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## Conference Paper

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# Towards a typology for B2B application platforms

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## 1. Introduction

Following and supporting the development of mobile devices, applications and application platforms such as the Apple App Store and Google Play have become popular among consumers. Platform theory is a topic that is increasingly researched, amongst others from a business perspective (see e.g. Gawer and Cusumano, 2002; Gawer, 2009), but when it comes to software platforms, most academic attention is given to business-to-consumer (B2C) app stores. Less research though is dedicated to business-to-business (B2B) application platforms, and it is unclear to what extent findings from B2C research apply to this field as well.

In this paper, we provide an overall analysis of the B2B application platforms' main features and provide a typology for B2B application platforms. In general, we will define 'application platforms' as all types of platforms that facilitate the distribution and execution of stand-alone software units. With stand-alone software units, we mean pieces of software that can run and provide its intended functionality without requiring other software than the platform, in other words: the applications (or apps). Our definition of application platforms makes it thus a hyponym of platforms, and a hypernym of the previously mentioned app stores. Examples of application platforms that are not app stores include operating systems and social websites that allow for apps, like Facebook.

Our main research question is:

*What are the main features of B2B application platforms and can strategic implications be derived from this?*

More precisely,

1. *What are the main differences between B2C and B2B application platforms?*
2. *Do existing typologies (e.g. Ballon, 2009 and Ballon and Walravens, 2009) apply to B2B application platforms? If not, which are the critical variables to distinguish between different types of B2B application platforms?*

Our methodology builds on two main pillars. First, we provide a review of the recent literature on platform theory, in particular as applied to application platforms. Second, we provide an extensive benchmark of eight B2B application platforms. The result of this benchmark is then compared to standard results on B2C platforms such as the Apple App Store, Google Play, Steam and Facebook. The paper draws on research conducted within the FP7 Future Internet Public Private Partnership (FI-PPP) project FIspace (see e.g. Lindmark, Buchinger, & Spek, 2013)

Section 2 provides an overview on previous research on application platforms, platform theory and platform typologies. Section 3 introduces eight B2B software platforms and discusses their general characteristics based on five criteria. These platforms and their characteristics are compared against popular B2C platforms in Section 4. The implications are discussed in Section 5, whereas general conclusions and plans for further work are presented in Section 6.

## 2. Application platforms

Recent business literature has devoted significant attention to a special type of

ecosystem innovation, namely industry platforms. Platform theory, especially when related to ICT industries, conceptualizes platform as a particular and important structuring element within an “industry architecture” (Jacobides, Knudsen, & Augier, 2006). Gawer and Cusumano (2014) consider industry platforms as innovations and distinguish them from other types of ecosystem innovation in the sense that the first exhibits ‘network effects’ (or ‘network externalities’): the more parties use a platform, the more value it has to its owner and its ecosystem. From a technical perspective, the term ‘platform’ is often used to refer to the structure of hardware, an operating system, or software framework that enables the operation of a number of associated components or services.

While many types of industry platforms exist, high-tech industry platforms have received most attention in the literature; see e.g. (Gawer, 2010, p. 289). With the success of consumer platforms for mobile devices, notably Apple’s iOS and Google’s Android, application platforms have gained special attention, albeit mostly in B2C markets.

In section 2.1, a theoretical overview of the general characteristics of platform theory will be provided. In section 2.2, an existing platform typology will be introduced and discussed.

### *2.1. Platform theory*

Components or services within the platform’s ecosystem constituency have an economic value. Platforms and their providers mediate and coordinate between various stakeholders. Rather than to focus on profit maximization in

a single market, they principally aim for incorporating a variety of stakeholder groups. This entails the tasks of balancing interests between these groups and equilibrating openness and lock-in of customers (Cortade, 2006). In many cases, the revenue stems from either of the mediated partners for the service provision while the other side(s) of the market is (are) included for free (J.-C. Rochet & Tirole, 2002).

One particular characteristic of platform markets is defined in “two-sided market” or “two-sided network” theory (Armstrong, 2004; Jullien, 2004; J. C. Rochet & Tirole, 2003). Two-sided markets can be defined as all the markets for which inter-group network externalities exist (Armstrong, 2006), i.e. between two or more groups of users (we speak of intra-group externalities when the utility derived from one good or service is positively correlated to the number of users of this good or service (Varian, 2000)). In addition, network externalities can be differentiated according to whether they are direct or indirect. There are direct externalities when the number of users has a direct positive impact on the utility derived from the product (Liebowitz & Margolis, 2002), e.g. the higher the number of phone users, the more utile for one to have a phone. Indirect externalities are such where the impact is mediated by another market (Liebowitz & Margolis, 2002). Farrell and Klemperer (2006) distinguish the effects even further, speaking of network effects if “one agent’s adoption of a good (a) benefits other adopters of the good (a “total effect”) and (b) increases others’ incentives to adopt it (a “marginal effect”)” (Farrell & Klemperer, 2006, p. 44).

The existence of network externalities in two-sided markets has unexpected economic consequences on price formation, level and structure (J.-C. Rochet & Tirole, 2004). First, platform owners face the chicken or the egg causality dilemma: the more users of one side of the market (A) are using their platform, the more users of another side of the market (B) can be interested, and vice-versa. Without any users (A) (the starting point) there are no incentives for users (B) to join the platform. As a result, models sometimes prescribe to subsidize one side of the market in order to attract users of the other side. More precisely a profit-maximizing platform should apply higher tariffs to the customers where price elasticity is the lowest. In some cases one side of the market is completely subsidized, in the sense that access to the platform is freely available or even incentivized.

## 2.2. Previous Platform Typologies

Based on this theoretical groundwork, the paper takes platforms, being active in two-sided markets, as a central concept. A recent overview of platforms in ICT industries suggests distinguishing the various types of platforms according to

- (i) whether there is *control over assets*: does the platform owner provide core

functionality so that the platform in essence can provide functionality without external assets (components, content, etc.), and

- (ii) whether there is *control over customers*: does the platform owner have the customers locked-in or will customers switch to another platform if ecosystem participants decide to move to this other platform.

(P. Ballon & Van Heesvelde, 2011).

An overview of this typology, including examples, is given in Table 1. Note that this typology is derived without specifying a difference between B2C and B2B markets. Via their given examples, a tendency towards B2C platform can however be presumed. This typology will serve as a basis for the analysis conducted here. By doing so, the paper will question whether this categorization is generally applicable to the current needs.

## 3. Benchmark of B2B application platforms

In this section, we provide an overview of eight B2B application platforms that have been selected after a consultation of business experts. They are, in alphabetic order: Alibaba,

Table 1: Typology of platforms

	No Control over customers	Control over Customers
Control over Assets	Enabler Platform The platform owner controls many of the necessary assets to ensure the value proposition, but does not control the customer relationship. <i>Examples: IMS, Intel</i>	Integrator Platform The platform owner controls many of the assets to ensure the value proposition, and establishes a relationship with end-users. Entry of 'third-party' service providers is actively encouraged. <i>Examples: iPhone, Microsoft</i>
	No Control over Assets	Neutral Platform The platform owner is strongly reliant on the assets of other actors to create the value proposition, and does not control the customer relationship. <i>Examples: Google search, PayPal</i>

(Source: adapted from Ballon & Van Heesvelde, 2011, p. 9)

Ariba, Descartes, E2open, Fraunhofer Logistics Mall, GT Nexus, Salesforce AppExchange and SAP store.

### 3.1. Platform descriptions

In this subsection, the platforms to be studied will be shortly introduced.

The **Alibaba Group** is a Chinese private company that operates a number of services to facilitate global electronic trade. The centre of it all is their e-commerce platform for SMEs (Alibaba Group, n.d.-b), which has been around since 1999. Since it started, it has branched out in different markets using sub-websites, e.g. Taobao Marketplace (launched in 2003) to serve the Chinese C2C market, Alipay (2004) as an online payment platform, Alibaba Cloud Computing (2009) offering a cloud computing and data management platform, and AliExpress (launched in 2010) for international B2C sales. (Alibaba Group, n.d.-a)

**Ariba** (Ariba, Inc., n.d.-a) is an American company, founded in 1996, which was acquired by SAP in 2012. Its main focus is on procurement and trade, it calls itself “the world’s largest trading partner community” (Ariba, Inc., n.d.-b), and as such is a bit more limited than some of the other platforms. It acts both as a trading community as well as a provider of ICT solutions to facilitate trade between its participants.

The Canadian company **Descartes** (Descartes, n.d.) offers solutions in the field of logistics. To be precise, it lists six groups of solutions: Logistics technology platform, Routing, mobile & telematics, Transportation management, Customs & regulatory compliance, Global logistics network services, and Broker & forwarder enterprise systems. For its solutions it makes use of long-term partners. Its corporate fact sheet (The Descartes Systems Group, Inc., 2013) lists over 10,000 customers in more than 60 countries.

**E2open** is an American company founded in 2000, delivering “cloud-based on-demand software solutions” for enterprises to plan and execute “across global trading networks”. (E2open Inc., n.d.) It features four products:

E2 Process Management, E2 Planning & Response, E2 Cloud Connectivity and E2 Analytics. Each of these products consists of several modules.

The **Fraunhofer Logistics Mall** (Fraunhofer Innovationscluster Cloud Computing für die Logistik, n.d.) is being developed by the German applied-research organization Fraunhofer, In the mall, third parties can offer logistic services and software to the target audience, in particular SMEs who cannot afford an extensive ICT support department. All of this is based on cloud computing, on an infrastructure offered by Logata GmbH, whereas companies can also run their own cloud for internal services. The Logistics Mall is not active yet, but it is planned to launch in 2014.

**GT Nexus** (GT Nexus, Inc., n.d.-a) is a private company, founded in the United States in 1998, which provides cloud-based business network for global trade and supply chain services. Early 2013, it announced a merger with logistic software provider TradeCard, though it remains unclear what will be the exact consequences of this merger. It claims to be the “largest global trading and commerce network.” (GT Nexus, Inc., n.d.-c) Most of its solutions currently deal with supply chain management, from inventory and procurement to transportation and payment. It claims to be the only platform to capture both financial and physical supply chain processes. Its platform connects large clients from different fields, including major banks and logistic service providers. (GT Nexus, Inc., n.d.-b)

The **Salesforce AppExchange** (Salesforce.com, inc., n.d.) is a platform for apps that run as plug-ins in the customer relationship management (CRM) software by the American stock-traded company Salesforce.com, Inc. The AppExchange was launched in 2005 as a marketplace for web applications that work together with the Salesforce software. The apps do not contain the core functionalities that are being developed by Salesforce themselves, but rather should be seen as additional cloud computing functionalities. As per September 2013, the platform contains over 1,900 apps.

Table 2: Overview of B2B application platforms

	Focus	Requirements	Developer strategy	User strategy	Revenue model
<b>Alibaba Group</b>	Trading	Web-based	Internal subplatforms	Open	Premium usership
<b>Ariba</b>	Trading	n.a.	n.a. presumably largely in-house	Closed	n.a., presumably direct revenues
<b>Descartes</b>	Logistics	n.a.	n.a. presumably largely in-house	Closed	n.a. presumably direct revenues
<b>E2open</b>	Logistics	n.a.	n.a. presumably largely in-house	Closed	n.a. presumably direct revenues
<b>Fraunhofer Logistics Mall</b>	Logistics	NYA, cloud	NYA, (mostly?) third party	NYA, presumably open	n.a.
<b>GT Nexus</b>	Trading, supply chain	n.a., cloud	n.a. presumably largely in-house	Closed	n.a. presumably direct revenues
<b>SAP Store</b>	ERP	SAP, mobile apps	Internal and third party	Open	Cross-subsidisation, own apps
<b>Salesforce App Exchange</b>	CRM	Salesforce, web-based	Mostly third party	Open	Cross-subsidisation

N.B. 'NYA' means 'not yet active' and 'n.a.' means 'no available information at the time of this writing'.

The **SAP store** (SAP AG, n.d.) is a platform that offers solutions that run within the SAP ERP system. The solutions range from e.g. CRM and planning to cloud services. They can be offered by third parties, so called 'Solution Providers'. However, when checked in September 2013, it's most popular solutions were all developed by SAP itself: 'SAP CRM Sales', 'SAP Travel Receipt Capture' and 'SAP BusinessObjects Mobile'. From the 24 'popular' solutions featured on the store's site, only two are not provided by SAP: 'Inventory Management' by Larsen & Toubro Infotech and 'Skill Scanner' by EPI-USE America, each having a few hundred downloads. Per solution, the platform indicates which mobile platforms (iOS, Android, Blackberry, Windows) it runs on.

### 3.2. Criteria

Desk research is based on the only data available, i.e. what the markets themselves publish online and what can be found in third-party reports. To structure the analysis, the Business Model Matrix (Pieter Ballon, 2007)

has been used to define the following business model variables:

1. The *(business) focus* of the platform, e.g. the industries that are being targeted.
2. The *requirements* of the platform, i.e. the kinds of hardware and software one needs to use the platform and its applications.
3. *App development strategy*, i.e. in-house app development or open third-party development. In the latter case, this also includes strategies to attract and incentivise developers.
4. *App user strategy*, i.e. the strategy to attract business users onto the platform.
5. *Revenue model*, i.e. the means of revenue generation for the platform itself.

The first point deals with the market (niche) to target. This can be a specific industry, or more general. It is a general variable. The second point is more technical in nature, and examines how the platform links up to existing technologies. It links to Ballon's *functional architecture*. The last three points deal with the three main actors of the platform: the app suppliers, the app users, and the platform

provider itself. All three parties need to be either satisfied or be locked-in for the platform to succeed. These variables relate to Ballon's *value network*, *value proposition* and *financial model* respectively.

### 3.3. Results

The analysed platforms display a number of similarities as well as differences, as shown in Table 2. First of all, it is another illustration of the on-going 'platformisation' trend in ICT (see e.g. (Pieter Ballon, 2009; Gonçalves, Walravens, & Ballon, 2010)). In our limited set of examples, we have both a provider of a CRM system that sees itself as a platform and offers ERP as an integrated solution, as well as the opposite: a provider of an ERP system that offers CRM in its platform.

A first difference is in the (*business*) *focus* of the different platforms. There is a group of platforms that focuses on trade and community, while another group provide logistic solutions. Salesforce and SAP form a third group, being built around their own popular software packages.

Most of the platforms offer cloud services and provide web-based interfaces, not imposing many *requirements* on the software and hardware. The SAP Store is a clear exception here, offering applications for several mobile platforms. It is unclear whether the other platforms offer their services in the form of applications that can be run locally on a variety of devices, the BYOD (Bring Your Own Device) approach.

Not all platforms have publicly available information on the *development process of the apps and solutions*. For some platforms it is clear that external developers can provide their services via the platform. Descartes seems to have a selective procedure here, aiming for long-term relationships with service developers that they trust to bring value to their customers. Others seem to have a more open approach; this leads to more fluctuation of service developers. The SAP Store is open to third-party developers, but the majority of the popular apps are the ones that are being offered by SAP themselves. This strategy of

encouraging the use of the platform by offering own services in addition to third-party ones can backfire as well, since the in-house services might take a majority of the market, not leaving much room for the much wanted external developers. The Salesforce AppExchange on the contrary seems to be populated by many third-party services. E2open does not provide information, but gives the impression of developing all their software services in-house.

Less is known about the efforts to attract business *users* to the market. Some of the platforms appear very closed for visitors who have not signed up for the service, while others, most notably Salesforce AppExchange, SAP Store and AliBaba are open, allowing unregistered visitors to inspect the offerings. However, statistics are difficult to gather. Only AppExchange provides some statistics, like the amount of installs and pie chart of the amount of apps per category.

In terms of *revenue models*, it is difficult to make hard statements. One can assume that for the platforms that offer their already popular software packages, like Salesforce and SAP, the platform will create additional value to the software, this creating a form of cross-subsidisation: they might accept a financial loss in the platform field when this gets compensated by more revenues in software licenses. SAP might also get additional revenues for their own developed solutions on the platform. It is to be expected that other platforms aim for membership fees or consultancy fees. AliBaba has a premium membership system, offering verified memberships as well as gold memberships.

## 4. Comparison to B2C application platforms

Given the before-mentioned assumed anchor of the platform typology in B2C platform concepts, this section provides a complementary overview to the previous section on four B2C application markets: Apple iTunes App Store, Facebook, Google Play Store, and Steam. Their configurations, features and business models are sometimes more transparent to the public (than the B2B ones)

and should thus provide a counterweight for comparison and explanation of functionalities. By looking particularly into B2C models, we aim to derive an understanding of which categories of the platform typology are eventually to be changed for the B2B comparisons.

#### 4.1. Platform descriptions

The **iTunes App Store** (Apple, n.d.-a, n.d.-b) is the platform where Apple provides applications for devices running on their mobile operating system iOS (iPhone, iPod Touch and iPad).<sup>1</sup> 900,000 free and paid apps were offered for download via the App Store in June 2013. 50 billion apps were downloaded in total, 1.8 billion are downloaded monthly. Though Apple provides support for developing apps for companies and businesses, its main target is the consumer market with applications that match the needs of different types of smartphone users to personalize their devices (health applications, organizing and planning applications or mobile magazines). In terms of developer strategy, Apple relies on third party developers that enrich the Apple iTunes store – though not exclusively. Many applications are developed in-house. The revenue model consists on the one hand of app developers who need to be enrolled in a paid iOS Developer Program. On the other hand, hosting of the developed applications is free but Apple takes 30% of the revenue for apps and in-app purchases.

**Google Play** (Google, n.d.-a, n.d.-b) is the app distribution platform of Google. It offers users the possibility to browse and download applications for devices operating on the Android operating system. In June, 2013, 800,000 apps were available; 28 billion total downloads and 2 billion downloads per month are registered. Also Google follows a strategy of including external developers. They provide valuable apps and software themselves additionally. They get documentation and material from the platform and a possibility to exchange ideas via the platform or other

channels. Google takes a fee for the registration of third-party developers and charges 30% of the selling price of the app as well as in-app purchases.

Launched in 2004, the free platform **Facebook** counts around 1.28 billion monthly active users in 2014 (Statista, 2014). Since 2007, Third party developers have been able to provide apps, including games, usable via the platform (The Associated Press, 2013) while Facebook offers support in terms of monetizing strategies. In this paper, Facebook apps will be considered, with a focus on gaming applications. It relies on third-party developers for creating these gaming apps. The platform empowers and supports Third parties in the development of game applications and embedding of payment mechanisms for free. Payments for in-app items are collected from customers. For each transaction, Facebook credits Third parties with the proceeds from the sale minus their service fee of 30 % + any applicable tax. Facebook does not distinguish between developers – which can be individuals and professional game developing companies alike (Facebook, 2013; Kincaid, 2011).

**Steam** is an online platform that provides its registered users access to video games and related media. It proposes over 2,000 games (Steam, n.d.) to more than 65 million active users (Kohler, 2013). It was released in 2002 by the video game company Valve Corporation to make the process of buying, downloading and maintaining games easier (Kohler, 2013). Since 2005, third-party developers can propose their games on Steam through the Steam Store, in which case Valve keeps a share of the revenues (Hagiu & Herman, 2013). Beyond a distribution platform, Steam provides additional services to its customers, e.g. storing in the cloud, social features. To game developers, it provides Steamworks, a free application programming interface. The platform runs on Microsoft Windows, Apple's OS X and Linux, as well as on iOS and Android for mobile devices (Steam, n.d.). Third-party developers range from small independent studios to large publishing houses (Hagiu & Herman, 2013). Steam developers need to be active users of the platform (having a valid and non-limited Steam account including the

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<sup>1</sup> An App Store for OSX software (Apple's laptop and desktop operating system) exists as well, but will not be considered in this paper.



possession of a game on this account) and pay a one-time €100 submission fee. The later shall serve as a barrier for spam and joke submissions. (Valve Corporation, n.d.).

#### 4.2. Characteristics of B2C applications platforms

The B2C application platforms, separately from their B2B equivalents, equally show some similarities and differences.

First, their common denominator is their *business focus*, which is on the consumer market albeit with different emphasizes.

Google Play and the Apple iTunes Store provide a multitude of apps allowing the personalization of the device. Their applications reach from gaming, organization and planning, health or shopping apps to name just a few classifications. Differently, Steam follows a more narrow approach by primarily offering game applications.

Google Play and Apple iTunes are running on the Android or iOS *operating system*, thus are configured for mobile devices, either from Apple (iOS) or Android-enabled (including multiple brands and models). Steam can be downloaded to run on Microsoft Windows, Apple's OS X and Linux, as well as on iOS and Android for mobile devices. Facebook and respectively games on Facebook are available on the web and multiple mobile operating systems, including Android and iOS.

The discussed B2C platforms follow a *third-party development strategy*, meaning that they facilitate the development of apps on top of their platform to external parties though this does not exclude certain in-house developments (own assets vs. external assets). To do this, the platforms provide APIs, SDKs, "how-to" information, blogs and education as well as communication channels for the developer community to spur interaction between the app developers, provide support and help-centres or contact points. All of the platform providers (except Google) review (or facilitate peer reviewing) and approve the built apps before publishing. Apple and Google are developing applications themselves, thus

bringing additional value to the device and rendering the third-party applications valuable but optional.

The user strategy is similar for all the platforms. They provide information for the user to initially get an image about the products and services, the prices (here: of the apps), their functionalities and configurations. In order to use them (e.g. download and run them on an appropriate device), users need to register and make an account. The registration for users is free on all platforms.

In order to generate *revenues*, all platforms keep a service fee for any monetary transaction the external app developer conducts via the platform (direct revenues). This includes transactions such as the purchase of the application as well as purchases items *within* the application (i.e. in-app purchases). These service fees are situated at 30% for Apple, Google and Facebook but depend on individual agreements between developers and Valve in the example of Steam. Price setting for the game is done in collaboration between the third party developers and Steam. Besides this revenue stream, Apple, Google and Steam demand an initial fee from the app developers to create a respective account and prevent spam and malware by abusing the development tools. Steam however claims that all proceeds from the submission fees are donated to Child's Play, a charity organization (Valve Corporation, n.d.).

#### 4.3. Comparison of B2B and B2C application markets

The B2B and B2C application platforms in this study show a number of similarities as well as differences. Whereas B2B application platforms are commonly focused on one line of business (an industry or a process, like logistics, trade or enterprise resource planning), this is only true for some of the B2C markets: Steam focuses on gaming, but the iTunes App Store and Google Play are general. Facebook is a general platform as well, although in the context of this paper the scope is limited to how Facebook deals with games.

Table 3: Application platforms categorised in the typology of platforms.

	No control over customers	Control over customers Fraunhofer Logistics Mall
Control over assets	Enabler platform	Integrator platform
	-	Ariba, Descartes, E2Open, GTNexus, Salesforce, SAP <i>iTunes App Store, Google Play, Steam</i>
No control over assets	Neutral platform	Broker platform
	-	Alibaba, <i>Facebook Games</i>

B2C markets clearly state their technical requirements (operating systems) in advance, whereas the B2B markets do not always specify. This likely is because on the one side single clients are bigger in scale, so a platform might invest in custom modifications and consultancy in order to get a client on board. On the other side, budgets on the client side are bigger so investments in the technical infrastructure can be made to match the requirements.

Where B2C platforms are to a certain level open on their third-party development strategy, B2B platforms provide less information. This is not to say that support does not exist, but it's not openly available on the Internet.

Similarly, B2B platforms provide less information to (potential) users than the B2C platforms. Information provided is often general and abstracts from technical details and pricing details; when a potential customer wants to know more, a quote has to be requested. There are exceptions to this, e.g. the Salesforce AppExchange and SAP store providing more information.

Finally, when it comes to revenue models, most B2C platforms focus on transaction fees, which is in sharp contrast with most B2B markets. Transaction fees only make sense for trade platforms like Alibaba, and application-centred platforms like those of Salesforce and SAP. The other B2B markets, which put less emphasis on modular applications, either charge fees or use their platform to create indirect revenues, e.g. to stimulate more lucrative business activities, like consulting.

## 5. Discussion

When the typology of platforms by Ballon & Van Heesvelde (see section 2.2) is considered, the examples discussed in the previous sections can be organised as in Table 3.

What instantly becomes clear is that all application platforms exercise a control over customers. Client profiles are with the platform owner and to a large part not accessible for external developers.

The B2C platforms are spread over the issue on whether to have control over assets or not, although given the small sample size conclusions can hardly be made. However, for the B2B platforms, almost all exercise a crucial control over assets, either by developing largely in-house, or by providing key assets (e.g. basic applications) themselves, making third-party apps optional yet useful extensions. The exceptions are Alibaba, where the key asset, goods and services, are still with the parties offering them, comparable with eBay in the article of Ballon & Van Heesvelde.

The only example omitted in the table is the Fraunhofer Logistics Mall, since its unclear whether the platform owners provide their own core components. In that case it would be an integrator platform, otherwise a broker platform.

What becomes clear is that especially for B2B application platforms, the typology by Ballon & Van Heesvelde is not very distinguishing, since all but one (or two) platforms fall into the same category. However, based on the criteria

Table 4: Typology for B2B application platforms

		Revenue model	
		Direct revenues	Indirect revenues
Application development strategy	In-house development	Service solution platform Alibaba, Ariba, Descartes, E2Open, GTNexus	Internal subsidisation platform
	Third-party development	Classic app –store Fraunhofer Logistics Mall	Support ecosystem Salesforce, SAP

brought forward in section 3.2, it might be possible to propose a new typology based on the most distinguishing criteria, namely the app development strategy and the revenue model (see Table 4). In these two variables, we have seen a main split: regarding the app development strategy, either in-house development or third-party development can be distinguished. This corresponds greatly to the question of control over assets (having referred to the applications as the assets of the platform in many parts). The revenue model supports two strategies: the direct and the indirect revenues for the platform. The former refers to the direct generation of revenue by selling applications or software via the platform. Indirect revenue is related mainly to cross-subsidisation of other products of the platform provider. It might even be, that the app unit is creating loss but adds to the portfolio of the platform and thus to the profit making units of the business. Using these two criteria, the typology consists of the following four categories:

- The *service solution platform* sells clients a modular but complete solution that is developed in-house.
- The *internal subsidisation platform* offers a platform consisting of in-house developed applications to support a more profitable business.
- The *classic app store*, where clients pay for access or for individual applications, which are mostly being developed by third parties. The platform takes a part of these revenues. This model is closest to the

mobile B2C application markets of Apple and Google.<sup>2</sup>

- The *support ecosystem*, where third-party developers create applications for a platform. This platform then supports a more profitable business. The platform owner generates revenues from the more profitable business, whereas third-party developers can create revenues from selling applications.

Most B2B application platforms are service solution platforms, but the sample includes also a *classic app store* as well as two support ecosystems. Hence, it can be argued that this typology provides a more useful classification for B2B application platforms than the one proposed by Ballon & Van Heesvelde. More cases are however necessary to prove this argument in respect of the (yet) empty category of an *internal subsidisation platform*.

## 6. Conclusions and further research

This paper has described the initial steps to derive a typology for B2B application platforms. It has started from an existing platform typology, but considered it unfit for B2B application platforms since all eight studied platforms fall into the same two categories. The main characteristics of B2B application platforms have been analysed,

<sup>2</sup> One can argue that these application markets also subsidise other business activities, in particular the sales of mobile devices, and thus these markets are support ecosystems as well. They are listed here because the direct revenues are significant.

compared to B2C application platforms, and used to propose a novel typology.

The main research question has been about the features of B2B application platforms. In the paper, these have been analysed based on five criteria: (1) the business focus, (2) the technical requirements, (3) the app development strategy, (4) the app user strategy, and (5) the revenue model.

The B2B application platforms have shown some significant differences on these variables when compared to B2C application platforms. Both the technical requirements as well as the exact pricing are more obscured. The revenue model focuses less on transaction fees, but instead either charges fees for a full service bundle or generates revenue indirectly, mainly by cross-subsidising other business activities.

Finally, a new typology has been constructed, focussing on the two variables that account for the most significant split: application development strategy (in-house or third-party development) and revenue model (direct or indirect revenues). This results in a typology of four platform types: (1) the service solution platform, (2) the internal subsidisation platform, (3) the classic app store, and (4) the support ecosystem.

The authors acknowledge that the studied samples represent only a fraction of available B2B (and B2C) platform solutions. Further research is thus required to expand the sample, not least to prove the concept of *internal subsidization platforms*. It is yet to be studied how other business model variables are configured within examples of this category.

Further, the analysis gave reason to adapt the platform typology of Ballon & Van Heesvelde, 2011 in order to use it targeted to B2B application platforms. It requires further research on whether an analysis of B2C platform applications (in separation of B2B) demands the same exercise and could suggest yet another platform typology.

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