

In the knowledge based economy innovation has become one of the major sources of competitive advantage for companies and key factors of economic growth. Given, however, the high level of competitiveness and the level of uncertainty, the investment in innovative products and processes requires a thorough study of profit options for a company. The focus in the present paper is on the general decision-making mechanism preceding investment in innovations. Its methodology is largely determined by profitability conditions that need to be accounted for in the decision-making agenda of a company. The paper concludes with recommendations concerning business model for innovative companies operating in cross-border contexts.

1. Introduction

The key factors in economic development are efficient methods of production and structural factors increasing added value. The leading role in the process of more efficient allocation of resources and assets is attributed to entrepreneurs who bring about innovative behaviors to market. This is particularly relevant with regard to developing and low-income economies. Following (Baumol 1990, 987) entrepreneurs are broadly understood as “persons who are ingenious and creative in finding ways that add to their own wealth, power and prestige”. As (Szirmai et al. 2011, 4) emphasize it is possible to allocate ‘entrepreneurial talent’ in such a way that it would “retard economic development”. On the contrary, productive entrepreneurial activities include “creation, recognition, and utilization of *positive* opportunities within existing firms (or through creation of new firms) in such a way that involves ‘innovation’ ...” (Szirmai et al. 2011, 4).

The Oxford Handbook of Innovation (Fagerberg et al. 2005) provides us with a broad definition of innovation as inventions which are effectively put into practice¹. Often the notion of innovation is understood in a narrow sense of technological product innovation

¹ In this regard it follows the observation in (Rogers 1995), where ample empirical evidence sustains the claim that there is a significant time lag between invention and a follow-up innovation, which averages around 10 to 20 years. J. Schumpeter explained the lag in terms of a continuous struggle between entrepreneurs and social inertia.

resulting from entrepreneurial activity of a technology-intense company. Product or process innovation becomes, on this view, the dominant kind of innovation. There is, however, a growing tendency to treat innovation broadly, not only embracing ‘inventions’ or ‘rationalizations’ which are not directly related to technology, but also non-technological innovations. These would include inventions in business model, organizational style, supply chain or social innovations.

Innovative companies’ strategies would usually require a discrimination between radical vs. incremental innovations². Radical innovation, i.e. usually a new product introduced to the global market, gives a company the chance to adopt a monopolist position as theorized by J. Schumpeter, but would require an enormous organizational effort and expenditure – activities that need to be backed up by a proactive risk management strategy³.

Incremental innovations do not stepwise change the organizational structure of a company and are much more easily adoptable to the operating conditions and existing business model. However, in the long run the effect may be difficult to discriminate from a radical innovation⁴. Moreover, the full impact of radical innovations is possible only after a gradual increase of adoption capacity of the market.

What seems to be more relevant with regard to developing economies is a distinction of relative innovativeness proposed by (Szirmai et al. 2011, 6) who follow (Fagerberg 2005):

An important distinction in the innovation literature is between innovations that are new to the world, innovations that are new to the domestic market or innovations that are new to the firm Innovations that are new to the world are primarily found in the advanced economies. ... In developing countries far removed from the international technological frontier, innovations will tend to be new to the market or new to the firm.

² The distinction impacts the financing forms of innovative companies which differentiate accordingly their ownership strategies with regard to debt and equity allowable control rights (Casson et al. 2008).

³ J. Schumpeter’s early interest focused on the factors determining innovation occurrence, such as individual’s uncertainty of adoption scale, competitiveness and time-pressure, and social inertia, see (Fagerberg 2005, 9).

⁴ (Fagerberg 2005, 7) points out that the distinction between product and process innovation is sometimes also substantiated with a divergent social effects they result in.

The latter set up added value in the process of diffusion and adoption. This process, when based on the advantages of technologically lagged companies, may result in the transformation of a catching-up company into a technological leader⁵.

What may turn out to be a critical factor – as regards complimentary assets discussed in the following section – is ‘the absorptive capacity’ ([Cohen and Levinthal 1990](#)) of innovative companies to acquire and assimilate knowledge which was generated elsewhere. While the co-evolution of incrementally increased knowledge-assets generated internally may be beneficial for the operational management of the company, it may constrain companies’ absorptive capacity ([Fagerberg 2005, 9](#))⁶. This effect may be weakened by creating more open network connections, which would path-dependencies and partly rely on ‘weak-ties’.

Networks are integrated into more complex structures called ‘systems of innovation’ ([Van de Ven et al. 1999, 149](#))⁷. They typically include institutions (laws, rules, thought styles, habits), political processes (regional, national, global), research infrastructure (R&D institutions), financial infrastructure (public financing, venture capital, banking system), human capital (labor force), etc.

2. Key factors determining profitability

When considering the factors relevant for maximizing the chances to profit from radical or disruptive innovation, it is worthwhile to take into account the possible chances vs. vices. As succinctly expressed by [Teece \(2012, \)](#):

Innovators—firms that are the first to commercialize a new product or process in the market—do not always profit the most from their innovation. Sometimes a fast second entrant or even a slow third will outperform the innovator. The technology behind the computerized axial tomography (CAT) scanner, now a standard medical diagnostic tool, was developed in the late 1960s by a senior engineer at EMI Ltd. Although

⁵ For a modelling approach see ([Kubielas 2009](#)).

⁶ Such impediments may also arise with regard to knowledge generated internally as, for instance, Xerox did not recognize relevance of a PC with graphic interface and original accessories such as mouse to its focal production of photo copiers, see ([Rogers 1995](#)).

⁷ More specialized studies differentiate spatially extended systems of innovation such as ‘national’ ([Lundvall 1992](#), [Nelson et al. 1993](#)) and ‘regional’ ([Braczyk et al. 1997](#)).

EMI brought the technology to market fairly quickly, introducing a commercial model in the United States in 1973, eight years later it had dropped out of the scanner business, leaving the market to later entrants. The EMI story is far from unique. . . . Dell pioneered a new distribution system for personal computers and, despite recent challenges and many would-be imitators, remains one of the world's leading PC vendors. Toyota's much studied "Toyota Production System" has provided the auto maker a source of competitive advantage for decades, contributing to the company becoming the world's biggest car manufacturer in 2008.

The crucial elements discriminating between the success and failure cases were pinned down in (Teece 1986). They include the following: appropriability regime, industry evolution, and complementarity. The original proposal also included elements which enhance the explanatory power of the proposed account, namely: system integration and industry structure.

The notion of "appropriability regime" is supposed to capture the conditions which determine the chances of the originator of innovation to capture and maintain the profits from the innovation. It basically embraces two elements, i.e. the legal system of a given country or region and the characteristics of technology. They define the level of difficulty in imitating the original idea and solution in the country. A 'weak' appropriability regime does not warrant effective legal protection of intellectual property rights, which may be due to either a weak and ineffective legal system in the country or the characteristics of technology at hand.

In contrast, a 'strong' appropriability regime takes place when the innovation is easily protected within an effective legal system and usually is based on knowledge which is tacit and could not be straightforwardly imitated. What is relevant with regard to companies innovation strategy is the differentiation of appropriability regimes in different domains of a much finer scale than countries or industries. As Teece puts it (2012, 2):

a firm with a strong position in downstream complementary assets might decide it is in its interest to weaken the upstream appropriability regime, as in the case of IBM making its server operating system available as a non-proprietary product to gain advantage in the sale of related hardware, applications, and services.

This is a principled example as patents, usually considered to be the most legally secure and strong protection form for intellectual property rights, may not provide the grounds for the

most effective strategy of intellectual property management and profitability⁸. First, they are expensive and this form of protection usually dramatically increases with time. Second, they turn out to be valid only after a legal trial in court. Thirdly, the effective legal protection against patent infringement globally is costly. Fourthly, in contrast to e.g. trade secrets, patents do not provide an effective protection with regard to process innovation.

The evolution of industry is primarily characterized by development of standards. In most cases the standards are related to product design or a narrow class thereof. The earlier quoted passage from (Teece 2012) gives ample illustration to instances of late-entrance advantage at a seemingly mature stage of industry evolution⁹.

Apart from ‘appropriability regime’ there is yet another factor that determines profitability of an innovation, namely ‘complementary assets’. They comprise elements which are usually not considered relevant to innovation, i.e. marketing, manufacturing, after-sale service, distribution or software infrastructures, customer relationships, brand or verified business model.

Complimentary assets may be classified accordingly with the increasing degree of imitability. The core is thus constituted by technological know-how, accompanied by other forms of effective intellectual property protection, such as trade secret, trademark, copyright, patent, followed by competitive manufacturing, distribution, service, complementary technology and others (Teece 2006, 1136).

Although this is not mentioned in the original contribution of Teece, it seems that complementary assets include also the R&D capacity, which consists of human resources and financial assets. In combination with the other strong complementary assets they would usually allow to make up for the price/quality distance between two and four-fold.

Typically, start-ups or innovators do not initially possess complementary assets comparable to transnational corporations. However, the option is to make alliances or contract the missing assets with no extra time lag usually results in imitator’s advantage and profit discount.

Therefore it is a viable combination of invention with a sound business model that determine the profitability options for inventor. As emphasized by (Teece 2012, 9): “The

⁸ (Abril et al. 2007) presents a detailed complex model for profitability path for corporate patent holders.

⁹ An example discussed in (Teece 1986, 286) concerns the advantage of Apple of Xerox despite the latter’s origination of computer graphic interface and accessories, e.g. mouse.

innovator must correctly assess the firm's existing capabilities, and/or its ability to develop new ones in a timely, cost-effective manner".¹⁰

3. The profiting from innovation framework

The key compounds discussed in the preceding section combine into 'The Profiting from Innovation Framework' first introduced in (Teece 1986):¹¹ "The Profiting from Innovation Framework provides the basis of an explanation for how managerial decisions, intellectual property protection, and the asset structure of the firm impact the business enterprise's ability to capture value from its innovation" (Teece 2012, 11).

The Profiting from Innovation Framework (the PIF, in short) provides a 'normative theory' of strategic decision making. The effective evaluation of available assets and intellectual property strategy are integrated within the PIF to suggest recommendations for strategic decisions regarding management of innovations. The diagram in Figure 1. displays the decision algorithm for strategic innovation management with regard to profit optimization.

¹⁰ There is an ongoing debate concerning for instance viability of IBM's business model at the early stages of the development of PC market. It is suggested that IBM could have evaluated its assets, such as brand and customer relations more effectively and depend on internal supply of microprocessors rather than rely upon Intel's external supply giving away a significant share in profits; see e.g. (Teece 2012,9).

¹¹ D. Teece's conception was appended twenty years later (2006), while the present discussion follows the most recent version of the framework (Teece 2012).

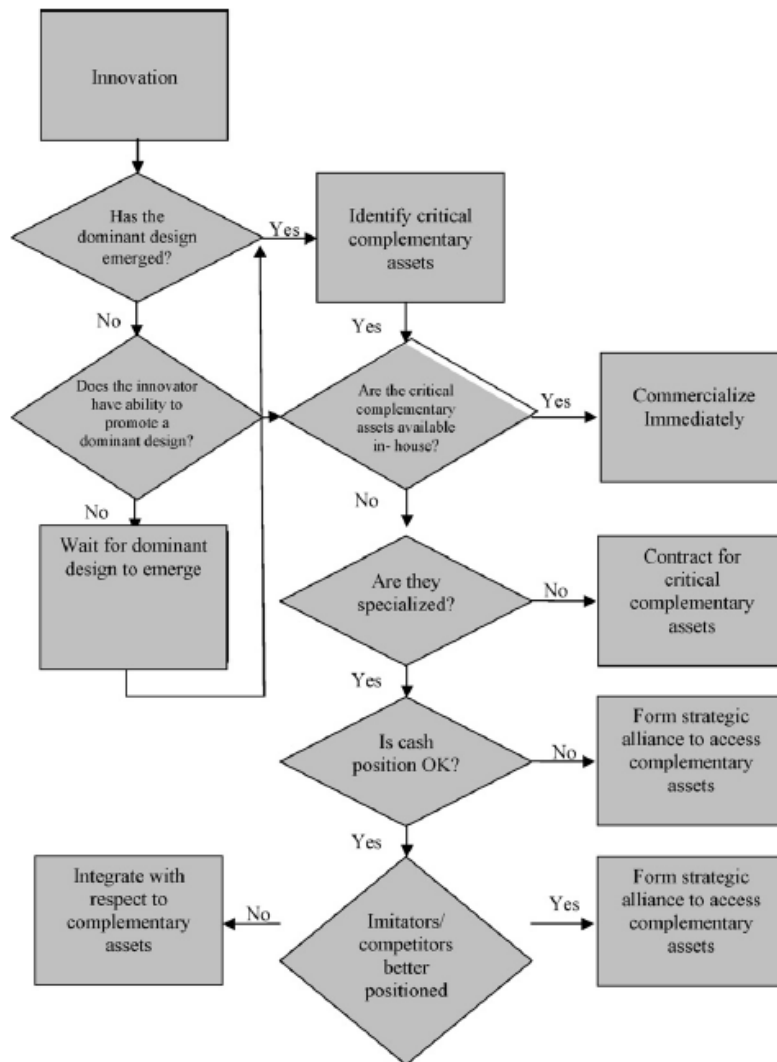


FIGURE 1. The PIF based market-entry strategy map (source: Teece 2006, 1139).

The PIF, however, can be taken as a descriptive tool to predict profit distribution among the stakeholders: the innovator, imitator, suppliers, customers and contracted owners of complimentary assets. In that sense the PIF theory is empirically testable.

The recommendations based on the PIF require the assessment of the maturity of industry development. In case the assessment is low profitability is far-fetched unless the company has the ability to establish the standard design by itself. There may be instances of a successful introduction, however, profitability from innovation at this stage is highly uncertain. On the contrary, if the industry is well developed than other PIF factors determine the possible level of profitability for the innovator company. Typically, strong appropriability regimes promote strong intellectual property protection and thus may warrant high level of expectance with regard to innovation profitability. This, however, may not be applicable to some industries, like software production (Teece 1986).

Next, the important factor which in many instances determines the profitability balance between the innovator and imitators is the access to complimentary assets. The PIF would strongly recommend for young technological start-ups or small innovative companies to form strategic alliances or participate in contractual networks.

The PIF presents a generic framework. The business model implementing the PIF-based strategy would typically complement it with the company's specific intellectual property managerial decisions. In most applications PIF will fit the radical product innovation scenario with strong intellectual property protection options.

4. Innovation and internationalization

Innovation in the global market results in the impact on the pressure of competition and the management of intellectual property leading thus to new framework for strategic growth decisions. They would typically concern organizational boundaries and value alliances, location of activities and intellectual property portfolio management. A generic business model embracing these issues is presented by ([Onetti et al. 2012](#)). They present an extensive literature review which identifies key methodological observations regarding business model tailored for managing innovation in fully internationalized contexts.

Business model has to be clearly differentiated from strategic concepts. Organizational strategic decision making framework delimits business models of a company by identifying in terms of value proposition the area of business competition and the company's positioning in that area, while "the business model logically is presented at operational level, since it defines how to execute the strategy, representing the firm's underlying core logic and strategic choices" (Onetti et al. 2012, 358). Business model, however, needs to be comprehensive and embrace the description of processes and activities as well as cooperative networks. However, "A business model definition has to balance comprehensibility and generalizability, theoretical foundation and potential to be used as managerial tool. The ultimate goal is to produce a framework that is applicable to firms at different stages of evolution, of different sizes, and operating in different industries" (Onetti et al. 2012, 359).

A different recommendation concerns a clear-cut discrimination between business model and 'the financial implications'. Cost, revenue, cash flow, profit and other financial aspects are not 'business model building blocks'. Rather, they constitute measures against which one can determine the business model effectiveness, but not the latter's constituents.

In global context business model has to include the location determination factors¹². They are most pertinent for technological start-ups as they need to make fast and valid decisions regarding the localization of activities with regard to resources access, intellectual capital, knowledge-spillover effect, developing client network, possible alliances, etc.

The business model framework for innovative companies operating in the global context is presented in Figure 2. below.

	FOCUS	LOCUS	MODUS
Activity A	How much to allocate?	Where?	Who? In-house or Third Parties? How? Capital or labour-intensive? How much tech-intensive?
Activity B			
Activity C			
...			

FIGRUE 2. Business model framework for innovative companies. (Source: Onetti et al. 2012, 360).

‘The focus’ of business is determined by the company’s value proposition (organizational strategy). One of its critical components is the decision regarding internal R&D activities or outsourcing thereof¹³. ‘The locus’ identifies locations of the company’s resources and value-adding activities. These decisions affect both the organizational structure as well as network capabilities of the company. Finally, ‘the modus’ means business modes

¹² (Antonietti et al. 2011) provide empirical evidence which demonstrates that location affects export performance of innovative companies using a large sample of Italian manufacturing firms.

¹³ The traditional M. Porter’s value chain model (1985) was tailored for an environmental context with clear identification of internal activities generating value. It has become almost impossible within the last two decades to apply Porter’s, especially with regard to knowledge-based companies or intensive research-based companies. Porter’s mechanical concept of value chain has been replaced by more flexible terms such as “value system”, “value network” or “value web”, which refer to reciprocal relations (“complex adaptive systems”), groups of activities or internal-external relations (Onetti et al. 2012, 360). For a more principled view see also (Lafley et al. 2012).

with regard to organizational structure and network setup. The three elements constitute business model as ‘strategy enabler’, the framework for implementation of company’s strategy and its market delivery.

The combinations of the business model framework elements are plenty and describe varied business models of companies, but typically innovative companies would instantiate one of the following categories: multi-location organization, focused company – ‘technology broker’ for a specific technology or network-based firm within a wider setup of partner relationships.

The business model framework presented in ([Onetti et al. 2012](#)) is intended to overcome limitations of traditional models with regard to the needs of innovative companies operating in global and highly internationalized contexts, which face cross-boundary challenges. The model presented here is considered from the perspective of strategic decision-making and will obviously not suffice with regard to business guidelines.

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Abstract

The paper presents the key factors determining strategic innovation decision-making framework. It follows D. Teece's 'profiting from innovation framework' (the PIF in short), presenting its key components and discussing the decision flow-chart for optimizing profitability with regard to radical product innovation. This framework is appended by a discussion of strategic decision-making in the cross-border context and the specifics of business plan preparation for innovative companies.

Key words: profiting from innovation, D. Teece, innovation management, strategic decision-making

Streszczenie

Artykuł prezentuje kluczowe czynniki determinujące strategiczne decyzje dotyczące innowacji w przedsiębiorstwach. Omówione są kluczowe elementy schematu zaproponowanego przez D. Teece'a (schemat uzyskiwania korzyści z innowacji) oraz zarysowane zostały zasadnicze elementy schematu decyzji dla optymalizacji korzyści w odniesieniu do radykalnych innowacji produktowych. Ten schemat jest uzupełniony o dyskusję strategicznych decyzji w kontekście ponadnarodowym z uwzględnieniem specyfiki przygotowywania biznes planu dla firm innowacyjnych.

Słowa kluczowe: korzyści z innowacji, D. Teece, zarządzanie innowacjami, decyzje strategiczne