Chapter 1

Risk Spreading between the Diversified Subscription Businesses and the Existing Business: Focusing on the Case of Apple

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Prologue

- (1) **Teachings of “Risk Sharing”** to reduce the risk for a pair of individuals.

*Two are better than one, because they have a good return for their labor:
If either of them falls down, one can help the other one up. But pity
anyone who falls and has no one to help them up.*

The Old Testament, Ecclesiastes, 4: 9–12

The readers should note that this saying starts with the word “Two,” which means “two people” or “two companies,” which could be a wife and her husband, teacher and student, or a holding company and its subsidiary. Both the people and the companies in this pair are independent but cooperate with each other. Consider the case of independent but allied companies. When a subsidiary company is facing bankruptcy, the paternal company may help it. Think of the relationship between an automobile

company and its allied parts supplier (often called a *detail-controlled parts supplier*). When the supplier is unable to cover its fixed costs for manufacturing the parts to be supplied to the automaker, the automobile maker will help to compensate the fixed cost of the parts. This is known as a *risk sharing* relationship (See Monden and Nagao (1988)).

- (2) **Teachings of “Risk Spreading”** to reduce the risk for investors in multiple projects.

Ship your grain across the sea; after many days you may receive a return. Invest in seven ventures, yes, in eight; you do not know what disaster may come upon the land.

The Old Testament, Ecclesiastes 11

Readers should note that this saying starts with the phrase “your grain.” Thus, it assumes “only one person or one company” at the beginning. It is only an individual who scatters seeds in several fields or only one company that invests its funds in several venture companies (or “start-up” firms). Then, in the case of a disaster, it may not be possible to obtain good results from all the fields or all firms you have invested in, but it is more likely that you will see good results when there is a higher possibility of *risk spreading* among various opportunities.

Consider a Japanese *mega-supplier* that manufactures electronics parts for the automobile industry. Because this mega-supplier (often called a *black-box parts maker*) is technically excellent, it can supply parts to several automakers. Thus, even if this mega-supplier is unable to supply products to a certain automaker, it will be able to provide products to other automakers. Therefore, the company continues to make higher profits, thanks to its *risk spreading* ability on account of its high technical capability (See Monden and Nagao (1988)).

- (3) **“Life Cycle”** of any person or merchandise.

The sound of Gion Shoja bells echoes the impermanence of all things; the color of Sala flowers reveals the truth that the prosperous must decline. The proud do not endure; they are like a dream on a spring night. (Gion Shoja is the name of the temple built for the Buddha.)

Heike Monogatari (*The Tale of the Heike*) (mid-13th century)

McCullough (1988)

This proverb means everything has its own life cycle, including manufacturing products whose stages of life are infancy, growth, maturity, and finally, decline, but this cycle can be reversed through industrial “dematurity.” In the case of the life cycle of industrial products, any product may eventually decline. For example, even sales of Apple’s smartphone (iPhone) seem to have declined recently. To solve the problem of this decline, Apple is going to apply the concept of “risk spreading” between their smartphone business and other service businesses. Thus, we will examine how they cope with this situation via “subscription” service businesses.

1. Research Theme

1.1 “Risk spreading” in the business portfolio

This study first investigates the reason for the recent emergence of the “subscription” business model in the field of digital business as conducted by Google, Apple, Facebook, and Amazon (GAFA) and then theoretically examines the “risk spreading” in a company that has subscription businesses from the viewpoint of the *business portfolio* strategy. The study then analyzes various forms of actual subscription businesses.

In addition, from the “security” *portfolio* selection as well as “business” *portfolio* decision theories, the current study clarifies whether the subscription business in the digital field can contribute to the goal of “risk spreading.”

Finally, the study examines the recent case of the subscription businesses launched by Apple and clarifies whether their business model can satisfy the risk spreading goal.

1.2 Why has the subscription business emerged?

1.2.1 What are the reasons for the emergence of the subscription business?

One of the main reasons the subscription business has recently become popular is because the sales of hardware products have recently decreased, creating a need to compensate for this reduction in *hardware* sales by increasing *service* sales.

This idea could also be rephrased as follows: From the *high-risk and high-return* business model of selling physical products to the *low-risk and low-return* business model of selling a service.

This change in the business models can further be likened to a transition from *buying and selling* to *lease or rent* in real estate businesses. *Capital gains* from selling a condominium could result from the former, while *income gain* from renting the condominium to a person could result from the latter.

The subscription business in this study resembles the latter business, which is low risk and low return, while the manufacturing and selling of the physical products resemble the buying/selling aspect of real estate businesses, which entails high risk and high return. However, it is not possible to determine which business model is better. It depends on personal characteristics or attitudes toward the risk. That is, it depends on whether the investor is *risk seeking* (preferring a high-risk and high-return business) or *risk averse* (preferring low-risk and low-return businesses).

Among these two types of businesses, the flat-rate subscription business belongs to the low-risk, low-return type, which enables the *smoothing of the sales revenue* or smoothing of the monthly profits.

2. Two Types of Subscription Businesses: Flat-Rate System and the Usage-proportional Rate System

The flat-rate system is a contract that enables users to watch movies or listen to music as many times as they want once they have paid a monthly flat-rate fee. Under this system, once users have paid the monthly fixed amount of the fee, the amount will not be refunded even if they do not use the service at all. However, even if a subscriber uses the service multiple times, the fee does not change. Thus, for such users, the fee for one-time usage of service will decrease. As a result, this system may increase customer loyalty so that the company is able to increase the number of successive users.

The *usage-proportional rate system* is often applied to *sharing services* such as “car sharing,” “lodging,” and so on, which use the usage-proportional rate system and charge only for the number of times or hours the service is used. This system is popular because the user does not need to

pay any fees if they do not use the service. Such a system will be convenient for those who will not use a particular service frequently, such as luxury car rental. (For details of the two types of subscriptions, see Tzuo and Weisert (2018).)

3. “Risk Spreading” Through the Business Diversification from the Viewpoint of the Portfolio Selection Theory

3.1 *Maturation of the life cycle of the main businesses in Google, Apple, Facebook, and Amazon*

The return on sales (or net profit on sales) of large internet-related companies such as GAFA has fallen from 26% in 2012 to less than 20% in 2019 (*The Nikkei*, 2019.02.26). The main reason for such a slowdown is due to a decrease in sales growth of their main businesses, such as the decline of iPhone sales. This means that GAFA’s main businesses have recently declined.

3.2 *Diversification strategy to cope with the maturity in the business life cycle*

3.2.1 *What is the diversification strategy as risk spreading? Analysis from the viewpoint of the portfolio selection in security investment*

The portfolio selection theory of various security investments was first proposed by Markowitz (1952), and this study applies his theory to the portfolio problem of diversified businesses.¹

¹ The portfolio in the security investment is a set of various stocks that will be held by an investor. The decision to have such a set of securities is called the optimal portfolio selection. The basic decision rule for formulating such a portfolio is as follows:

(a) The investor not only wishes to maximize the *expected revenue* from their stock investment but also attempts to minimize the risk from their investment. Such risk could be measured by the *variance* surrounding the expected value of their revenue.

(b) Various investment opportunities (i.e., revenues from various securities) are not mutually independent. That is, various investment opportunities will move in the same or

Suppose that the price of stock A is highly *correlated* with the price of stock B. That is, if the price of A goes up, the price of B will also increase, and vice versa. Also, if the price of A goes down, the price of B will also decrease, and vice versa. In such a case, the risk of the total portfolio of two such securities will increase; such an investment in two brands will be *high risk and high return*.

On the contrary, if the correlation of prices between two different stocks is lower, then the investment in such stocks will be *low risk and low return*. Due to their *risk-averse* behavior or *risk spreading* investment, such a security investment portfolio will be created if the investor favors *low risk and low return*.

3.2.2 “Risk spreading” through the business diversification strategy from the viewpoint of portfolio theory: Case of Apple

Since selling smartphones as hardware merchandise has declined, Apple has decided to extensively move into new “*service businesses*” such as the movie, music, and game-selling services. Thus, it seems that Apple

in the opposite direction with the revenue of the entire security market or with the revenue of the other securities. Such mutual relationships between various securities could be statistically measured by the *co-variance* or by the *correlation coefficient*.

Under the above general relationship, the security investor will make his or her decision about the trade-off (or priority) between the *expected revenue* (i.e., average revenue to be gained) and the *variance* (i.e., various values of revenues).

In such a situation, when the value of the portfolio of the security market as a whole (i.e., the general index of stock price such as “Nikkei average,” “TOPICS,” or Dow–Jones stock average) will significantly increase, the stock price of a certain company may also increase at the same time (i.e., positive correlation) or it may decrease inversely (i.e., negative correlation). For example, *the stock prices of the companies that are producing the complementary goods may show correlated behavior*. If such complementary stocks are held, then a “high return” may be obtained if you are lucky, but you may incur a big loss if you are unlucky. However, if the stocks of *rival* firms in the same industry are held, then stock prices of such firms may show negative correlation (or adverse correlation). That is, loss may be smaller even if you are unlucky, or a low return may be obtained even if you are lucky.

regarded such an expansion of business brands as a kind of “risk spreading” strategy between iPhone and the new service businesses.

Unlike Apple’s intention, however, *their diversification strategy could not be regarded as a risk spreading strategy*. The reason is that Apple is attempting to use iPhone sales, which has been their most profitable business, to increase business in other areas. Apple has attempted to increase the sales of their new service businesses under the assumption that *their customers will make good use of iPhones* to enjoy movie and games services, and so on (i.e., subscription business).

However, *declining* iPhone sales do not correlate with the increased sales of their new subscription services. In other words, *since iPhones sales are weak, their sales of new services would also be weak*, and their diversification businesses would therefore form a “high-risk” pattern as a portfolio. Let us check how the real situation is in Apple.

3.2.3 *Shorter length of usage time for iPhone is under competition among various “contents” attractiveness*

As of December 2018, the average number of hours of smartphone use per day is 3 hours and 5 minutes in Japan. In addition, since services such as music, movie, games, and news can all be accessed via a smartphone, there is likely to be fierce competition among various services at certain times.

Therefore, because there is competition among various services for the “limited timespan of usable time” for smartphones, it will not be possible for Apple to meet the expectations of these services. That is, decreasing iPhone sales would not be compensated by increasing sales of new service businesses; therefore, adverse or negative correlation between two businesses would *not* be possible.

However, if adverse correlation occurred between the aforementioned two businesses, then it follows that the *variance* of profitability of the portfolio of *both* businesses will be statistically smaller than that of *each* business. The risk of the portfolio will therefore be smaller and the effect of risk spreading could be gained.

3.2.3.1 Risk figure β_i of each business i in a diversified company

Monden and Fernand (1995) developed a mathematical model to derive the *risk figure* of each business in the diversified company, using the measure of *the sensitivity of how the change of profitability of a certain business will vary depending on the changes of total profitability of the whole portfolio of the businesses of the company as a whole*. This risk figure is β_i for each business in a company, which is similar to the β_i of the capital asset pricing model (CAPM).²

3.2.3.2 Three-dimensional “Product Portfolio Management”

Suppose that there are many hundreds of divisions or subsidiary firms in a large diversified company, and each subsidiary firm conducts each business of the diversified parent company. Then, by applying the risk coefficient β_i of each business, the top management of the diversified parent company can use the following three measures for each business: (1) growth rate of sales, (2) rate of profitability, and (3) risk rate. The growth and profitability were proposed by the Boston Consulting Group matrix (BCG matrix), while the risk measure β_i of each business i was also added

²Markowitz (1952) pioneered the theory of portfolio selection for stock investment, and Monden (2001) introduced the quadratic programming model of optimal portfolio selection. Further, Sharp (1964), Lintner (1965), and Mossin (1973) were the pioneers of CAPM.

In addition, Monden and Fernand (1995) proposed a new model to show the “risk” measure of each business in the multi-brand (diversified) company. The essence of our diversified company model is as follows:

Denote:

$$\begin{aligned}\beta_i &= \text{cov}_{ip} / (\sigma_p)^2 \\ &= r_{ip} \sigma_i \sigma_p / (\sigma_p)^2\end{aligned}$$

where cov_{ip} is the covariance of business X_i and business X_p , r_{ip} is the correlation coefficient between the revenue rate of business i and the revenue rate of the business portfolio, σ_i is the standard deviation of the revenue of the business X_i , σ_p is the standard deviation of the revenue of the business portfolio β .

Here the value of β_i is how the revenue of business i will move in response to the change of the revenue of the business portfolio as a whole.

by Monden and Fernand (1995), and the authors refer to this model as a *three-dimensional model of Product Portfolio Management*.³

4. The Manufacturing Company to be Transformed to a Service Company: Case Study of Apple's Subscription Business

4.1 Three categories of Apple's businesses

Apple began to introduce flat-rate services to recover the decrease in smartphone sales. We first examine their current financial performance (see Table 1).

Table 1. Quarterly sales of each business segment of Apple (million dollars).

Net sales by each business	Three months ended		Change rate
	Dec. 29, 2018	Dec. 30, 2017	
iphone	\$51,982	\$61,104	(15)%
Mac	7,416	6,824	9%
ipad	6,729	5,755	17%
Wearables, Home and Accessories	7,308	5,481	33%
Services	10,875	9,129	19%
Total of net sales	\$84,310	88,294	(5)%

³ According to the BCG matrix, each business is classified into one of the four categories: *Star*, *Cash-cow*, *Dog*, and *Question-mark*. Since we have added the risk measure into the above four categories, each of these categories will be additionally evaluated by considering whether they are "risky" or "safer" depending on if β_i is $<$ or ≥ 1 , or equal to 1, or minus. Thus, the classifications will be [*prospective Goose* or *risky Goose*], [*prospective Star* or *risky Star*], [*pet Dog* or *biting Dog*], or [*prospective Child* or *questionable Child*], and so on.

However, it should be noted that the measure of β_i implies whether or not the business in question will be influenced by the average profitability of the whole portfolio of businesses. Thus, if β_i is bigger than 1, then business i will be regarded as being safer compared to the move of the business of the company as a whole.

There are many other studies of the mathematical models for the *diversified business portfolio strategy*. Examples are Bettis and Mahajan (1980), Rabino and Wright (1984), Carzo and Wind (1985), and Colin and Ruefli (1992), among others.

4.1.1 *Apple's existing hardware merchandise*

Hardware products sold by Apple include the iPhone, iPad, iPod, Mac, Apple Watch, and so on. As shown in the quarterly statement of Apple's segmented sales from October to December 2018, iPhone sales have decreased compared to the same quarter in 2017.

Total corporate sales of the company as a whole decreased by 5% to 84,310 million dollars. The reasons are as follows: iPhone sales decreased 15% to 51,982 million dollars to the same quarter of last year 2017, and as a result, the sales ratio of iPhones to total corporate sales also decreased from 69.2% to 62%. This was the reduction just after 9 years.

However, the sales of the services of the quarter ended in Dec. 29, 2018 has considerably increased by 19%, compared to the sale of the same quarter ended in Dec. 30, 2017 (See Table 1). When we notice this point Apple's business model is enjoying the "risk spreading" between the declining iPhone business and the increasing Services business.

4.1.2 *The new subscription businesses*

From September 2019, Apple decided to introduce four flat-rate subscription services, as shown in the right-hand side of Fig. 1.

4.2 *New subscription strategy*

4.2.1 *Apple TV + and Apple Arcade*

Apple TV + is a flat-rate movie service and Apple Arcade is a flat-rate game service.⁴ Both have been introduced to rebuild the company as a whole after its decline.

⁴ *Apple's game and the Cloud Streaming Game*

Apple's new game service based on the flat-rate system is to be a so-called Cloud Streaming Game, which uses massive volumes of cloud data. A cloud game uses the game software of the massive volume of data in the "cloud," which is a large internet-based data center. From such a cloud, the game data are *sequentially* received and reproduced as a game on a smartphone or iPad. This game service is based on the technique known as *streaming*.

Fig. 1. Existing services, hardware sales, and new flat-rate businesses.

Source: Adapted from *The Nikkei* (2019.03.27a, 2019.03.27b, 2019.03.27c).

There are many rival companies in the movie and game services business competing throughout the world.

Since 60% of young people aged 18–29 use flat-rate movie services instead of the toll TV movie, Apple is also facing a challenge selling their movies to this age group.

4.2.1.1 The characteristics of Apple's movie services based on the iPhone business

Apple has attempted to utilize the iPhone platform since it is still earning huge revenue from this at present. However, the smartphone is now under *commoditization* due to the growth of Chinese and Korean companies and Apple may not continue their high-end marketing policy as before.

Under the “5G” technology of the next generation of global communication, younger people will be able to watch movies via smartphones. The critical factors may be how Apple sets the price of movie services and

For example, Sony has been using the “PlayStation” games console for a long time, but they recently began using the “PlayStation Now” for cloud streaming games. Microsoft recently began to affiliate with Sony, and they are co-developing a cloud service game system.

its “content,” which must be the most competitive factor in internet movies.

4.2.2 *Apple News + as the flat-rate news service*

This service was launched in the United States on March 25, 2019. When subscribers pay a monthly rate of US\$9.99, they can read any of the more than 300 journals and magazines such as *The Wall Street Journal* (WSJ), *Fortune* (economic magazine), and so on. Other examples include *Time*, *New Yorker*, fashion magazines such as *Vogue*, and science magazines such as *National Geographic*. Apple claims that the total price of these if they are purchased individually would be US\$8,000 per year.

4.2.2.1 Competition between “Apple News +” and individual journals

The Wall Street Journal (WSJ) sells its own *online journal* at their own flat rate of \$40 per month.

Because WSJ’s online journal is in competition with “Apple News +,” WSJ online service may not be able to compete with Apple News + as a whole. From such a viewpoint, some of the large online journals do not participate in Apple News +.

WSJ, however, may have decided to participate in Apple News + because they may be able to obtain additional readers if they participate in Apple’s *ecosystem*⁵ because there are 14 billion iPhone users.

4.2.2.2 Competition for revenue allocation between “Apple News +” and the collected individual journals

“Apple News +” may compete with the participating journals and magazines for the allocation of their revenues. Apple demands 50% of the total revenue, but it is reported that the participating content providers such as WSJ, *Time*, and *Vogue* are accusing Apple of being greedy (*The Nikkei*, 2019.03.27a, 2019.03.27b, 2019.03.27c).

⁵ Refer to Monden (2014) and Monden (2018, Chapter 9, pp. 213–214), for details of Apple’s “ecosystem.”

Suppose that Apple computes the gross margin from the market sales of “Apple News +” by applying the following formula:

$$\text{Gross margin} = \text{total revenue from subscription fees} \\ - \text{full costs of Apple News +}.$$

However, there must be additional *opportunity costs* on the side of WSJ, for example. This is the amount of reduced sales due to the decrease in the number of readers caused by the market sales of “Apple News +.” Thus, WSJ will demand at least as much *additional profit* as will be lost due to participation in Apple News +.

We now calculate how the royalties from all the movies, music, electronic journals, content, and so on will be allocated to the content provider firms.

In the case of flat-rate internet services, the allocation rate of the total royalties will be determined by the following formula, depending on (1), (2), (3), and so on (*The Nikkei*, 2019.05.23):

- (1) Number of content providers
- (2) Number of subscribers
- (3) Total amount of advertisement revenues

Allocated amount of total royalties for content provider j

$\geq [(\text{flat-rate subscription fee}) \times (\text{total number of subscribers}) + \text{advertising revenue} - \text{full cost paid by platformer}]$

$\times \{[(\text{list price } P_j \text{ of the journal } j) \times (\text{sales quantity } M_j \text{ of journal } j \text{ in the internet group service})]$

$/\sum (P_j \times M_j)\}$, where $j = 1, 2, \dots, n$ (n = total number of the included journals).

In the above formula, the right-hand side of the equation indicates the *opportunity cost* paid by the participating content provider j . According to the *cooperative game theory*, if the opportunity cost of participant j is at least compensated by the transformer (i.e., the cooperative group leader),

there will be no complaint among the participants regarding the cooperation (see Monden, 2018).

5. Conclusion: The Relationship between the iPhone Business and the New Service Businesses

This section summarizes whether Apple's new subscription business could achieve the *risk spreading* effect in their entire business portfolio.

The new flat-rate service business (business B) was introduced for the purpose of recovering the decline of iPhone sales (business A) (See Table 1). Thus, it is assumed that *risk spreading* between these two kinds of businesses could be achieved.

For A and B to achieve reducing the whole risk as a whole of the company, there must be an *adverse correlation* between business A (i.e., iPhone) and business B (i.e., new subscription businesses). That is, even though the revenue from iPhones may decrease continuously, the revenue of the new business B must *increase*, so that the risk of the company as a whole must be at least minimized. Apple has succeeded in their business of iPhone developed by Mr. Steve Jobs, one of co-founders. That was the typical technical innovation. Meanwhile, the sales of their high-grade iPhone has decreased in China due to their own low-end smartphone since 2018.

Thus Mr. Tim Cook, the present CEO, has introduced the new service business, "subscription business," since 2019, which has been discussed in this paper. They have succeeded in this new business, covering the decline of iPhone, and have increased the total sales and total profit of the company. (The sales in the first quarter of 2020 was increased by 17% compared to the last year, which was 13,348 million dollars, the highest quarterly sales of the company.)

Following this success of new service business, Mr. Tim Cook has proudly said to the security analysts (in 2020. 05.25) that **"we have always overcome the hard situation by investing in the next generation technical innovation"** However, accurately speaking this service business was not a "technological" innovation, but the "subscription business" which has been adopted by many companies such as video streaming service by Netflix, etc.

However, since any business will have a lifecycle as like as any creature, the market of this new service business will also encounter the maturity stage and get into the decline stage. Then what business will Apple get into? For example, could Apple again make any technical innovation as Steve Jobs has developed iPhone?

In the world of biological creatures only the one who could have adapted the environmental change can survive. Even though their change is just a change at random, as a reverse of “*mutant*,” they could succeed in the “evolution” as a “*survival for fittest*.” The author would like to hope that that Apple also would make such an endless evolution from now on, too.

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Further Readings (all in Japanese)

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