

Increase the Diffusion Rate of Emergent Technologies

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INTRODUCTION

During the past decades the requirements of research institutions and technology-oriented companies has changed radically. Global competition for customer and markets as well as in research and development is carried out at global level. Furthermore, the high dynamics of technology markets leads to constantly shorter product- and technology life cycles.

Traditionally, technology transfer into market was conducted by cost-cutting and/or innovation. However, in many cases research institutions as well as companies concentrated mainly on the improvement of their current value proposition (technology and/or product). Potential in providing new services and organizational innovations as well as innovations within the business model often remained unused. But sticking rigidly to traditional business methods is often no longer possible and can lead to the endangerment of viability and survivability of institutions or companies. Research institutions in the area of applied research (such as the Fraunhofer Institutes in Germany) especially face this problem, as their mission is to transfer technologies into market.

Therefore it will be increasingly significant for research institutions and technology-oriented companies to pursue developments and trends in industries such as markets, customer groups, technology fields, etc. and to identify growth areas outside their current market and application field. Thus, the commercialization of emergent technologies can be pushed through different applications and the amortization of the R&D effort can be reached sooner. Different applications often require several concepts of technology commercializa-

tion. The concept can be different in the quantity of the essential partners, the value chain, the kind of the value proposition, the kind of revenue achievement, etc. Technology exploitation claims a holistic consideration of all relevant issues in terms of developing new business models for the emergent technology (Nair & Paulose, 2014; Boons et al., 2013).

These business models should offer advantages along the value chain (not only for the end user, but also for all other stakeholders) and dissolve industry structures and market barriers (which could entail competitive advantages). Through new business models, the rate of technology-diffusion of research institutions and technology-oriented companies can increase by addressing new markets and/or improve within established markets. Unfortunately, the majority of research institutions, as well as technology-oriented companies, do not deal - or do not deal enough - with these issues (Bezerra Barquet et al., 2013). Often they are not sensitized to, or are rather scared of, the laborious process behind the identification of new business models. In many cases they have neither a clearly enunciated corporate strategy nor a vision of the future on which the business model creation can be elaborated.

The diffusion of a technology into market is a crucial task for companies as well as for research institutions. The purpose of this article is to design a methodology to support institutions of applied research and technology-oriented companies in the identification and elaboration of attractive business models based on their technological know-how, the relevant future markets and the customers' business model.

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BACKGROUND

In literature, Rogers (2003) defined the term diffusion as the “process by which an innovation is communicated through certain channels over time among the members of a social system....” The diffusion of a technology follows similar principles, as in many cases a technology will be integrated into products and appear as an innovation.

The diffusion of new technologies into market, even if they have a high potential, is difficult. Many technologies require a period of years before they are adopted by the social system. In some cases, technologies never make it into market (Gómez & Vargas, 2012).

The diffusion of a technology into market needs to aim for the following objectives.

Increase the rate of diffusion of the technology within a market: The rate of diffusion is the relative speed at which an innovation is adopted by members of a social system (Rogers, 2003). A high technology diffusion rate implies a bigger market demand and therefore a higher potential for the company or institution in marketing their technology.

Decrease of the adoption time of the technology within a market: A high gradient of the rate of adoption over time brings advantages in terms of competition as competitors need to develop their technologies and/or adopt their business model in order to address the same market. However, if the gradient is too high, companies and/or institutions can face problems with the provision of the technology to the customer. In this case, the demand is much higher than existing resources can handle.

The general adoption of a technology model or adoption of an innovation model is the Bass model, which is shown in the Figure 1.

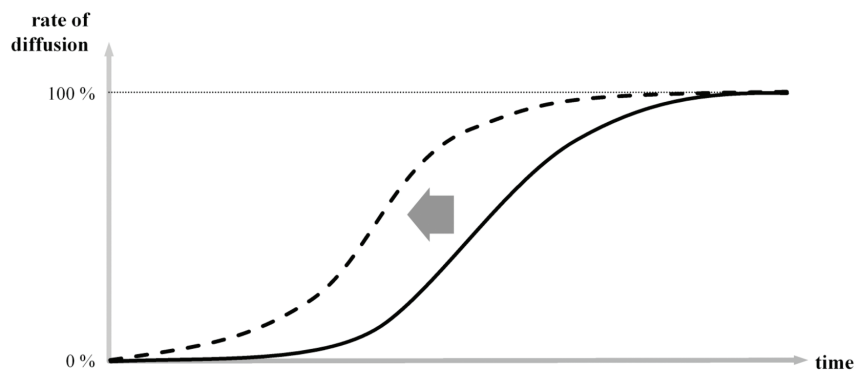
The big challenge facing research institutions and companies is how to increase the rate of adoption and decrease the adoption time for technologies. Green emergent technologies are an example of how commercialization has had a huge impact on the success of technology as a whole (Balachandra, Nathan & Sudhakar Reddy, 2010; Bohnsack, Pinkse & Kolk, 2014).

Therefore, it can be determined that appropriate methods are located in the area of marketing through a more rapid spread of information about new technologies or by more adequately sensitizing potential customers and creating awareness (Rogers, 2003). Information about an innovation or a technology can be transferred through different communication channels. These can be separated into two categories; the first is the mass media channel, for example, radio, television, etc. and the second is the interpersonal channel through which communication takes place face-to-face between two or more individuals (Rogers, 2003). Furthermore it is easier for an innovation or a technology to be adopted by individuals than organizations.

But even if potential customers are aware of a technology, other issues, like trust in the new technology or the costs, can prevent its diffusion (see Figure 2).

In the past few years, interest in the topic of business model engineering as greatly increased. Many expectations are connected to the business model concept which current research disciplines have not been able to fulfill. In this relatively young field of research, there has not yet emerged a common understanding of the term.

Figure 1. Diffusion theory of technologies



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