section

2.1 What types of business platforms exist?

Several types of business platforms can be identified from existing literature. The first distinction can be made between one-sided, two-sided and multi-sided platforms where the communication and information exchange act as the main criteria for defining the type of platform.

The second distinction can be made between internal and external platforms where internal platforms are designed for product development whereas external platforms allow complementors to develop additional services and products (Gawer & Cusumano, 2014)

The final distinction can be made between transaction and innovation platform where a platform can either facilitate various forms of online buying or selling or act as a space where open innovation is encouraged and multiple parties are able to share their innovations, technologies or ideas.

2.2 What is the difference between the various types of platforms?

2.2.1 What is the difference between one-sided, two-sided and multi-sided platforms?

One-sided platforms facilitate the communication between the users of the platform, who form one distinctive group of consumers which exhibit same-side network effects and have interchangeable roles. (Staykova & Damsgaard, 2014). One example of a one-sided platform were the earlier versions of Facebook, which purely connected a group of users with each other. (Staykova & Damsgaard, 2015)

If one or more suppliers and customers are established on a platform and there is a bilateral exchange between suppliers and customers, it is referred to as a two-sided platform. (Daxhammer et al, 2019). Examples of two-sided platforms include the gaming platform Steam and Philips Hue, which acts as a platform for Philips' smart lights system. In these examples, the platform allows the users to develop their own innovations and release it on the respective platforms in order to create more value for future users.

Furthermore, a distinction exists between a two-sided platform, where there is a bilateral exchange between supplier and customer, and a multi-sided platform where several providers combine their value offerings (Daxhammer et al., 2019). Multi-sided platforms connect multiple independent groups for direct interaction supported by various rules and functionalities.

An example of a multi-sided platform is the Play Store available to Android users. Here, multiple app developers and mobile users create their own applications which future users can download and utilize.

Multi-sided platforms (MSPs) have two key features according to Hagiu & Wright (2015):

- They enable direct interactions between two or more distinct sides
- Each side is affiliated with the platform

Direct interaction means that the users on two or more distinct sides retain control over the key terms of the interaction, as opposed to the intermediary taking control of those terms.

Affiliation means that the users on each side make platform-specific decisions that are necessary in order for them to directly interact with each other. Hagiu & Wright (2015) name examples such as: a fixed access fee, expenditure of resources or opportunity costs.

After attracting a sufficient number of users, it is possible for one-sided platforms to change into two-sided or multi-sided platforms by adding other groups of users that derive value from a connection to the existing user group (Daxhammer et al., 2019) For example, it is common for one-sided Internet platforms to attract large numbers of users by offering free services and then selling advertisement space to a different group, turning into a two-sided platform. (Daxhammer et al., 2019)

2.2.2 Differentiating internal and external platforms

Gawer and Cusumano (2014) propose that platforms can have different roles within a company. Platforms can act as internal platforms, which are designed for efficient product development or external platforms, which allow external complementors to develop complementary services, products and technologies.

Baldwin & Woodard (2009) expand on the concept of internal platforms by dividing them into two different roles: Internal platforms that are used for a single product line and internal platforms that are used for multiple product systems.

In general, internal platforms like these only serve as a way of efficiently sharing technology and reusable components within companies or organizations but are not accessible to actors outside of this system. (Gawer & Cusumano, 2014)

Gawer & Cusumano (2014) argue that industry or external platforms are products, services or technologies that are developed by one or several firms and serve as foundations upon which other firms can build complementary products, services or technologies. They are similar in a way to internal platforms, allowing the sharing of information and resources. However, these resources are available to other actors as well.

External platforms have varying degrees of openness, allowing other firms to build complementary services or products on the platform, possibly generating positive network effects. Even though the degree of openness might vary depending on the product and market, the general goal is to create a market that includes complementors along with the platform

2.2.3 Differentiating Transaction and innovation platforms

Platforms create value in two principal ways. Transaction platforms often facilitate various forms of online buying and selling. Compared to traditional businesses, the key focus of transaction platforms is to connect different groups of users.

For example, consider the difference between a traditional cab company and Uber. The goal of a

traditional cab company would be to provide taxi services to those who require one. Their main goal is to transport their passengers to their destined place. However, in the case of Uber, their main goal is to connect drivers and passengers. Other examples of transaction platforms include Amazon, Airbnb and booking.com.

Multi-sided platforms are also often used in open innovation. This is a process where a company sources technology or ideas from outside their own structure, while sharing internal resources so multiple platform participants can cooperate on developing this technology. (Kim & Yoo, 2019)

Open innovation requires various parties who contribute to its funding, generation and commercialization, and it is located in networks rather than in individual firms (Doganova & Eyquem, 2009). Those networks consist of actors such as firms, entrepreneurs, customers and the intermediaries that circulate around them.

2.3 What categories exist for business platforms?
For external platforms, Eisenmann, Parker & Alstyne (2011) note that it is common in platform economies to feature a "Winner take all" approach, allowing one or a few platforms to monopolize a layer of the market. This leaves room for very few competitors or perfect substitutes. As such, they propose a model where besides direct competitors, platforms are divided into three categories:

- Weak substitutes
- Complements
- Unrelated platforms

Baldwin & Woodard (2009) go on to suggest a hub and spoke model which can be used, where the core is formed by a single platform surrounded by complements and complementors that have various relations to the core platform. They do suggest that this model becomes inadequate once complementors start forming their own alliances and relations because these are harder to depict in such a model.

Baldwin & Woodard (2009) also support the idea of a layered market, where one layer is dominated by one or a few platforms but go on to state that this model tends to generalize platforms with comparable but distinct products into one single layer.

2.4 What strategies exist to become a platform leader?
Platform leaders are organizations that have successfully established their platform in such an effective way that they essentially become an industry platform. In turn, this means that they reach a position where they are able to drive the overall trajectory of the business platform in its respective business.

Gawer (2011) identified two generic strategies to become a platform leader.

1. Coring

Coring is a set of strategies a firm can use to create a platform where none existed before. It is a set of strategic moves to identify or design an element and making that specific element core to a new market or platform. These activities have different actions for both a technological and business perspective. From a technology perspective, coring includes keeping intellectual property a secret and closed from the competition or solving problems existing within current platforms. From a business perspective, a firm could choose to adopt high switching cost to competing platforms, essentially locking in customers.

2. Tipping

Tipping is a set of activities to win the platform wars in existing markets. Examples of tipping include sales, marketing, pricing or product development. These activities have different actions for both a technological and business perspective. From a technology perspective, tipping includes attempting to develop unique features that are hard to imitate whereas from a business perspective, actions such as building coalitions or considering different pricing mechanisms could be used to become a platform leader

The main difference between coring and tipping is that coring strategies are focused on becoming a platform leader in markets where, at the time, no existing platforms are present. Coring strategies are focused on entering markets with an innovative platform to become the market leader whereas tipping strategies are used in existing markets with multiple platforms to become better than competing platforms.

An example of coring strategies used is by Thingiverse. In 2008, Thingiverse became a platform for 3D printing where users could upload designs to allow others to download and 3D-print existing designs. 3D printing was a relatively new concept and Thingiverse allowed users to share their designs. Nowadays, Thingiverse is the largest platform in the 3D printing industry.

An example of tipping strategies is by Uber. Competitors of Uber failed to keep up with the growth of Uber because the strategies by Uber mainly focused on marketing and branding. Furthermore, competitors were only available in select major cities whereas Uber is available in more locations. Along with their extensive marketing, these tipping strategies allowed Uber to become the platform leader in on-demand taxi services.

Finally, Anderson et all (2014) postulate that while some markets are indeed dominated by monopoly platforms, others are divided into duopolies, with two or more platforms competing in the same market. These are then divided into price setting and price taking duopoly platforms. Price setting duopolies allow competing platform sponsors to determine their own prices, while price taking duopolies work with a fixed platform price, leaving platform performance as the sole metric for capturing platform demand.

2.5 What stages of business platform development exist?
For classifying multi-sided platforms based on stage of development we propose the classification used in the paper "Platform growth model: The four stages of

growth model" (2019) by J. Kim and J. Yoo. This research is a multiple-case study, studying 21 different companies using 30 interviewees, focus groups and over 90 sources of previous literature on multi-sided platforms.

Kim & Yoo (2019) suggest that multi-sided platforms are not consistent entities that simply exist within a market, but instead develop over time through four discrete stages. Their goal is to study these discrete stages and the main challenges the platforms face within them.

The four stages of platform development are defined as:

1. Entry

Here, the platform needs to choose a market and a service to start their business with.

2. Growth

Here, the platform needs to create a two-sided market by subsidizing the right side.

3. Expansion

Here, the platform will need to reach critical mass by encouraging network effects.

4. Maturity

Here, the platform needs to secure its place in the market by managing quality and revenue structure.

2.6 What roles do platforms fulfill?

To determine the appropriate typology to use for platform types, we investigate the development of the typology formulated by Evans (2003), Evans, Hagiu & Schmalensee (2005) and Evans & Schmalensee (2005).

Evans (2003) distinguishes between three major platform types: market-makers, audience-makers and demand coordinators. The goal of market-makers is to connect multiple groups to enable transactions with each other.
Examples of market-makers include traditional exchanges, online marketplaces and dating services.

Audience makers include advertising supported media and online portals that connect advertisers with audiences and derive their money from this process.

Finally, demand coordinators essentially include all other multi-sided platforms which sell goods or services across multiple groups to generate indirect network effects.

This typology is expanded by Evans, Hagiu & Schmalensee (2005). The previously mentioned demand coordinators are divided into transaction-based platforms and shared-input platforms.

Transaction-based platforms generate value from facilitating transactions between multiple parties whereas shared-input platforms seek to match groups and resources to achieve a common goal and create value

Eventually, Evans & Schmalensee (2005) simplify and expand their approach to a clearer and better-defined typology, dividing platforms into: exchanges, advertiser-supported media, transaction systems and software platforms.

Exchanges are similar to earlier market-makers and matchmakers. They describe any platform that matches different groups for the goal of facilitating transactions along with any transactional costs.

Advertiser-supported media are the successor to audience-makers and seek to allow advertisers to reach a wide audience, while the audience is attracted with content created or purchased by the firms.

Transaction systems provide payment systems that help facilitate transactions more easily and securely for both buyers and sellers on a specific market.

Finally, software platforms operate services for the development of online applications. Software platforms attempt to sell their services to users that need to operate on their platform.

In this report, the latest typology is used as this typology is concise, establishes clear borders between the different categories and provides the most extensive description of all platform types.

2.7 What are simple rules?

Eisenhardt (2015) defines the purpose of simple rules as: "short cut strategies that save time and effort by focusing our attention and simplifying how we think".

Simple rules exist in complicated situations to assess the most critical areas and bottlenecks. They are especially helpful to simplify complex situations. They provide a good middle ground between an inefficient structure with too many rules and chaotic structure with no rules. Simple rules are simple enough to easily communicate and universal enough to apply to an entire organization, streamlining and unifying the decision-making processes. (Sull & Eisenhardt, 2015)

2.7.1 Types of simple rules

Sull & Eisenhardt (2015) propose six types of simple rules. These rules have been broadly divided into two chapters. The first three type of rules are about making better decisions and rationalizing decisions and are described in chapter 2: *Making better decisions* (Sull & Eisenhardt, 2015, pp. 50-70).

1. Boundary rules

Boundary rules present limitations in choosing partners or projects for a specific company. Partners could be ill-fitted or unreliable, projects could be unfeasibly or unprofitable. Boundary rules exist to aid in the process of choosing these things. Here, she mentions a small innovative company which has to select dentists by using simple rules. The simple rules mentioned are: "The dentist has to be between 35 and 50 years old, "The dentist has to have an innovative website" and "A maximum of two financial charges per year is allowed". Essentially, these simple rules allow the company to select an innovative dentist who is able to pay their bills.

2. Prioritizing rules

Prioritizing rules rank various decision options in order to determine which option is the most important to pay

attention to. Prioritizing rules allow a company to prioritize the actions according to importance and possible benefits gained. An example of a prioritizing rule is “Choose the most profitable project” or “Choose the project with the quickest payback time”

3. Stopping rules

Stopping rules describe when to stop with an action, product or collaboration to minimize potential losses. For example, stopping rules could tell the user to stop working together with a supplier when pre-determined results fail to be achieved. An example of a stopping rule could be “If a partner does not use our product for three months, terminate the relationship”. Relationships work in bilateral directions and thus this simple rule prevents losses by terminating contracts at the right moment

The following three rules are about efficiency and aim to do things better. These rules are described in chapter 3: *Doing things better (*Sull & Eisenhardt, 2015, pp. 70-97)

4. How-to rules

How-to rules describe the specific steps necessary to achieve a goal. They describe the actions which have to be taken in specific situations by the user. For example, when streamlining a production process in order to achieve a specific goal. An example given is concerned with a major social media company. The executives were spending too much time in useless meetings. The simple rules formulated for their meetings were: “Do not use Powerpoint presentations” and “Meetings cannot be cancelled”. These rules allowed the executives to invite those concerned with the meeting and create short and effective meetings.

5. Coordination rules

Coordination rules act as a guideline on how to streamline and organize various processes. Usually coordination rules describe the relationships between processes in an attempt to streamline the coordination between those processes. In a production process, examples of coordination rules could include: “Start producing after quantities are determined”, “Transport the packaging after the finished products have cooled down”

6. Timing rules

Timing rules describe when the optimal time is to act. Timing rules describe what the criteria are to start with specific actions to ensure that the timeline of a project is optimized, and actions are strictly taken when most advantageous. An example mentioned is a film studio which formulated the simple rules “Release one movie per year” and “Release this movie by November”. These rules aim to attract children in the holiday season and to keep them curious for new releases.

2.7.2 Crafting simple rules

When crafting simple rules, Sull and Eisenhardt (2015), provide three simple steps:

1. Determine what will move the needles.
2. Find out what the bottleneck is.
3. Craft the simple rules.

The goal of these steps is to produce simple rules that are actually useful for their intended purpose rather than just mindlessly developed writing. The first two steps have less to do with what simple rules to adopt, and more about where they are necessary. For a simple rule to be effective it needs to make an actual difference in the results for the user.

The first step, moving the needles, means identifying what goals the user wants to achieve and where simple rules can actually provide a meaningful improvement towards these goals. Of course, this step is completely different for every user, but it means that a simple rule should only be used when they can help gain a significant improvement to the current situation.

The second step, finding out the bottleneck, determines what problem the simple rules are actually meant to address. In the end simple rules are meant to address a single problem that is holding back the user from improving his results, so identifying that problem is the first step in designing a simple rule.

Finally, the third step is actually crafting the simple rule. A simple rule can be about nearly any subject and there is a very wide variety of simple rules in almost every part of society. Some can be built on purpose, some are developed instinctively. However, all rules should be simple, unique to the subject and situation and relate to specific activities

2.7.3 Evaluating simple rules

In their book, Sull & Eisenhardt describe four features that are present in well-made simple rules:

1. Simple rules should be limited to a handful.
2. Simple rules should be tailored to the user.
3. Simple rules should be tailored to one activity.
4. Simple rules need to offer concrete guidance but should allow for interpretation.

As previously mentioned, simple rules are designed to address a specific problem, for a specific user, to achieve maximum results by addressing the most critical points in a process. One of the main advantages of simple rules is that they are easy to remember and communicate, allowing them to be applied uniformly by the user.

It is for this same reason that only a limited handful of simple rules can be used at a time. If too many rules exist at once, they are unlikely to all be remembered by the user and can therefore no longer be applied as easily. Of course, every user is different in his ability to remember and apply these rules, therefore there is no fixed number that they are limited to. Instead, every user is meant to decide for himself what constitutes a “handful” and how many simple rules can effectively be used at the same time.

Because simple rules are meant to address a certain bottleneck, they will need to offer concrete guidance to the user, allowing him to actually address the issue in an effective way. On the other hand, because situations might differ slightly the simple rules also need to be open for interpretation to allow for a certain amount of flexibility.

Finally, in order to be concrete and effective in addressing the bottleneck, simple rules need to be tailored a certain user and a certain activity. This prevents them from becoming too vague or generic and

therefore lose their ability to offer concrete guidance in specific situations.

3. Methods

The goal of this study is to help platform managers of multi-sided platforms to become aware of simple rules and potential disadvantages of simple rules in order to become the dominant platform in their corresponding development stage, role or type of platform. In order to reach the goal, this study provides the correct simple rules for their situation. The goal within this study is to provide a comprehensive list of simple rules found in assigned literature and to classify them according to platform type, stage of development and type of simple rules.

The literature provided consists of 20 papers that deal with various types of business platforms and 13 reports that were conducted by master students of the University of Twente. The 20 papers provided tackle various topics ranging from leadership to development. These reports by master students have in turn gathered simple rules from literature regarding business platforms provided to them. The master students read and analyzed various papers and compiled lists of simple rules.

The author has extracted rules from these papers and reports and tested them to the criteria of good simple rules as provided by Sull & Eisenhardt (2015). Collecting Simple rules was done in cooperation with fellow researcher B. Groenewegen and the resulting lists of rules were then discussed and combined into one dataset. Using this method, the researchers were able to critically assess simple rules, eventually removing some level of biases. Simple rules that did not fit the criteria for good simple rules were either discarded or reworded in the case of a poorly worded simple rule which could qualify for a good simple rule.

4. Results and findings

There are two main perspectives on how business platforms can be seen according to Gawer (2014). One perspective describes business platforms as a multi-sided platform that acts as an intermediary for the purpose of transaction or innovation. The other definition is based upon an engineering perspective and describes a business platform as an architecture that creates a family of products through the systematic re-use of components that are shared among multiple products. For this paper, the business perspective is used for business platforms, essentially describing them as intermediaries by enabling a connection between multiple sides. In this research, multi-sided platforms are divided into four categories as described by Evan & Schmalensee (2005); advertiser-supported media platforms, software platforms, transaction platforms and exchange platforms. Furthermore, we have divided multi-sided platforms into the four development stages described by Kim & Yoo (2019); Entry, growth, expansion and maturity.

For the classification of simple rules by type, the author has used the six types of simple rules as formulated by Sull & Eisenhardt (2015); boundary rules, how-to rules, timing rules, stopping rules, prioritizing rules and coordination rules. This categorization can be found in appendix 3.

As mentioned before, in collaboration with a fellow researcher, the simple rules were evaluated based on two criteria: Whether they apply to a specific situation and whether the rules were simple enough to be understood without having read the paper from which the rule originates. In collaboration with researcher B. Groenewegen, rules that did not fit these criteria were either removed or reformulated. A table of the evaluated simple rules gathered from the reports compiled by the master students can be found in Appendix 1. A table of the evaluated simple rules from the literature provided by the author can be found in Appendix 2. The simple rules in these two appendices were then categorized to type of simple rule, type of platform and the stage of platform development.

In appendix 5, the classification of simple rules according to development stage of the platform can be found. What can be noticed from analyzing the results from appendix 5, in conjunction with appendix 1 and 3, is that during the entry stage of a platform, most of the simple rules are tailored to entry strategy. These rules are primarily how-to based rules, boundary, and timing rules.
An example of a relevant boundary-type rule during the a platform's entry stage is:

- *Do not enter a market where a lot of independent platforms exist (Coolman et al., 2020)*

Boundary rules help platforms in the entry stage to identify whether a market is attractive or unattractive to enter. Markets with a lot of independent platforms might be saturated and therefore too competitive.
Some examples of 'how-to rules' during the entry stage are:

- *Launch a variety of options with the latest technologies in the first stage of the platform's lifecycle (Rietveld & Eggers, 2018)*
- *When entering the market, focus on creating positive customer expectations (Mantena & Saha, 2012)*
- *Involve multiple stakeholders when designing the platform. (Proskuryakova, Meissner, & Rudnik, 2017, p. 221)*

These rules are made to focus efforts of the platform owner on the right things and to give some guidance. These rules can be used as a useful tool in the setting of short-term goals during the entry stage.
There is one timing rule to be found in the appendices during the entry stage:

- *Release a product or service in a period with a low amount of new releases (Rietveld et al., 2019)*

Following this rule will allow the implementor of this rule to release their product in a period where competition is less fierce, thus increasing the likelihood of success.

After a platform has successfully gone through the entry stage, it will enter the growth stage. During this stage, one of the primary goals will be to transition to a multi-sided platform. The simple rules to overcome challenges

within this stage can be divided into three categories: how-to rules, prioritizing rules and coordination rules.

- *Examples of how-to rules are: When creating a platform, allow integration of non-paying users. (Sussan & Acs, 2017)*
- *Prevent the chicken and egg problem by providing first party content (Sriram et al., 2015)*

These rules are, as was the case for entry stage how-to rules, primarily objectives for development of the platform in order to create the conditions for growth.
In the appendix, one prioritizing rule regarding platforms in the growth stage can be found:

- *The focus must be on addressing the early adopters and not on the late adopters (Rietveld & Eggers, 2018).*

This rule will help platforms to focus on the user group who's participation has the highest likelihood for successfully growing the platform, which is in this case the early adopters.
For the growth stage, there are three coordination rules to be found in the appendices. These rules are:

- *Managers should apply introductory pricing at the beginning of the product cycle and expend software variety in a later stage. (Sriram et all., 2015)*
- *Managers need to stimulate organizational support for the emergent platform within an early stage. (Perks et al., 2017)*
- *Managers should train successful athletes, players or staff from the clubs in behavior towards the media. (Budzinski, Oliver, and Satzer, 2011)*

These rules are made to provide guidance to managers of platforms to make the right decisions, with the goal of reducing the need for delegation.

The following stage after the growth stage, is the expansion stage. During this stage, one of the key objectives is to acquire a large user base which will lead to gaining critical mass. Platforms should encourage network effects in order to reach this critical mass. There are five types of rules to be found in the appendices during this stage: prioritizing rules, coordination rules, boundary rules, how-to rules and stopping rules.
The only coordination rule during this stage which can be found in the appendix is:

- *When the service has become well accepted, shift the resources to focus primarily on acquiring new buyers and sellers.*

A rule like this helps in focusing on the activities that are likely the most helpful in acquiring networking effects, which will result in a higher chance of success.
An example of a boundary rule during the expansion stage is:

- *Work together with companies with a high market share to increase the chance of reaching the critical mass in time to survive.*

Boundary rules during this stage describe which kind of companies to work with and which companies not to work with in order to successfully grow the platform.
Examples of how-to rules during this stage are:

- *Form strong partnerships, especially with trustworthy complementors (Den Hartigh et all., 2016) (Nambisan et all, 2018)*
- *Share reference designs with independent developers or product innovators. (Boudreau, 2010) (Ozalp et all., 2018)*

These rules serve the same purpose as in the previous stages.
An example of a stopping rule during the expansion stage is:

- *Determine a deadline for the moment your platform has to reach a critical mass of customers (Coolman et al., 2020)*

Acquiring a critical mass is essential for survival and this rule will lead to a stop decision if the deadline of acquiring critical mass has been reached and critical mass has not been reached. After this point it is less likely that a platform will still be successful.

The last stage is the maturity stage. In this stage, the platform has acquired a large enough user base to survive. Their position in the market has to be defended by managing the quality and revenue structure of the platform. As can be seen in the appendices, the various types of simple rules during this stage are how-to rules and coordination rules.
Examples of how-to rules during this final stage are:

- *Ensure that updates to a platform do not happen too frequently and bring substantial benefits to each update (Song et all., 2018)*
- *Standardize the platforms production processes (West & Wood, 2013).*

Standardization can be seen as a way of reducing cost through the simplification of processes.
Regarding coordination rules during maturity, examples are:

- *A developer should not set the price in advance for a product or service that is accessed via a platform (Gans, 2012)*
- *It is important to decide how to respond to envelopment before it happens.*

These rules can be seen as a way of setting up procedures for handling matters such as suing of competing companies and cooperation with other platforms.

Conclusion

In this paper, the authors combined the concept of simple rules with the development of platform businesses and constructed a list of categorized simple rules which can aid in developing platform businesses. Multiple conclusions can be drawn from this paper. The first one being that many simple rules are not that simple. Many simple rules which were gathered from literature had to be reformulated or disregarded because they simply did not fit the criteria of a simple rule. Managers of platforms should be able to understand the simple rules without needing to have read the paper in which it was originally formulated, in order to efficiently reap the benefits from the implementation of these rules. A few conclusions can be drawn from the list of categorized simple rules. The first one being that most of the simple rules could be categorized as how-to and just a small amount simple rules could be categorized as timing-, stopping-, prioritizing- or coordination rules. This is perhaps simultaneously one of the limitations of this research. It may be interesting to see more simple rules added which are not how-to rules. Most simple rules did not apply to a specific platform type, most rules applied to platforms in

general. There were a handful of simple rules formulated for specific types of platforms, however, no simple rules about transaction system platforms were included. However, the categorization according to specific development stages was much better defined and simple rules tailored to development stage can be found within the list in the appendices. Relevant how-to rules have been identified for each of the four development staged and these rules were categorized. How-to rules aid in objective setting by management which can have a time sparing effect since decision-making will become an easier task. The large list, along with the categorization of simple rules by development stage and rule type can be used by managers of platform businesses to help in developing their platforms, and thus this list can be seen as the practical application of this research. An assessment of the development stage in which a platform is currently situated will be the start of the process of selecting the appropriate simple rules. It is advised that only a handful of rules are selected, since simple rules will lose the aspect of simplicity if too many are selected.

Limitations

There are some limitations to this research. Firstly, due to the novelty of the idea of simple rules, the topic is not yet very defined, since not much research has been conducted on this topic. Since not much is known yet about simple rules, and not many papers exist on this topic, the authors of this article only had a limited view of the concept. Secondly, the authors of this article relied on the reports of master students, who arguably also do not have a complete view on the topic. Many rules had to be partially reformulated or disregarded, which might have resulted in loss of meaning and completeness of some rules.

As for implications for future research, development of simple rules which could be categorized as other than how-to rules could be a useful addition in order to provide managers with more tools in their decision-making. Next to that, research on the use of simple rules in the development of platform businesses may be useful to assess the practical application of simple rules on the development of platform businesses.

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Appendices

Appendix 1 Table of simple rules

Group D

	Do
Company / Platform Owner	1. Form strong partnerships, especially with trustworthy complementors (Den Hartigh et all., 2016) (Nambisan et all, 2018) 2. Form partnerships with different types of partners, e.g. hardware developers and software developers to build up network diversity (Den Hartigh et all., 2016) 3. Share reference designs with independent developers or product innovators. (Boudreau, 2010) (Ozalp et all., 2018) 4. Involve multiple stakeholders in the execution and formulation of enterprise activities (Boudreau, 2010) (Nambisan et all, 2018) (Parker et all., 2016) 5. Ensure that updates to a platform do not happen too frequently and bring substantial benefits to each update (Song et all., 2018)
Product / Platform	6. Only use good quality materials to develop the product or platform (Den Hartigh et all., 2016) (Ozalp et all., 2018) 7. Form strong partnerships with the most important complementors (Den Hartigh et all., 2016) (Ozalp et all., 2018) 8. Allow consumers to influence product/platform (Randall et all., 2013) 9. Make sure the application review time is as short as possible to encourage application development (Song et all., 2018)
Customer / End-user	10. Consider the consumer-side attention spillover mechanism as a potential way to encourage complementary innovation. (Foerderer et all., 2018)

Group 3

	Do	**Context**
Sponsor's promotion	1. The objective of all parts of an ecosystem should be to maximize the value of the platform (Rietveld et al., 2019) 2. Managers should not lower their reputation by providing products with a lower quality than expected on the platform (Den Hartigh et al., 2016)	2 Because the reputation of their platform has an influence on the result of the promotion
Pricing	3. Ensure that the side that is more price-sensitive is subsidized (Eisenmann et al., 2006). 4. Demand quality from the supplier to deliver quality to the customer (Eisenmann et al., 2006). 5. Connect a select group of customers or suppliers to the platform, potentially through contracts. (Eisenmann et al., 2006). 6. Allow external parties to display advertisements via the platform (Eisenmann et al., 2006). 7. Add extra features and complements for consumers who are willing to pay for them (Eisenmann et al., 2006). 8. Launch a variety of options with the latest technologies in the first stage of the platform's lifecycle (Rietveld & Eggers, 2018).	6 in order to finance the platform

	9. The focus must be on addressing the early adopters and not on the late adopters (Rietveld & Eggers, 2018). 10. Employ crowdsourcing to enable external parties to produce complements for the platform (Bergvall-Kåreborn & Howcroft, 2013). **Don't** 11. Do not engage in transactions with competing platforms	
Technical	12. Standardize the platforms production processes (West & Wood, 2013). 13. Commit to a certain universal level of quality on the platform as a guideline (Den Hartigh et al., 2016). 14. The technical design of products should allow complements of other developers (Ozalp et al., 2018). 15. Sharing knowledge among developers should be encouraged (Ozalp et al., 2018). 16. Do not allow products of a low quality on the platform to enable cheaper production (Den Hartigh et al., 2016) 17. Do not focus on increasing the value of the platform's own product but focus on the total value creation of the ecosystem (Parker et al., 2016)	13 to ensure customer trust
Innovation	18. The focus of managers should be on reflecting how available resources can be used optimally (Hevner & Malgonde, 2019). 19. Managers should request feedback from their consumers. (Kapoor & Agarwal, 2017).	
Competition	20. It is important to decide how to respond to envelopment before it happens.	20 This could be through adjusting the business model, cooperating with other platforms or suing the competitors. Envelopment could lead to exiting the market, which is the worst-case scenario.

Group 4

Do	Context
1. New products need to have comparable reliability compared to products of the past (Bresnahan & Greenstein, 1991) 2. Advertise on a single platform instead of multiple. (Athey et al., 2018) 3. Choose a platform that is a good match for your advertising budget, (Athey et al., 2018) 4. As a publisher/platform, focus on reach over depth (Athey et al., 2018) 5. Pool information about consumers with partners to increase ad value on both your platforms. (Athey et al., 2018) 6. Encourage other platforms, such as public ones, to go ad-free. (Athey et al., 2018) 7. Do not advertise on multiple platforms that share portions of their audience (Athey et al., 2018)	4 To maximize the value of your advertisements 7 (Essentially all platforms)
8. When entering a platform market which has crossover with your current platform's users, bundle the competitor's functionality into your current product. (Eisenmann et al., 2011) 9. Focus on appealing to early adopters specifically. (Dranove & Gandal, 2003) 10. Use the internet to watch reactions to your product and try to influence these reactions. (Dranove & Gandal, 2003) 11. Do not provide the option of buying your product and your competitor's product separately, if possible (Eisenmann et al., 2011)	

12. Do not start an envelopment attack when your target has the ability to respond in kind (Eisenmann et al., 2011) 13. Entrants should not risk strengthening the incumbent's technology by using cross-compatible technology (Dranove & Gandal, 2003)	
14. When entering the market, focus on creating positive customer expectations (Mantena & Saha, 2012) 15. Try to achieve co-opetition with a platform that has an inferior technology when you are the dominant platform. (Mantena & Saha, 2012) 16. Lower the price for customers on the platform side with weaker network effects and raise the price for customers on the side with stronger network effects. (Mantena & Saha, 2012) 17. When creating a platform, allow integration of non-paying users. (Sussan & Acs, 2017) 18. Do not share your network with platforms that have closely matched technology when you are the dominant platform (Mantena & Saha, 2012) 19. Do not focus on improving technology when in co-opetition when it is an inferior platform (Mantena & Saha, 2012)	15 by using direct network sharing

Group 8

	Do	Context
Managerial rules for platform providers	1. Encourage discussions and criticism on the platform (Mačiulienė et al., 2016) 2. Protect information reliability, user privacy, user data and security of online payments on an online platform, (Mačiulienė et al., 2016)	2. To improve the trustworthiness of the online platform
Managerial rules for complementors	3. Form strong relationships with high-status partners (Srinivasan & Venkatrama, 2018) 4. Aim for low overlap in products with competitors (Srinivasan & Venkatrama, 2018) 5. Aim to release a product/service in high-value categories without previous hits (Rietveld et al., 2019) 6. Always maintain a high-quality product or service (Rietveld et al., 2019) 7. Release a product or service in a period with a low amount of new releases (Rietveld et al., 2019)	3. to attract resources from investors

Group 9

	Do	Context
Platform owner	1. Consider technology as much an operant resource as human beings. (Ramaswamy and Ozcan, 2018) 2. Do not implement a dual strategy (Exclusivity or AMC) (Cennamo & Santalo, 2013) 3. Do not value users solely on their volume/potential turnover (Xie, Wu, Xiao & Hu, 2016)	
Service provider	4. Allow external service providers join the platform without extra fees, other than their own costs for building their app (De Oliveira and Cortimiglia, 2017)	

	5. Enable connection via multiple devices. (Haile and Altmann, 2014)	

Group 10

	Do	Context
Governance	1. Do always perform quality assurance on major third-party content (Coolman et al., 2020). 2. Do not make decisions based on the current installed bases of the consoles (Coolman et al., 2020)	
Critical mass	3. Focus on attaining critical mass. (Coolman, Dijkstra, Abdalla, Remmelink, & Wonders, 2020; Evans & Schmalensee, 2010). 4. Work together with companies with a high market share (Coolman et al., 2020). 5. Determine a deadline for the moment your platform has to reach a critical mass of customers (Coolman et al., 2020). 6. Use word of mouth and advertising to inform the target population of the launch of a platform (Coolman et al., 2020) 7. Do not enter a market where a lot of independent platforms exist (Coolman et al., 2020)	3 Critical mass is necessary to survive and become viable, even without fixed costs or economies of scale 5 $N>N_{min}$
Price Strategy	8. A developer should not set the price in advance for a product or service that is accessed via a platform (Gans, 2012)	

Group 11

	Do	Context
Platform-Platform interaction	1. Platforms should increasingly differentiate themselves from the rival platforms (Li et al. 2010) 2. The owners of a joint platform must ensure the existence of a platform leader within the joint platform (De Reuver et al.,2014)	2 to coordinate the activities of participating members and manage the relations with complementors
Platform-Contributors interaction	3. Two-sided platforms should have different pricing strategies depending on buyer and seller expectations (Hagiu and Spulber, 2013, p. 934). 4. Prevent the chicken and egg problem by providing first party content (Sriram et al., 2015)	

Group 12

	Do	Context
Perspective & Approach	1. Capturing value should be part of every exercise in strategy, business model design and innovation (Teece, 2018) 2. Managers should use information transparency (Xu & Zhang, 2013) 3. Managers should avoid the perspective of having a "generic active customer" (Helberger et al., 2018)	2 to establish investors' transparency in the market
Partnership & Network	4. Managers should define public values of the platform and translate those into instructions for stakeholders (Helberger et all, 2018) 5. Managers should follow a vertical integration strategy when introducing first-party applications. (Li & Agarwal., 2017) 6. Managers should formulate platform values as demands (Heylighen, 2017) 7. In case of a competitive scenario, managers should not add "connectors" to share intellectual property (Gawer & Cusumano, 2014)	4 to stimulate stakeholders to work together and fulfil responsibility

Platform / Ecosystem Value	8. Managers should never stop innovating on the core of the platform(Gawer & Cusumano, 2014) 9. Managers should seek complementary patents on new features, processes and/or designs(Teece, 2018) 10. Managers should apply introductory pricing at the beginning of the product cycle and expend software variety in a later stage. (Sriram et all., 2015) 11. Managers should ensure that the platform offers a lot of variety within products and product categories to stay relevant and attract visitors. (Jiang et all., 2011) 12. Managers should decide between a specialization or multihoming approach. (Cennamo et all., 2018) 13. Managers should not use cross-platform development technology such as middleware tools (Cennamo et al., 2018)	8 And ensure that the platform provides an essential function to the overall system 11 to stay relevant and attract visitors
Finance-related	14. Managers should be careful of hidden platform-specific costs when multihoming (Cennamo et all., 2018) 15. Managers should set the fee high enough to separate the high-demand seller from the low-demand seller. (Jiang et all., 2011) 16. Managers should contractually capture the option to sell independent seller's products. (Jiang et all., 2011) 17. Managers should invest in consumer reviews to reveal the seller's service level. (Jiang et all., 2011) 18. Avoid focusing on concentration of products or services (Sriram et al., 2015)	14 because hidden costs could differ among platforms

Group 14

	Do	Context
General	1. Organizations should set up mutual development teams with the help of crowdfunding to gain more knowledge about the market. (Nucciarelli et al., 2017). 2. Managers should never stop evolving the platform (Ramaswamy & Ozcan, 2018)	2 In order to do so, an actor should never lose interaction with other engaging actors
Partners	3. Create relational ties with the key decision makers in new partnering organizations. (Perks et al., 2017) 4. Managers need to stimulate organizational support for the emergent platform within an early stage. (Perks et al., 2017) 5. Involve multiple stakeholders when designing the platform. (Proskuryakova, Meissner, & Rudnik, 2017, p. 221)	
Rules	6. Organizations should refrain from focusing on the platform's technical architecture and what has been done in the past (Perks, et al., 2017).	
Value proposition	7. Managers should use customer knowledge and feedback for new product development. (Ramaswamy & Ozcan, 2018). 8. Use structured product development methods for the design of new services. (Hofman & Meijerink, 2015)	7 because this could enhance the effectiveness of the new product development process
Innovation	9. Keep investing in technology and strive to become the dominant technology (Schilling, 2011) 10. Online retail platforms should enable one-stop shopping. (Reinartz et al. 2019).	10 in order to gain a competitive advantage over branded product platforms

Group 15

	Do	Context
Core interaction	1. Managers should set up joint development teams with the help of crowdfunding (Nucciarelli et al., 2017).	1. The goal of these development teams is to gain more knowledge about the market
Partners	2. "Managers should invest in strong relational ties with key decision makers in new partnering organizations" (Perks, Helen, Kowalkowski, Witell, and Gustafsson, 2017). 3. "Managers need to nurture organizational support for the emergent value platform from an early stage" (Perks, Helen, Kowalkowski, Witell, and Gustafsson, 2017). 4. Managers should train successful athletes, players or staff from the clubs in behavior towards the media. (Budzinski, Oliver, and Satzer, 2011)	
Rules	5. "Lead firms should refrain from focusing chiefly on the platform's technical architecture and what has been done in the past" (Perks, et al., 2017).	12. Quality assurance agencies should not have a too procedural approach to establish a system rewarding learning outcomes (Belleflamme & Jacqmin, 2016, p. 167).
Value proposition	6. Managers should use customer knowledge and feedback for new product development.(Ramaswamy & Ozcan, 2018, p. 29)	6 Because this could increase the success on the market and enhance the effectiveness.
Miscellaneous	7. Online retail platforms should enable one-stop shopping (Reinartz et al. 2019)	

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Appendix 1.1 Collection of simple rules without references
Group 2 (Lacking references)

	Do	Don't
Sustainability of the platform	1. Use performance indicators for CBE's. 2. Create commitment to sustainability to improve economics and social performance. 3. Use positioning as a sustainable platform, when the platform identifies as being sustainable.	4. Don't keep harvesting after a successful product/service but, try to improve or even innovate again. 5. Don't position the platform as sustainable where this is not the case. 6. Don't treat passengers and drivers unequally.
Communication in the platform	7. When you want to make changes to the platform you need to change the mindset of the participants as well. 8. Ensure that the participants of the platform can communicate and collaborate regularly. 9. Use ICT based programs for not only passengers but drivers as well.	10. Do not assume that the micro-entrepreneurs are all capable of using ICT platform-enabled ecosystems, without help or support. 11. Do not surprise participants but introduce them to the new approach.
Internationalization of the platform	12. Analyze the competitive strategies of incumbent players in other nations when entering a potential market.	13. Do not try to operate across borders using a trial and error method, research the market first.
Structure of the platform	14. Create value with your customer, rather than from your customer. 15. Try to break up a large company in separate departments that are specialized in a product or service. 16. Use an incremental approach towards participants to implement platforms 17. Take advantage of complementors to create a platform that belongs to the local ecosystem configuration.	
Ways to a successful platform	18. Launch small and with the right side. 19. Focus on critical mass and quality ahead of money. 20. Create real value and share it fairly with all participants.	21. Do not launch a big platform in the first phase. 22. Measure more than just financial metrics. 23. Don't give producers more attention than consumers.

Group 6

	Do	Don't
Critical Mass	1. Work together with companies with a high market share to increase the chance of reaching the critical mass in time to survive. 2. Determine a deadline for the moment your platform has to reach a critical mass of customers (N>Nmin). 3. Platform businesses must attain critical mass to survive and become viable, even without fixed costs or economies of scale (Evans & Schmalensee, 2010). 4. For two-sided platforms, participation levels below the critical mass will initiate a downward spiral. The focus should be on finding the customer groups to participate on the platform. 5. Remember the target population is almost never well-informed of the launch of a new business of products. Use word of mouth and advertising to inform them.	6. Do not enter a market where a lot of independent platforms already exist.
Governance	7. Compare the possible application of one module in respect to existing modules of the business. 8. Always perform quality assurance on major third-party content. 9. As a platform owner, make sure the developers are forced to share the code at some point, so they lose the IP rights. 10. A newspaper company needs the ability to collectively reconfigure its resource base by changing, adapting or extending its extending RPV to effectively respond to digital disruption.	11. Do not offer too much space for advertisement because this will decrease the value of the platform. 12. Do not make decisions based on the current installed bases of the consoles.
Performance	13. Do not rely on installed base advantage as a safety shield for the first mover if the market is in the quality driven region. 14. In the quality driven region, incumbent needs to achieve quality levels at least comparable to those of the entrant. 15. Determine the time a developer has IP-rights. A longer period in which the developer has IP-rights increases the developer value but lowers the pace in which the platform will develop itself.	

Group 7

	Do
Perceived platform value	6. In order to create value, the platform must be a complement in the industry. 7. In order to create customer loyalty, an ecosystem must be created. 8. Managers of monopoly platforms should inform users about prices charged to developers, if the platform is a monopoly but not if the platform is competing with other platforms 9. Managers of matching platforms with limited choice should charge higher fees than platforms with unlimited choice, and vice versa.
Platform growth	10. Understand and control the cross-network effects in a two-sided network 11. Look for which side to subsidize on the platform and determine if subsidizing that side has a positive effect on the platform performance. 12. Look for partners to bundle your platform with to gain synergy of platforms..

	13. Stimulate platform growth by opening the platform to an open source. 14. When the service has become well accepted, shift the resources to focus primarily on acquiring new buyers and sellers.
Propensity to single-platform market	15. If coexistence is desired, ensure sufficient horizontal differentiation in the market

Appendix 2: Simple rules gathered from additional literature

Paper nr.	Literature	Simple Rules
1	**Anderson, E. G., Jr., Parker, G. G., & Tan, B. (2014)**	1. A platform monopolist should never stop increasing content availability. 2. A duopoly platform should always avoid price competition. 3. Consider added value of platform performance to be low in content-driven markets and high in performance-driven markets 4. In a platform monopoly, firms should analyse feedback from the developer side to avoid product development errors
2	**Benlian, A., Hilkert, D., & Hess, T. (2015)**	5. Developing platforms need to decide their level of openness before searching for complementors. 6 A platform needs to use the variables accessibility and transparency to manage their openness.
3	**Boudreau, K. (2010)**	7. Platforms that want to increase innovation should share hardware with complementors. 8. Platforms should never give up platform control to increase innovation.
4	**Boudreau, K. J. (2012)**	9. Platforms should increase their number of complementary producers if they seek a greater variety of products
5	**Boudreau, K. J., & Jeppesen, L. B. (2015).**	*No useful rules were extracted from this literature*
6	**Breidbach, C. F., & Brodie, R. J. (2017)**	10. In service platforms actor engagement should be the focus of the platform.
7	**Cenamor, J., Usero, B. n., & Fernández, Z. (2013).**	11. Platforms looking for more adoption should increase the number of complementary products. 12. Multi-sided platforms should avoid relying on traditional market knowledge.
8	**Eaton, B., Elaluf-Calderwood, S., Sorensen, C., & Yoo, Y. (2015).**	13. Platforms need to prioritize the use boundary resources when establishing control over their service system 14. A platform should actively decide what boundary resources to offer to complementors, before releasing them. 15. A platform must predict how offered boundary resources might be used by complementors before releasing them. 16. A platform should obtain ownership and control of customer data.
9	**Foerderer, J., Kude, T., Mithas, S., & Heinzl, A. (2018).**	*No useful rules were extracted from this literature*
10	**Fu, W., Wang, Q., & Zhao, X. (2017).**	17. At the emergence stage, platforms should focus on building infrastructure and directly stimulating network effects directly. 18. At the expansion stage, platforms should focus on building relationships among different participants and indirectly generating network effects via value co creation 19. At the maturity stage, platforms should focus on building the right environment, while still stimulating network effects via value co-creation.
11	**Ghazawneh, A., & Henfridsson, O. (2015).**	20. In a censored digital application platform, application developers should be treated as important resources for growing the platform ecosystem 21. In a censored platform, boundary resources should continuously be shaped and reshaped to handle the relationship with end-users 22. In a focused digital application platform, platform owners should focus on development of specialized applications and increase their catalogue 23. In an open digital application platform, external resources should be made available to application developers
12	**Hedman, J., & Henningsson, S. (2015).**	24. Existing actors should collaborate to manage technology to hinder new actors to enter in order to protect their market position

		25. New entrants should focus on technological capital to compete in new markets. 26. New entrants should use technology that is compatible with existing actors. 27. New entrants should establish collaborative partnerships with existing actors.
13	**Karhu, K., Gustafsson, R., & Lyytinen, K. (2018).**	28. Platforms need to prepare to defend their boundary resources through the use of other boundary resources or legal action.
14	**Koh, T. K., & Fichman, M. (2014).**	29. Buyers should leverage existing relationships with suppliers when competition increases on exchanges. 30. Use separate strategies for single-homing users and multi-homing users. 31. Long strong relationships should be encouraged between buyers and suppliers to increase commitment to the platform
15	**Kude, T., Heinzl, A., & Dibbern, J. (2012).**	32. In the enterprise software industry, spokes should never stop innovating their product/service, to reduce the risk of becoming obsolete. 33. Hubs should be aware which capabilities spokes are aiming for in order to manage partnerships in a better way. 34. In case of a low level of layer overlap, a hub should attract spokes by increasing Technological capital. 35. In case of a high level of layer overlap, a hub should attract spokes by offering access to broad markets, providing them with Commercial capital.
16	**Seamans, R., & Zhu, F. (2017).**	36. Platform owners should learn from their sister organizations' experiences when responding to competition 37. Platform should choose between differentiation and cost-cutting strategies to survive against competition.
17	**Song, J., Baker, J., Wang, Y., Choi, H. Y., & Bhattacherjee, A. (2018).**	38. IT platforms should focus on building a critical mass of users and aggressively market information about their user base to potential developers 39. IT Platforms should be technologically compatible with their adopter to increase adoption
18	**Tee, R., & Gawer, A. (2009).**	40. If there is a sub-optimal fit, platforms need to be adapted to better fit with the existing industry architecture. 41. Boundary resources should be used to control the specifications of complementary products 42. Platforms need to use incentives for complementors to encourage suitable complementary products.
19	**Thomas, L. D. W., Autio, E., & Gann, D. M. (2014).**	*No useful rules were extracted from this literature*
20	**Tura, N., Kutvonen, A., & Ritala, P. (2018).**	43. Value creation should be defined from the stakeholders' perspective. 44.Use ex-ante design to get the commitment, attention and inputs of multiple stakeholders that are involved with the platform. 45. Setting an ex-ante framework is essential for the development of a platform over time. 46. Actor roles within a platform should be identified and filled in early on the platform design

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Appendix 3: Classification according to type of simple rule

As discussed in the paper, Sull & Eisenhardt (2015) propose six types of simple rules:

1. Boundary rules
2. How-to rules
3. Timing rules
4. Stopping rules
5. Prioritizing rules
6. Coordination rules

This table divides the various simple rules found in the reports into the appropriate simple rule category using the same numbering system introduced in appendix 2.

	Group D	Group 2	Group 3	Group 4	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 14	Group 15
Boundary rules					1,5		5		4,7				
How-to rules	1,2,3, 4,5,6, 7,8,9	1,2,3, 4,5,6, 7,8,9, 10,11, 12,14, 15,16	1,2,3, 4,5,6, 7,8,9, 101,1 1,12,1 3,14,1 5,16,1 7,18,1 9	1,2,3, 5,6,7, 8,9,10 ,11,12 ,13,14 ,15,16 ,17,18 ,19	3,4,6, 7,8,9	1,2,3	1,2,3, 4,6	1,2,3, 4,5	1,2,3, 6	1,2,3, 4	1,2,3, 4,5,6, 7,8,9, 11,12, 13,14, 15,16, 17,18	1,2,3, 5,6,7, 8,9,10	1,2,3, 5,6,7
Timing rules							7						
Stopping rules					2				5				

Prioritizing rules		13	9										
Coordination rules			20			4			8		10	4	4

Appendix 4: Classification according to platform type

In this appendix we classified simple rules according to the typology used by Evans & Schmalensee (2005)

	Group D	Group 2	Group 3	Group 4	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 14	Group 15
Exchange			16								15,16,17	10	
Advertiser-supported media			6	4									5
Transaction system													
Software platform	2, 3		15		7,8,9			2	3,8		10,13		
General/ universal rules	1,4,5,6, 7,8,9	1, 2,3, 4,5, 6, 7, 8,9, 10,11,12,13,14 ,15, 16	1, 2, 3, 4,5, 7, 8, 9,10, 11,12, 13,14, 17,18, 19, 20	1, 2,3, 5,6, 7, 8, 9,10, 11,12,13,14,15 ,16,17, 18, 19	1,2,3,4, 5,6	1,2,3,4	1, 2, 3, 4, 5,6,7	1,3,4,5	1,2,4,5,6,7	1,2,3,4	1,2,3,4,5,6 ,7,8,9,11,12,14,18	1, 2,3, 4, 5, 6,7, 8, 9	1,2,3,4,6,7

Appendix 5: Classification according to development stage

	Group D	Group 2	Group 3	Group 4	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 14	Group 15
Entry stage		1,11,12 ,14	8	9, 13, 14	5	1	5, 7		6, 7			5	
Growth stage		16	3, 5, 9	17	4	3		3, 4		4	10,	4	4
Expansion stage	1, 2, 3, 4, 7,8	7,8,13	10, 14, 15	8, 16	1, 2, 3, 9	4	3, 4	5	3, 4, 5		2, 12, 14	1, 3	3
Maturity stage	5	2,3,4,6, 9,10	4,6,7,11,12,16 ,17,19, 20	1, 4, 5, 6, 10,11,12,15,19	7	2	1, 2		8	1, 2, 3	1, 4, 5, 6, 7, 8, 9, 11, 15,16, 17, 18	6, 7, 8, 9, 10	1, 2, 5, 6, 7
General rules	6,9	5,15	1,2,13, 18	2, 3, 7, 18	6, 8		6	1, 2	1, 2		3, 13	2	