WASEDA BUSINESS & ECONOMIC STUDIES 2019 NO. 53

Characteristics of Sales and Profit Growth Curve in Platform Businesses

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Abstract: In this paper, two hypotheses are developed and examined using data on the differences in sales growth and changes in operating profit margins following sales growth in platform type (PF) and value chain type (VC) businesses in eight industries. Hypothesis 1 states that PF businesses show more of an exponential function type curve compared to VC businesses. Hypothesis 2 states that operating profit margin in PF type companies rises relatively easily along with sales growth compared to in VC type companies. The data support hypothesis 1, while hypothesis 2 is partially supported. This is likely because a fixed ratio decrease caused by the scale effect does not necessarily occur following sales growth, even in PF type companies.

Keywords: platform type business; value chain type business; network effect; scale effect

1. Introduction

With the popularization of personal computers (PCs) and smartphones, an increasing number of companies are adopting a platform (PF) type business model. Successful companies have achieved high growth and profit ratios. One characteristic of PF type businesses is that they can provide a wide range of products and services, and, therefore, have different characteristics from value chain (VC) type businesses in terms of sales growth and changes in profit ratio following business growth. This paper aims to develop two hypotheses on the differences between PF type and VC type businesses and to investigate the compatibility of these hypotheses using relevant data.

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Within the context of this paper, PF type refers to a type of intermediary company called a “marketplace” (Hagiu and Wright, 2015a). Being intermediary companies, PF types benefit from network effects (Parker et al., 2016). PF types are also said to easily enjoy increasing returns (Eisenman et al., 2011).

However, previous studies did not compare actual sales data and profit ratio data from PF type companies with data from non-PF type companies (or VC type companies). We use Japanese market data to examine whether the theoretical characteristics of PF type companies are reflected in the sales and profit ratio data.

2. Definitions of PF Type Companies and VC Type Companies

The PF type companies covered by this paper are all successful companies that offer online services (industry leaders). The VC types are also successful companies in the same industries, but they are not necessarily online companies. In this paper, PF type businesses and VC type businesses are defined according to Negoro (2017) as follows.

PF type businesses

- These businesses provide online services by offering products and services produced or provided by other companies.
- The provider of the “finished product/service/information” is responsible for the quality of the finished product/information.

VC type businesses

- These businesses provide products and services that are either their own or stocked from another provider.
- They are directly responsible for their product/service quality.

3. Basic Assumptions

We developed our hypotheses based on the following assumptions on the differences between PF type and VC type businesses.

- PF type businesses offer a relatively wider range of products and benefit readily from cross-side network effects than VC type businesses do. Although their fixed expense ratios are relatively higher and they have higher break-even points, their profit ratios rise if they surpass their break-even points (i.e., they benefit readily from economies of scale than VC type businesses do).
- VC type businesses have a relatively limited range of products and do not benefit as easily from cross-side network effects as PF type businesses. They have relatively higher variability ratios and it is difficult for them to increase their profit ratios

even if they surpass their break-even points (i. e., they do not benefit as easily from economies of scale as PF type businesses).

4. Research Method

We employ the following process to analyze the data.

1. We first deduce the hypotheses based on sales growth curves and changes in operating profit margins following growth based on the assumptions described earlier for PF type businesses and VC type businesses.
2. We then investigate sales growth curves and operating profit margin changes following growth in successful companies (both PF types and VC type s) representing each industry.
3. Finally, we discuss the compatibility of the data obtained in step 2 with the hypotheses presented in step 1. If the data is in compatible, we explore the reasons behind it.

5. Hypotheses Development

This section covers the hypotheses presented in this paper and the basis of their formulation.

Hypothesis 1 on sales volume growth

- During the initial stage of a business, PF type companies demonstrate an exponential function type curve, unlike VC type businesses.
- VC type businesses have a relatively linear growth than PF type businesses even during the initial stages of the business.

Hypothesis 2 on operating profit margin changes following growth

- Following sales growth, the profit ratios of PF type companies rise relatively easily than those of VC type companies. In other words, the profit ratio of PF type companies does not easily decrease following sales growth.
- Compared to PF type companies, the profit ratios of VC type businesses do not necessarily rise following sales growth. In other words, the profit ratio could drop following sales growth.

The following assumptions on differences in fixed expense ratios (variable expense ratios) that impact the scale effect form the basis of our hypothesis on operating profit margin changes following growth. In other words, if the following are not true, changes would differ from those predicted by this hypothesis.

PF type companies: Additional costs following an increase in the number of products/customers are lower than that of VC type businesses.

- If no inventory is maintained, there will be no additional costs for managing inventory as the number of products increase.
- Such companies do not produce themselves, so there are no additional production facility costs as the company grows.
- They do not need to increase their sales personnel or locations as they grow.
- Even if there is expansion in some segments following growth, the profit ratio for the new segments does not change significantly.

VC type companies: Additional costs following an increase in the number of products/customers are higher than that of PF type businesses.

- There are additional costs for managing inventory as the number of products increase.
- Such companies have their own products, so there will be costs incurred on added production facilities and personnel.
- If the company does not sell online, costs will increase as sales personnel and locations increase with the growth of the business.
- If there is expansion in some segments following growth, more segments have a lower profit ratio.

6. Methods for Checking Compatibility with Hypothesis

① Compatibility method

The curves for sales volume growth and operating profit margin changes following sales growth are indexed and compared for PF type and VC type companies to determine compatibility with the hypothesis.

② Indexation method

A value of 100 is assigned to the first fiscal year of the applicable period, and sales are indexed for subsequent fiscal years. This is done to compare differences in growth curves (as opposed to comparing the absolute scale of sales).

③ The changes in operating profit margins are then plotted on a graph with the sales growth index on the horizontal axis and the actual operating profit margin index on the vertical axis. This is done to compare changes in operating profit margins following sales growth (as opposed to comparing the absolute scale of sales).

④ Use of proxy variables

There is variation in the information disclosed by companies, and there are cases where it is impossible to obtain any financial information. For such companies, a variable thought to have a direct causal relationship with sales growth is used as a proxy variable.

For example, the "number of parking spaces provided by the vendor" is used as the variable for the rental parking space industry. Parking charges or fees would be incurred when a driver uses the parking space, so this variable is thought to have a strong correlation with sales volume.

7. Analyzed Businesses

Companies undergoing continuous growth, both PF type and VC type, were selected for analysis. The top company in each industry was selected for PF type businesses. The sales growth and changes in profit ratio were measured against the fiscal year the company was listed (or the fiscal year immediately prior to listing) as the base fiscal year during the initial stage of the business. Note that, depending on the industry, PF type businesses provide either information or content as products.

Following is an overview of each business, and the characteristics of a potential impact on sales volume growth and operating profit margin changes following growth.

① EC commodity business

Rakuten Ichiba was selected as the PF type company, while Oisix. daichi Inc. was chosen as the VC type company.

Rakuten Ichiba is an e-commerce business directly managed by Rakuten, Inc. It deals with commodities. The company handles a wide range of products, from food products to home electronics, beauty products, and toys. It is a marketplace type of business, so it maintains no inventory. Rakuten handles web posts, orders, and payment, while each store is responsible for setting up its online platform, managing inventory, and shipping. Rakuten's revenue comes from stores' monthly fees and handling charges based on store sales volume. As of 2017, Rakuten had 90 million members, 44,300 stores, and over 1.9 billion products. This paper uses the distribution volume (rather than Rakuten Ichiba's revenue) as the sales variable. One factor propelling growth is the network effect, whereby as the number of stores increases, it attracts more consumers, which then attracts more member stores.

Oisix. daichi operates a business offering home delivery of food products. The company sells and delivers food and ingredients to consumers from its website and catalogs, with a focus on safe ingredients. Some examples of products include organic vegetables, specially cultivated agricultural produce, and additive-free processed food. As of 2017, it worked with more than 1,200 partner farmers (suppliers), and had 120,000 members. One factor propelling sales growth is the company's "kit Oisix" product (a meal kit sold to couples in their 20s to 30s who insist on quality), which has played a major role in attracting new customers. One factor impacting operating profit margin changes is that the company operates its own distribution center, where the company also manufactures its meal kits. Fixed expenses continue to increase as sales increase. For example, the company built a factory to manufacture kits in 2015.

② Travel agent businesses

Rakuten Travel was selected as the PF type company, while H.I.S. Co. Ltd. was chosen as the VC type company.

Rakuten Travel is an online travel agent business operated by Rakuten, Inc. In 2003, Rakuten purchased a hotel support business that was started by Hitachi Zosen Corporation. The company's business involves reserving lodging facilities (such as hotels and traditional Japanese inns), selling international airline tickets, and intermediary sales of travel packages for domestic airline carriers. Although the company's revenue comes from service fees, this paper uses reservation sales volume as the sales data so that it can be compared with the VC type business. One factor propelling growth is the network effect, whereby more users are attracted as the number of registered lodging facilities increases. A factor behind an operating profit margin increase following growth is that the company does not own any lodging facilities, so it easily benefits from economies of scale as sales increase.

H.I.S. Co. Ltd. sells discount airline tickets, packaged tour products (inside and outside Japan), and free plan products. The company continues to develop its channels through EC and brick-and-mortar shops. It has expanded its customer base and is the industry leader for discount airline tickets and package sales. One factor impacting operating profit margin changes is that the company owns 296 locations in Japan and 232 locations overseas, and employs many salespeople — this means that fixed expenses increase with increased sales.

③ Fashion industry

ZOZOTOWN (a business operated by START TODAY Co., Ltd.) was selected as the PF type company, while SHIMAMURA Co., Ltd. was chosen as the VC type company.

ZOZOTOWN is a fashion EC site operated by START TODAY Co., Ltd. The company is responsible for building sites, posting products, and handling payments. It also owns its own warehouses that are contracted to handle everything for shops, from inventory control to shipping. Its business is from consignment sales, so it does not own the inventory in its warehouses. As of the end of the 2016 fiscal year, it carried over 520,000 products from 954 shops — a large amount when compared with other fashion EC sites. This is likely due to the network effect, whereby the consignment nature of the business attracts a wide range of shops, which attracts more consumers, which, in turn, attracts even more shops. This paper uses the distribution volume (rather than consignment sales fees) as the sales data.

SHIMAMURA Co., Ltd. operates a retail clothing business. The company is a purely retail business that purchases products from apparel wholesalers for sale (it does not plan or produce any products). Its low prices and wide lineup make it popular among housewives and young women. The company focuses on selling various products produced in small lots for reasonable prices. It purchases products from suppliers and takes responsibility for all returns, and has, therefore, attracted many suppliers (more than 700 as of 2017).

④ Rental parking space business

Akippa Inc. was selected as the PF type company, while Times 24 (a business operated by PARK24 Co., Ltd.) was chosen as the VC type company.

Akippa Inc. operates a parking space sharing business. The company offers a service that matches drivers with parking spaces owned by individuals and companies. It charges a service fee to match people who want to reserve parking spaces at a low cost with people who want to use idle assets to earn supplementary income. The company benefits from the network effect between the number of parking spaces and drivers, and as of 2017, the number of registered parking spaces had grown rapidly to 12,000.

PARK24 Co., Ltd. operates a coin-operated parking business with locations in urban areas all over Japan. It offers around 16,000 small coin-operated parking lots and charges usage fees depending on the duration of time the spaces are used. Sales staff loan parking lots from landowners, and then Park24 has parking facilities built on the land. The sales personnel assigned to each area select the land and negotiate with landowners. It takes some time to add new parking lots as the sales staff must first search for land and negotiate with landowners. Two factors impacting operating profit margin changes are that the company does not benefit from economies of scale when obtaining land for parking lots, and that additional sales personnel and locations are required to add new lots.

This paper uses the number of parking spaces as a proxy variable for sales (for both companies).

⑤ Online music distribution business

iTunes was selected as the PF type business, while Mora（a music business operated by Sony Corporation）was chosen as the VC type company.（iTunes is a business of Apple Inc.）

When users access the iTunes service in Japan, payments are made to iTunes（that also charges sales fees）. However, this paper uses song sales volume as the sales data. The company easily benefits from the network effect, whereby the large variety of content attracts many users, which, in turn, attracts more music providers. Its major expenses are IT systems development and operating expenses. It costs very little to the company to store content.

Mora is an online music distribution site operated by Sony Corporation. Its sales are calculated as the product of the sales price of the audio source and the number of broadcasts. The company generally only handles music sold by Sony Music Entertainment, so it does not easily benefit from network effects.

⑥ Secondhand goods sales

Mercari Inc. was selected as the PF type company, while Hard Off Corporation Co. Ltd. was chosen as the VC type company.

Mercari Inc. operates "Mercari," a free market application used by individuals to buy and sell secondhand goods. Sellers use the application to list and sell products. The company charges a service fee for this. As of 2017, more than one million items were listed per day, and the service generates 10 billion yen per month. There are network effects between the wide range of sellers and users.

Hard Off Corporation Co. Ltd. operates a business that involves purchasing and selling secondhand goods. It is the top company in the secondhand goods business, and it continues to open new direct management and franchise locations that focus mainly on selling secondhand computers and home electronics. It also operates an EC site. The company purchases secondhand goods from individuals and companies and operates its own warehouses. Its sales volume growth is thought to be proportionate to store expansion.

This paper uses distribution amount and sales volume as the sales data for Mercari and Hard Off Corporation respectively.

⑦ Economic News distribution

NewsPicks（a business operated by Uzabase Inc.）was selected as the PF type company, while Nikkei Online（operated by Nikkei Inc.）was chosen as the VC type company.

NewsPicks is an online news distribution media service operated by Uzabase Inc. It publishes its own articles as well as articles from other media houses, and members are allowed to comment on articles. It earns revenue through articles published through tie-ups and monthly membership fees for the facility of reading articles available only on its service. It benefits from network effects, whereby the number of users increases as the number of news providers and commentators increases. The service offers fewer exclusive articles than a newspaper publisher would, and its major costs are system development and operating expenses.

Nikkei Inc. had previously focused on publishing and selling newspapers, but launched Nikkei Online (the digital version of its paper) in 2010. In addition to articles from the morning and evening editions, the site also distributes real-time news exclusive to the digital edition. Users can access articles using a computer (by accessing the website) or smartphone/tablet application. Monthly subscription fees for members constitute sales.

⑧ Lodging facility business

Airbnb was selected as the PF type company, while APA Hotel was chosen as the VC type company.

Airbnb uses a sharing economy business model where lodgers are matched with individuals who want to rent out idle assets. The revenue comes in the form of service fees. As of the end of 2016, the service had expanded into 65,000 cities in 191 countries and had rapidly exceeded a total of 200 million guests. The service expanded into Japan in 2014 and is mostly used by foreign travelers. The service likely benefits from network effects, whereby a large number of registered lodging facilities attracts more lodgers, which, in turn, attracts more lodging facilities. The company owns no property (lodging facilities) since it acts as an intermediary for lodgers.

APA Hotel is involved in developing and operating hotels. As of September 2016, it owns 411 hotels (including hotels under construction) and a total of 66,418 guest rooms, making it the top hotel chain in Japan in the number of rooms. The company's lodging facilities are inexpensive and offer standard quality, and the company has over 10 million APA Card members. The company is focused mostly in the center of Tokyo, and owns deformed land that was purchased at a low price after the bankruptcy of Lehman Brothers. Many guest rooms are concentrated in a single building and the company operates its hotels as business hotels with low labor expenses.

This paper uses the number of registered properties and the number of guest rooms as proxy variables for the sales data of Airbnb and APA Hotel respectively.

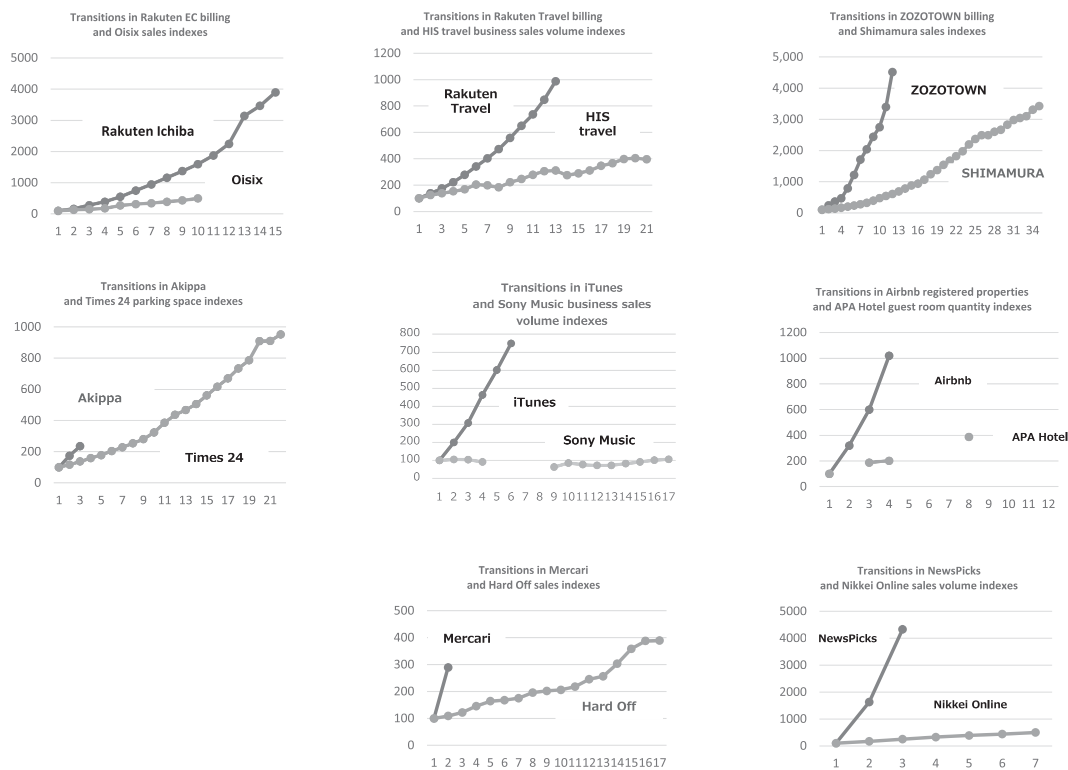

Figure 1.　Sales volume growth（index）of PF type and VC type companies in each industry

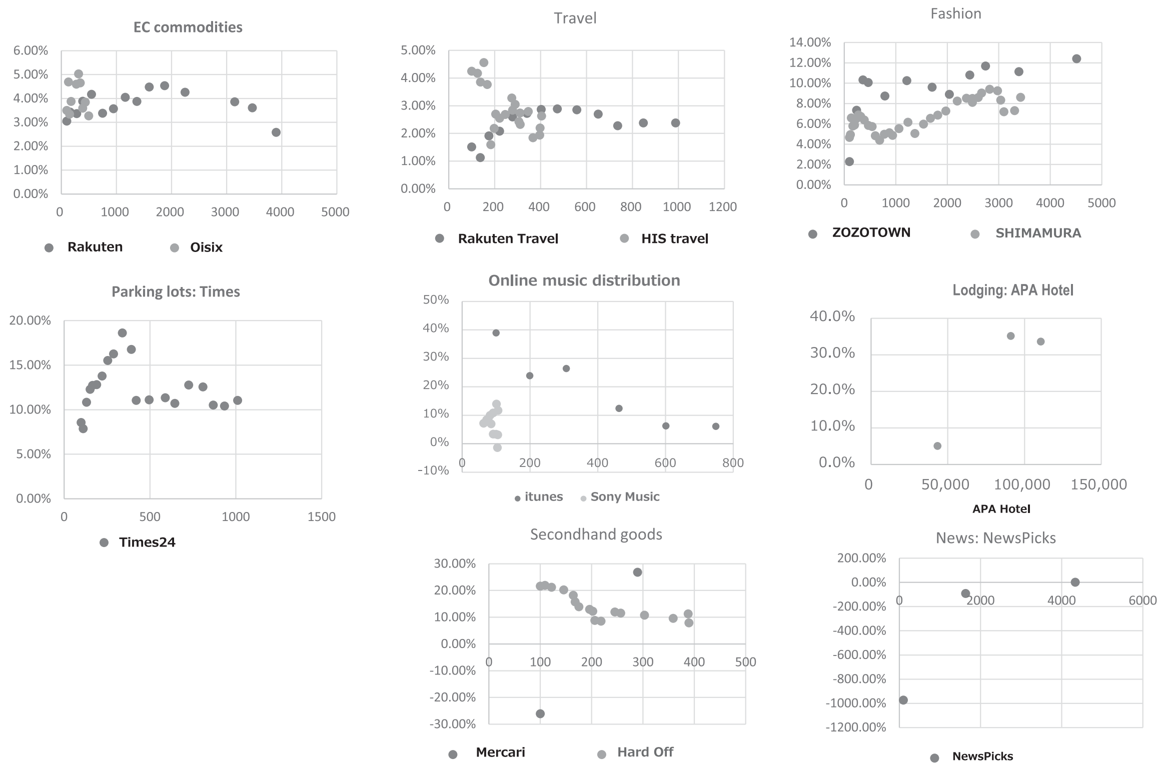

Figure 2. Changes in operating profit margins following sales growth of PF type and VC type companies in each industry

Table 1. Compatibility of hypothesis with sales volume growth for PF type companies and VC type companies in each industry

(Legend) ○ : Compatible, △ : Partially compatible, × : Not compatible

No.	Field	PF	Compatibility	VC	Compatibility	Industry
1	EC (B2C): Commodities	Rakuten Ichiba	○	Oisix	○	○
2	Travel	Rakuten Travel	○	HIS	○	○
3	Fashion	ZOZOTOWN (consignment sales)	○	SHIMAMURA	○	○
4	Parking lots/spaces	Akippa	(No. of spaces) ○	PARK24	○	○
5	Music	iTunes	○	Mora	○	○
6	Secondhand good sales (general)	Mercari	○	Hard off	○	○
7	News	NewsPicks	○	Nikkei Online	○	○
8	Lodging	Airbnb	(lodging facilities) ○	APA Hotel	○	○

Figure 1 presents a graph indexing the sales volume growth for PF type and VC type companies in the eight industries described above. Figure 2 presents a graph summarizing the changes in operating profit margins following sales volume growth.

8. Conclusion

The compatibility with the hypotheses in each industry are summarized as follows :

① Hypothesis 1 on sales volume growth

Looking at the sales volume growth curves in each industry selected for this paper, the PF type companies had an exponential function type curve compared to VC type companies, and therefore a high level of compatibility with our hypothesis. The case study for each company also shows that these companies benefit easily from cross-side network effects.

② Hypothesis 2 on changes in operating profit margins following growth

Although it was not possible to obtain adequate financial information, two out of the eight industries that were analyzed were evaluated as “Compatible”, two were evaluated as “Partially compatible”, and one was evaluated as “Not compatible”.

③ We can assume that the prerequisites for our hypothesis were not present in some industries, that were not evaluated as “Compatible.” More specifically, some factors could

Table 2. Compatibility of hypothesis with changes to operating profit margins following growth for PF type companies and VC type companies in each industry
(Legend) ○ : Compatible, △ : Partially compatible, × : Not compatible

No.	Field	PF	Compatibility	VC	Compatibility	Industry
1	EC (B2C): Commodities	Rakuten Ichiba	△	Oisix	○	△
2	Travel	Rakuten Travel	○	HIS	○	○
3	Fashion	ZOZOTOWN (consignment sales)	○	SHIMAMURA	△	△
4	Parking lots/spaces	Akippa	NA	PARK24	○	NA
5	Music	iTunes	×	Mora	×	×
6	Secondhand good sales (general)	Mercari	○	Hard off	○	○
7	News	NewsPicks	○	Nikkei Online	NA	NA
8	Lodging	Airbnb	NA	APA Hotel	×	NA

include a sudden increase in acquisition costs (especially EC consultants) to increase the number of providers (PF type company/Rakuten Ichiba), adjustments to purchasing prices to launch streaming services (PF type company/iTunes), increasing negotiation ability with suppliers due to the competition between wholesalers and volume purchasing and decreasing costs (VC type company/Shimamura), and low labor expenses (fixed expenses) and high guest room occupancy (VC type company/APA Hotel).

9. Research Limitations

There are some limitations to our research. Our aim was to compare data during the initial stages of each business. However, for some companies, we could obtain data only after the business was launched. Some of the selected companies had recently launched their businesses, so there was insufficient historical data.

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