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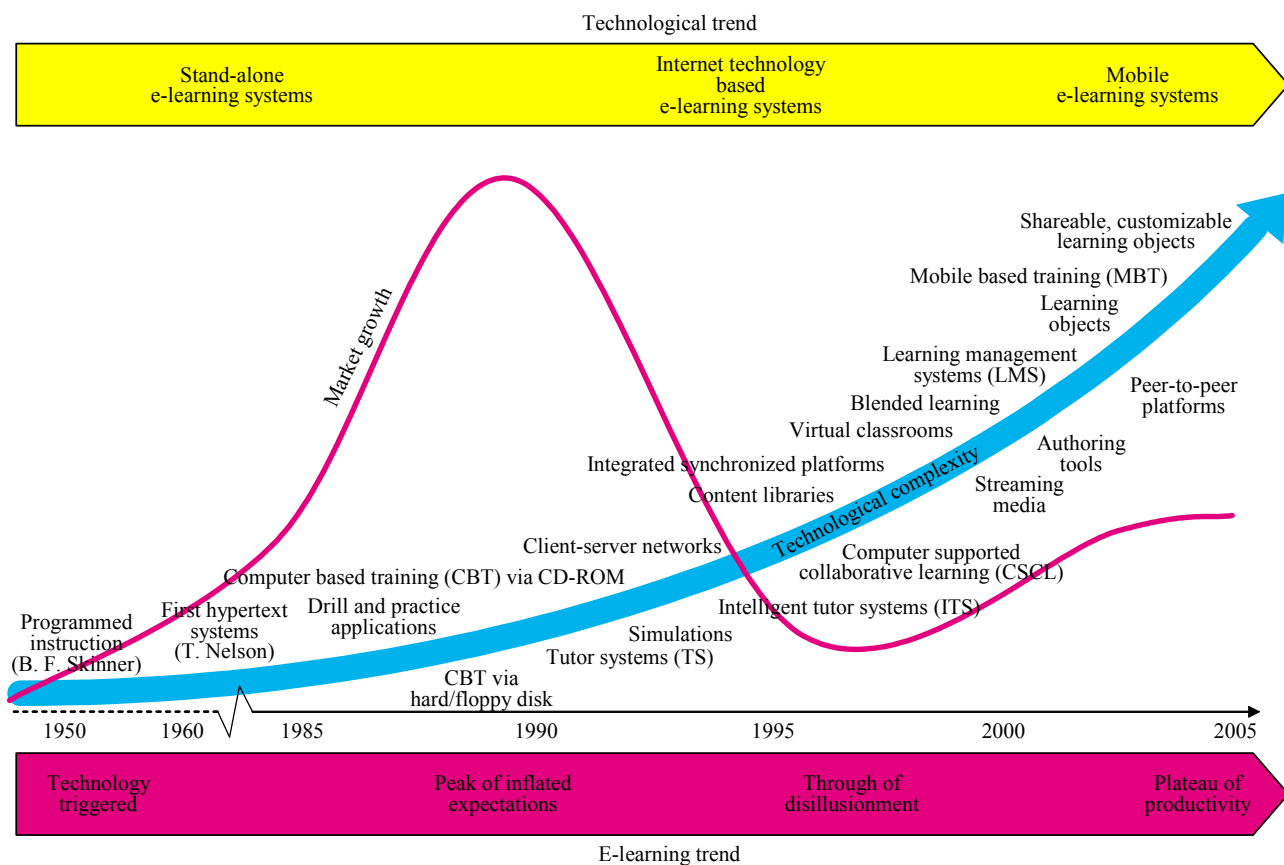
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Sustainable Business Models for E-Learning²

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Sustainable Business Models for E-Learning

Dipl.-Ök. Gabriela Hoppe, Prof. Dr. Michael H. Breitner

Abstract: E-learning becomes more and more important. Reasons are the paramount importance of knowledge, life-time learning, globalization and mobility. Not all providers of information system components for the specific domain of e-learning succeed in closing the gap between costs and revenues. Especially in the academic sector e-learning projects suffer more and more from decreasing funding. For many currently active research groups it is essential to market their research results, e. g. e-learning applications, in order to fund actual and future e-learning projects. Basis of a successful commercialization of e-learning products is a coherent and consistent overall e-learning strategy. E-learning strategies have to address economical, pedagogical and technological goals. For ensuring pedagogical and technological quality, different theories and models for e-learning already exist, e. g. the Essen Learning Model (ELM). But there is a lack of theories and models ensuring economical “quality” in terms of marketable and sustainable products. This paper presents a framework for sustainable e-learning business models. Its advantage is its suitability for products designed for, e. g., computer based training (CBT) as well as for web based (WBT) or mobile based training (MBT). Thus it considers opportunities enabled by new information technologies. The framework is also suitable to complete existing e-learning theories and models focusing only the pedagogical and technological dimension of e-learning. According to this new approach sustainable business models for e-learning integrate and consolidate strategic propositions concerning market model, activity model and asset model. By analyzing these issues, crucial success factors for the commercialization of e-learning products are identified. Additionally, successful relations between core activities and revenue models are presented.

Key words: E-learning, business models, sustainability, economical aspects, cost benefit analysis, e-learning architectures

1 Introduction

A discrepancy can be observed: Some providers of information system (IS) components for the specific domain of e-learning realize profits by offering e-learning products are likely to become key players in the e-learning domain. Others developing with the same or even more effort do not succeed in supplying e-learning products as successful as their competitors. Potentially useful, i. e. “applicable”, e-learning products face used, i. e. “applied”, e-learning products. Moreover, on the one hand, e-learning products are successfully offered by a variety of commercial e-learning providers. Many of them have already equipped pilot schemes for company training programs. On the other hand, successful e-learning products are subject to a lot of different research projects. Some of these projects also result in

theoretically marketable e-learning products. Especially in the academic sector many e-learning research projects benefit from governmental grants and subsidies. One handicap of these financial aids is their temporal limitation.

Today, for many active research groups it is essential to market their results and products in order to achieve long-term success to fund actual and future e-learning projects. A sustainable business model is crucial to put their work on a commercially exploitable basis. The business model is part of a comprehensive e-learning strategy. An e-learning strategy bases on conceptual analyses, implies the business idea, identifies target areas and presents preliminary activity plans for the design and deployment of e-learning systems (Back, Bendel, and Stoller-Schai 2001; Sailer-Burckhardt et al. 2002; Hoppe 2004).

The long-term success of an e-learning provider can only be ensured by an integrative e-learning strategy. The definition of a business model is a central part of the strategic tasks of an e-learning provider. Besides an economical dimension represented by a business model an e-learning strategy has to consider a pedagogical and a technological dimension, too. An e-learning strategy integrates analytical, behavioral and technological issues.

This paper presents a general applicable framework for creating successful business models for different e-learning architectures. This framework is suitable to supplement existing approaches for theories and models of e-learning which focus in particular pedagogical and technological aspects of e-learning.

This paper adopts a clear e-business focus because it focuses the e-learning providers' perspective. It concerns strategies for information and communication technology (IT) supported marketing of e-learning with a clear focus on sustainable business models. E-learning is thus regarded from the perspective of a specific e-business domain. E-business is characterized by IT supporting business processes in potentially all business branches, departments and functions.

Our methodical approach mainly bases on a classification of e-learning products, e-learning providers and business models. Combined with quantitative data describing the e-learning environment crucial success factors for sustainable business models for different e-learning providers are deduced. A case study clarifies some of these crucial success factors.

2 Characteristics of the e-business domain “e-learning”

Learning which is supported and/or made possible by the use of information and communication technology is defined as e-learning here. IT may not only act as auxiliary means but has to be immediately connected with the learning process (Seufert, Back, and Häusler 2001). IT suitable for enabling or supporting e-learning is called e-learning technology. An important part of e-learning technology are e-learning applications, i. e. software applications which are suitable to support or enable e-learning.

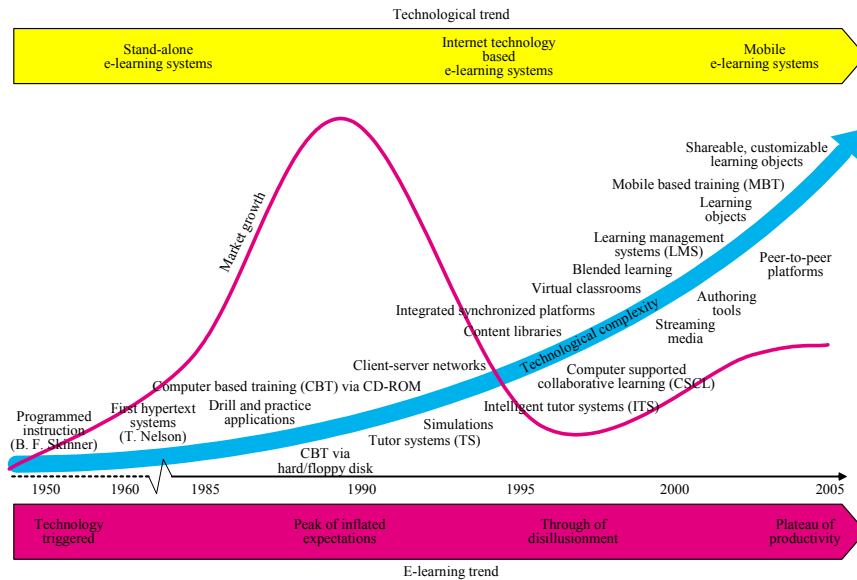


Fig. 1. Development of e-learning: technologies and trends

Due to the grade of interactivity and the technological complexity four types of e-learning applications are distinguished: drill and practice applications, (intelligent) tutor systems, simulations and CSCL (computer supported collaborative learning) applications. Applications are the core of e-learning because they mediate standardized or individually configured e-learning content. To run e-learning applications, suitable hardware is needed. Hardware often is not e-learning specifically designed.

Depending on the technical realization computer based training (CBT) and web based training (WBT) are distinguished. Didactical options and technological realization of WBT are usually more complex than those of CBT. E-learning products applicable for mobile learning, i. e. for use with handheld devices like personal digital assistants (PDA), are classified as mobile based training (MBT). Nowadays, MBT is mostly a subgroup of CBT because the technical feasible is not fully exploited. But the MBT sector becomes more and more important and complex.

E-Learning technology went through and is still object to fundamental technological changes. Figure 1 gives an overview over important e-learning technologies and trends and at the same time shows important popular e-learning terms.

The overall e-learning trend shows the development of e-learning from a technology triggered domain to a domain also regarded from an economical perspective. First, the development of e-learning was technology driven. According to inflated expectations a peak in market growth followed. The through of disillusionment following the inflated expectations is now followed by a stable plateau of productivity. It symbolizes a new way of analyzing, designing and deploying e-learning

systems. Productivity in terms of technological, pedagogical and economical effectiveness and efficiency can ensure mid- and long-term successful and sustainable deployment and marketing of e-learning.

As far as e-learning is IT-bound by definition, it is predestinated to be marketed within the scope of e-business. A variety of opportunities enabled by integrating new information technologies in marketing processes can be realized.

The next section presents characteristic e-learning products and e-learning providers to found a basis for further analyses of business models for e-learning.

3 E-learning products and providers

E-learning becomes manifest in an individual e-learning system (Hoppe 2004), see Figure 2. An e-learning system comprehends the already mentioned basic components application, content and hardware which are essential for its functionality and which are called the technical system. Furthermore, an e-learning system comprehends on the one hand orgware, i. e. all organizational issues concerning the deployment of e-learning, e. g. didactical concepts. On the other hand it comprehends manware, i. e. people who design, program, maintain and support the technical system and design, implement and survey organizational concepts. E-learning systems represent domain specific information systems.

Every element of an e-learning system which can be marketed autonomously is called an e-learning product. E-learning products comprise on the one hand hardware, software and content in terms of digital data, e. g. HTML or XML data. On the other hand e-learning products include services in connection with hardware, software, content, manware and/or orgware. E-learning products are offered by e-learning providers. According to the part of an e-learning system they offer, e-learning providers can be divided into different segments:

- Content providers offer predetermined e-learning content. Content is either standardized, e. g. business English vocabulary, or individualized respectively individualizable, e. g. company specific simulations. Often content is provided by publishing houses like PONS (www.pons.de) or Herdt-Verlag (www.herdt.com).
- Application providers offer e-learning applications. Often they cooperate with content providers, e. g. Herdt Verlag as a content provider cooperates with Hyperwave (www.hyperwave.de) and netucate (www.netucate.com). Sometimes, applications are offered as free- or shareware. This relates mainly to academic research and development (R&D) providers.
- Hardware providers offer e-learning hardware. In most cases, hardware is not e-learning specific. Hardware providers therefore often supply non-e-learning segments, too. Special e-learning hardware can be required due to special types of data, e. g. video or virtual reality equipment.

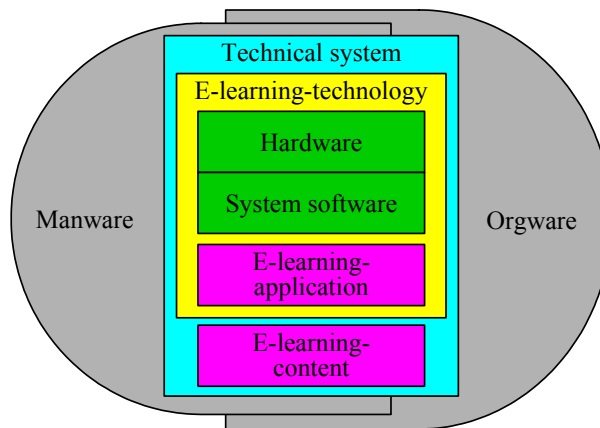


Fig. 2. Components of an e-learning system

- Service providers offer e-learning services. E-Learning services complement the mediation of e-learning content by e-learning applications. E-learning services can directly relate to learning processes. Examples are the provision of information and communication platforms, e. g. CLIX (www.im-c.de), or of tutorial assistance, e. g. like Teleakademie Furtwangen (www.tele-ak.fh-furtwangen.de). E-learning services can also have supporting functions. Examples for supporting services are hardware support, e. g. hosting services like BildungPlus eLearning Gesellschaft (www.bildungplus.de), software support, e. g. administrative support like e2e – Kommunikation & Entwicklung (www.net2study.de), or consulting services, e. g. legal, economical or didactical consulting like BOV AG Bildungsberatung (www.bov.de). Furthermore, supporting services can result in training, marketing, controlling, evaluation or certification related activities. For more examples see, e. g., Hoppe and Breitter (2003b).
- Full service providers offer all-in-one solutions which comprise products and services concerning the whole e-learning system.

In Europe, content and application providers⁵ represent the biggest market share. In Germany the market trend is full service providers (NFO Infratest 2003).

4 Business models

A **business model** is defined in a comprehensive way. According to Timmers (2000) it represents

⁵ The survey does not distinguish between content and applications and subsumes the two forms of e-learning providers as „content providers“.

- the architecture for product, service and information flows, including a description of the various business actors and their roles,
- a description of the potential benefits for the various business actors,
- a description of the sources of revenues.

A business model integrates aspects of specific sectors of business economics represented by single models for each sector. As an essence of different approaches (Timmers 2000; Wirtz 2001; Osterwalder and Pigneur 2002) three interdependent partial models are suggested here, see Figure 3.

The market model defines the various actors, their roles and the market structures. A separation of supply and demand model is useful. Statements about customer segments and positioning of a business are included. The activity model focuses the activities of a business. The activity model integrates manufacturing, marketing, after sales and support activities and is normally based on the concept of a value chain (Porter 1996). The asset model comprehends cost and revenue model. The three partial models are discussed in detail by Hoppe and Breitner (2003a). Profit is as well the incitement as the objective of a business model.

Making profit is the intention of a regular business. Companies not making at least medium- or long-term profits are not persistable. Business models provide an architectural framework for a business strategy. The analysis of business models helps classifying different business strategies and working out reasons and strategies for success or failure of a business (Wirtz 2001).

To grant not only short-term cost-efficiency, business models today have to address sustainability. Sustainability is a term stemming from forestry and focusing on preventing ecological resources for later generations. Meadows, Meadows, and Randers (1992) describe sustainability as the state of a system that can persist over an unlimited period of time in a constant environment and does not exceed its limits. Adopted to economics sustainability focuses on constancy, permanence and preventing economical resources. The term is associated with long-term goals, long-term planning and long-term success. Economical sustainability is medium- and long-term profit maximization. Sustainable products are products offering medium- and long-term customer-value. They persist over a longer period of time. Sustainable supply of products demands sustainable business models. Sustainability in this respect bases on the integration of all partial models. Offering sustainable products is one aspect of sustainable business models. This is even more emphasized by the fact presented above that today only few e-learning providers worldwide realize profits with their e-learning products.

Our approach is that business models for e-learning provide a framework for the economical part of an e-learning strategy.

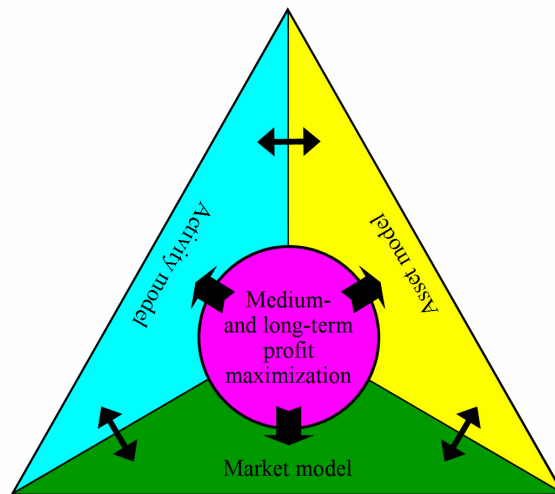


Fig. 3. Interdependent partial models of a holistic business model

They link the planning level, i. e. planning positioning and objectives of a business, with the process level, i. e. implementing this information (Osterwalder and Pigneur 2002). A business model is useful because

- it reduces complex events and relations and helps focusing crucial success factors of a business, above all resources and their transformation into products,
- it forces a provider to consider his opportunities systematically to found decisions,
- it provides a basis for future decisions concerning e-learning activities,
- it supplements e-learning models and theories focusing the pedagogical and/or technological dimension of e-learning, e. g. like the Essen Learning Model (ELM) which serves the improvement of the overall quality of learning environments on different levels. ELM is extensively discussed by Pawlowski (Pawlowski 2001). Especially this point is an interesting improvement of existing theories and models of e-learning.

5 Adaptation of the partial models to e-learning

5.1 Market for e-learning

The supply side of the e-learning market is represented by the market for e-learning providers. It is very intransparent due to the heterogeneity and the multitude of existing providers. One reason is that many providers do not exclusively offer e-learning products but belong to different market segments. 59% of the

interviewed German e-learning providers focused only the national e-learning market (Payome 2002). All providers have to take into account that international mainly English-speaking competitors start to enter e-learning markets worldwide successfully. The worldwide market for e-learning is very fragmented, i. e. consolidation has only begun. About 5.000 e-learning providers worldwide can be counted and none of them keeps a market share of more than 5% (NFO Infratest 2003). NFO Infratest (2003) emphasizes that only few e-learning providers realize profits with offering e-learning products.

Basically, commercial and academic R&D e-learning providers can be distinguished. Academic R&D institutions often focus the effective and efficient use of individually created e-learning technology for rather complex content. Products are often very specialized for quite small target groups. Academic R&D institutions mainly concentrate on the pedagogical reasonable or the technological feasible. Often, theoretically marketable products are abandoned if underlying research questions are answered and/or financial resources for product development are exhausted. Commercial providers often dissociate from research issues and concentrate on economical goals. They focus on the one hand fast-to-produce and easy-to-sell technology which can be created cost-efficiently. This is related to mainly optically very attractive packages and user interfaces and relatively low prices. On the other hand they focus specialized demand-driven products for small user groups and high prices, e. g. flight simulators for pilot training. Mainly, commercial providers focus on supplying e learning products for professional training (Schrape and Heilmann 2000). 96% of 161 commercial e-learning providers interviewed in 2001 identified companies as their main target group (Berlecon Research 2001).

The described trends are founded by several surveys. Different e-learning surveys base on different definitions of e-learning and focus different market segments, e. g. mainly commercial providers. Although their results often can hardly be compared or numbers can hardly be aggregated, typical trends for Germany and the USA, for Europe and worldwide can be derived. NFO Infratest (2003) provides the following numbers: The worldwide market for e-learning, i. e. expenditures for infrastructure, hardware, software and digital disposition of learning material, for 2004 is averaged about 30 billion USD (+/- 30%). The e-learning turnover in the USA for 2003 was valued with 7 billion USD, an increase of more than 438% compared to 2001. Estimated with 4 - 6 billion USD the European market for e-learning is smaller. In Europe Scandinavian countries (Norway, Denmark, and Finland) head the table of the highest per-capita expenditures for e-learning per year. This is explained by the widespread use and acceptance of internet technology. Furthermore Scandinavians are very good English speakers so they are not limited to the use of national e-learning products. They can use the wide range of English e-learning products. Focusing the turnover Germany, Great Britain and France head the table of the largest e-learning markets. The German e-learning market is estimated to grow steadily. Berlecon Research estimates 1,5 - 2 billion EUR in 2005, and IDC estimates 280 million EUR in 2004.

A variety of e-learning providers can be observed which is divided into the five different segments already presented in section 3. 2001, a survey figured out that providers compete within these segments whereas there is only little competition between the different market segments (Berlecon Research 2001). Only few e-learning providers worldwide realize profits with offering e-learning products (NFO Infratest 2003). That emphasizes the need for sustainable business models.

Concerning the demand side of the e-learning market it can be observed that e-learning products are to a different extent used in all educational sectors. This results from the need of life-time learning and continuous qualification. Education institutions integrate e-learning in traditional course programs. Completely e-learning-based education institutions evolve, e. g. the British Open University (www.open.ac.uk), the German Virtuelle Hochschule Oberrhein (www.viror.de) and WINFOLine (www.winfoline.de). This trend comprehends education institutions as well as institutions for postgraduate professional, technical, further or private education and training.

Today, e-learning is far more used in companies than in education institutions. The demand is not only large but also manifold. Surveys identify as main consumers of e-learning products big global companies in e-learning affine sectors. Above all are financial service providers, the automobile industry and retailers (Berlecon Research 2001; Payome 2002). E-learning products are not only demanded by education institutions or companies but also by individual, autonomous learners focusing special learning objectives. The learners' will to pay for education in general and especially for e-learning depends on societal, especially cultural, conditions. In the USA, education fees are common practice. In comparison to that, e. g. German learners are not used to pay extensive fees for educational technology (Bentlage and Hummel 2002). The choice of suitable revenue sources has to consider these national aspects. Furthermore, it has to be taken into account that the user of an e-learning product is not always the one who chooses it, implements it and/or pays for it.

5.2 Activity model prototypes for e-learning products

Regarding the process of manufacturing, marketing and deploying products in a value chain, several possible activities for e-learning providers can be identified. Figure 4 depicts exemplary activity models for e-learning providers which base mainly on deconstructing the e-learning value chain.

A full service provider fulfils all activities using in-house resources. This model demands the highest costs for a provider. Concentrating on offering WBT, the activities of packaging and physical distribution are rather low. A content provider concentrates on delivering content for applications. Often content generation comes along with didactical planning and part of product definition.

Model \ Activity	Full service provider	Content provider	Application provider	Hardware provider	Service provider
Product design	In-house	Outsourcing	Outsourcing	Outsourcing	Outsourcing
Pricing	In-house	Outsourcing	Outsourcing	Outsourcing	Outsourcing
Content generation	In-house	In-house	Outsourcing	Outsourcing	Outsourcing
Didactic planning	In-house	In-house	Outsourcing	Outsourcing	Outsourcing
Software provision	In-house	Outsourcing	In-house	Outsourcing	Outsourcing
Hardware provision	In-house	Outsourcing	Outsourcing	In-house	Outsourcing
Packaging	In-house	Outsourcing	In-house	In-house	Outsourcing
Promotion	In-house	In-house	In-house	In-house	In-house
Distribution	In-house	In-house	In-house	In-house	In-house
Learning process related services	In-house	Outsourcing	Outsourcing	Outsourcing	In-house
Support activities	In-house	Outsourcing	In-house	In-house	In-house

Marketing
 Manufacturing
 Deployment
 Support
 In-house
 Outsourcing

Fig. 4. Activity models for e-learning suppliers based on an e-learning value chain (vertically depicted) (modifying Keating 2002)

Application and hardware providing needs a large cost pool if the software or hardware is developed individually. Often content and application providers cooperate. Service providers can focus manifold activities or concentrate on distinct issues. Typical types of service providers can be found in the literature, e. g. Keating (2002):

- Navigators focus promotion issues.
- Merchants are responsible for distributing and billing e-learning products to end users what can for WBT for example be done via learning portals. A learning portal is a contact point which matches suppliers and demanders of e-learning (Rosenberg 2001).
- Customer relationship managers are responsible for managing and above all maintaining contacts with end users.

Besides, service providers can deal with quality management, tutorial assistance, hosting services, and other services exemplarily described above. Besides their core business, all types of providers have to consider marketing issues, i. e. product design, pricing, promotion and distribution, as far as their individual e-learning product is concerned. For example, a content provider has to sell his content in terms of a preliminary product to an application provider. Mostly, they all offer also at least basic support concerning their product.

Table 1. Fixed and variable costs of providing e-learning

	Fixed costs	Variable costs
General costs for an e-learning provider	- administrative staff - land and buildings - technical infrastructure - maintenance - insurances	- staff for special tasks - qualification
Costs for marketing e-learning products	- marketing infrastructure	- surveys - promotion
Costs for manufacturing e-learning products	- organization and equipment	- content - licenses and permits - packaging material - distribution
Costs for deployment related e-learning activities	- communication infrastructure - network fees (flatrates)	- network fees (dial up)

5.3 Asset model prototypes for e-learning products

Depending on the activities an e-learning supplier concentrates on, he has to consider the costs depicted in Table 1. Regarding the revenue model a big difference between commercial and academic suppliers of e-learning products can be observed. Concerning academic suppliers of e-learning products, the gap between costs of production and selling price is very often subsidized by public organizations or by grants. In contrast, commercial providers have to close this gap themselves. Revenues can be generated differently (see Wirtz 2001 for the following categories). They can be generated directly by letting pay the users of an e-learning product or service. Different revenue models imply not only the final users of e-learning products as potential payers. Third parties, e. g. education institutions wanting to offer an e-learning application to its learners, sponsors or data mining agencies, are possible payers, too. In these cases, revenues are called indirectly generated. Transaction dependent revenues are generated by selling an e-learning product respectively by charging fees for specific additional services, e. g. fees for tutoring paid per time or fees for e-learning news paid per use. Transaction independent revenues are generated by charging fees for services which are rather unspecific, e. g. membership fees for an e-learning portal. It has to be considered that the organizational effort of implementing the models differs (Kröpelin 2003). The organizational fit of revenue and also activity model has to be taken into account.

Centering the revenue aspect, Rappa (2003) differentiates nine business models for e-business. The models he presents are commonly found on the WWW. Some of the models he postulates however adopt models being common practice in the "bricks-and-mortar" business. Not all models Rappa presents are suitable for supplying CBT products. The suitability of revenue models for specific e-learning providers is discussed in section 5. Six revenue models have been observed to be

common in the e-learning sector and are applicable as well to CBT as to WBT and MBT products:

- Earning revenues by selling e-learning products bases on list prices. Concerning the R&D sector, grants and subsidies for fundamental research in e-learning are not considered a revenue model for e-learning, because this leads to marketable products only occasionally. In contrary, the use of existing resources for applied research that results in specific e-learning products is seen as a special form of selling e-learning products.
- Revenues by brokerage come from fees or commissions for bringing together interested parties and for facilitating transactions.
- Membership fees are taken regularly for participating in regular e-learning services, e. g. a regular newsletter or a forum.
- Subscription fees are taken for specific, individually requested services, e. g. information on e-learning providers in a specific postal area.
- Advertising messages can be posted by a supplier of e-learning products. Promoting and/or merchandising the e-learning product and/or related services on the one hand, the supplier earns money by posting advertising messages on the other hand. Advertising can also be the sole source of revenue while products and services are offered for free.
- The sale of customer related information to data mining agencies. This revenue model demands the collection of suitable data during the provision process. Legal issues may contradict the collection of user data.

6 Sustainable business models for e-learning

6.1 Elements of business models for e-learning

Some papers introduce best practice examples for e-learning business models. But the presented business models focus on internet based learning and mainly concentrate on the core activities of an e-learning supplier. Seufert (2003) for example distinguishes Alma Mater Virtualis, Virtual University, University Networks, E-Learning Providers, Education Consortiums, and Corporate Universities. Universities are explicitly emphasized in her approach. Our new approach is more comprehensive. A major advantage is that the business models presented below can be applied to the entire e-learning sector. The business models abstract from specific educational institutions and explicitly comprehend commercial providers.

A supplier's business model addresses his core business. The core business is defined by the activities he accomplishes with his in-house resources *and* by his revenue model. Both partial models have to be aligned with the actual e-learning market structures. Basing on actual market structures, e. g. market players, typical e-learning activities and common revenue sources business models for e-learning are composed of the elements presented in Figure 5.

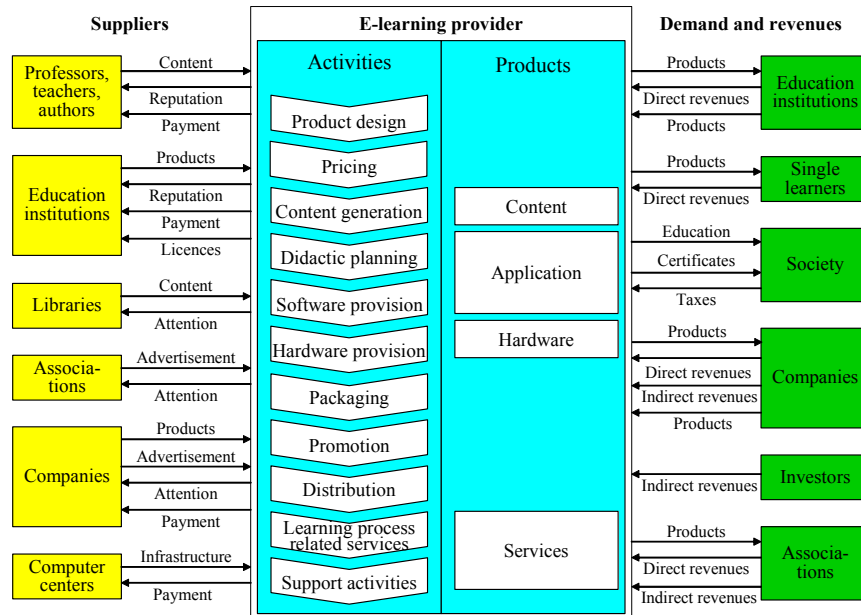


Fig. 5. Elements of business models for e-learning (modified from Kröpelin 2003)

6.2 Relation between core activities and core revenue sources

The activity models presented in section 4.2 can be connected to the revenue models presented in section 4.3 to compose consistent, successful e-learning business models. In this respect it is important to generally tell apart e-learning products designed or suitable for CBT from products for WBT. MBT is considered as a special form of CBT because currently MBT products focus offline learning with mobile devices. In general, MBT products today do not exploit today's technology, e. g. a GPRS or UMTS connection.

The description of exemplary business models in sections 4.2 and 4.3 already clarified that not each business model is suitable for the computer based *and* the web based supply. CBT applications for example represent rather "traditional" products being marketed like, e. g., other software products. Web based products offer new chances and challenges. Especially due to the WWW – and more and more wireless networks like WLAN, GPRS and UMTS – both new kinds of business models evolve and existing business models are updated. For example the collection of user data has become more and more popular by the use of the internet facilitating it. Or the posting of banner ads is a common model for suppliers providing a web site related to the e-learning product.

Table 2 matches activity and revenue models. Colored marks indicate the usefulness of the relations between core activities and revenue sources. Usefulness has to be seen in connection with effort and benefits of implementing the model.

Table 2. Intensity of the relation between core activities and core revenue sources

		Activity model																
		Full Service provider				Content provider				Application provider				Hardware provider				
		Navigator		Merchant		Other services												
Revenue model	Sale of e-learning products	CBT	WBT	CBT	WBT	CBT	WBT	CBT	WBT	CBT	WBT	CBT	WBT	CBT	WBT	CBT	WBT	
	Brokerage	Dark	Dark	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
	Membership	Dark	Dark	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
	Subscription	Dark	Dark	White	White	White	White	White	White	White	White	White	White	White	White	White	White	White
	Advertising	Dark	Dark	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light
	Sale of customer information	Dark	Dark	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light
																		depends on the service

The darker the color the more useful the relation. White marks indicate minor or no usefulness. Normally, a supplier can not be assigned to only *one* business model. In reality, business strategies are mostly based on a combination of different business models. The presented types of business models are idealized and stereotyped to clarify typical characteristics.

6.3 Crucial success factors for sustainable business models for e-learning

Comparing costs for implementing the models to realizable revenues according to observable market structures, crucial success factors for sustainable business models for e-learning providers come to the fore:

- The partial models of a business model have to be defined consistently.
- Target group and market segment have to be chosen carefully. Users coincide not always with payers. The overall costs of a system are allocated: Companies regard the costs per employee, and education institutions the cost per student. These particular aspects have to be considered when choosing the target group.
- Investments should aim on medium- and long-term profit maximization. The gap between provision costs and selling price should be closed. This can be realized by minimizing costs and/or by maximizing revenues. Revenues must compensate provision costs and exceed them in the long run. Business models based on manifold revenues often are not to prefer to business models with only one typical revenue source. Critical for a supplier is the balance between investments and likely revenues. The following equality for the profit P, combining costs C with revenues R con-

sidering the likelihood p , an interest rate I , and time t holds:

$$P = R - C = \sum_{k=1}^m p_k R(t_k) e^{-it_k} - \sum_{k=m+1}^n p_k C(t_k) e^{-it_k} .$$

- Cost reduction often can be realized by concentrating on core activities. They should be aligned with the core competencies of a company and reinforce each other (Porter 1996). Cooperations and alliances should be considered. Strong partners are, besides cost reduction, connected with image aspects of an e-learning product.
- Reusability of e-learning systems or at least single system components is an important possibility to realize cost reduction. The number of potential users of the e-learning system increases by reusing system components. The indirect costs of providing e-learning systems can be transferred to more payers. The separation of content and technology is one very promising way to ensure reusability. Extensibility, scalability and sustainability of the system components are associated keywords. These design principles ensure that opportunities enabled by new information technologies can be realized.
- Revenues can be earned by different models, in part presented in section 4. They generally differentiate in being generated directly or indirectly and in being generated transaction dependent or independent. An e-learning provider should try to establish different revenue sources which are aligned with his activity model.
- Due to fast changes in the e-learning environment, the adaptivity and scalability of a business model comes to the fore. Adaptivity refers to the ability to adapt to changing market structures, e. g. customers' needs. Scalability encompasses development, delivery technology and/or distribution (Seufert 2003).
- Successful e-learning is based on a coherent, harmonious concept including organizational, social, economical and technical aspects. Depending on the didactical and technical complexity of the e-learning system the prerequisites for its use vary. Benefits and costs of an e-learning system are combined with its overall complexity. Each component of the e-learning system has its proper benefits; by offering additional services or by embedding it in a comprehensive arrangement, a benefit surplus can be realized. Since the customer delivered value results from benefits *and* costs, less benefit does not mean less delivered value. For example, every type of e-learning application meets specific learning goals. The useful combination of different types of e-learning products which creates an added value is crucial. Customers are more likely to buy a product with high customer delivered value, basing on low-cost and/or differentiated products combined with high usability. Based on this, customer acceptance is reached and customers can be bound to a company and its products. This binding can also base on switching barriers. Customer orientation is required.

- Third parties are normally interested in sponsoring saleable products. Branding has to be seen in combination with customer binding, too. Brand recognition is one crucial factor for the success of market leaders in e-learning (Seufert 2003).
- Very specialized CBT applications, e. g. flight simulations, are often provided by full service providers. Although the target group is small, they create high revenues since they are relatively high-priced and come along with hardware and support contracts.
- For standardized CBT applications an often observable sustainable business model is the combination of "sale of e-learning products" with "content provider" and "software provider", e. g. Herdt Verlag in cooperation with Hyperwave. This results from relatively low complexity and isolated usability of CBT applications. This business model is not addressed to a specific target group; it matches individual learners as well as education institutions. Standardized CBTs profit from the large target group and often create high revenues even though they are relatively low-priced.
- WBT applications can not only be marketed via networks, but users even access and use them online. They allow the provision of integrated net based services. WBT services can easily create additional network effects. From a supplier's perspective, these services can be implemented relatively easy and cost-effective, e. g. economies of scale are realized, and cooperations can reduce costs. WBT applications allow the application of supplementary revenue models like brokerage, membership, subscription, advertisement and the sale of user data. Thus, WBT bare large potentials for additional revenue sources combined with low provision costs. Considering the end user, network costs and opportunities have to be taken into account.

6.4 Case-study: IWI-ELP

The e-learning platform IWI-ELP (see 130.75.63.44/elearning/frontend/login.php for a first WBT prototype) of the Institut für Wirtschaftsinformatik, Universität Hannover, is one example for a modern e-learning system. Many important success factors for sustainable business models for e-learning are incorporated. It clarifies especially significant technical aspects leading to sustainability. IWI-ELP is analyzed, designed, implemented and deployed by the Institut für Wirtschaftsinformatik (Breitner et al. 2003). Today it is a tutor system which accompanies lectures in information systems research. IWI-ELP enables students to repeat central topics in information systems research. Adaptivity to the learner's individual learning requirements is realized by registering central learning data, e. g. successfully solved exercises.

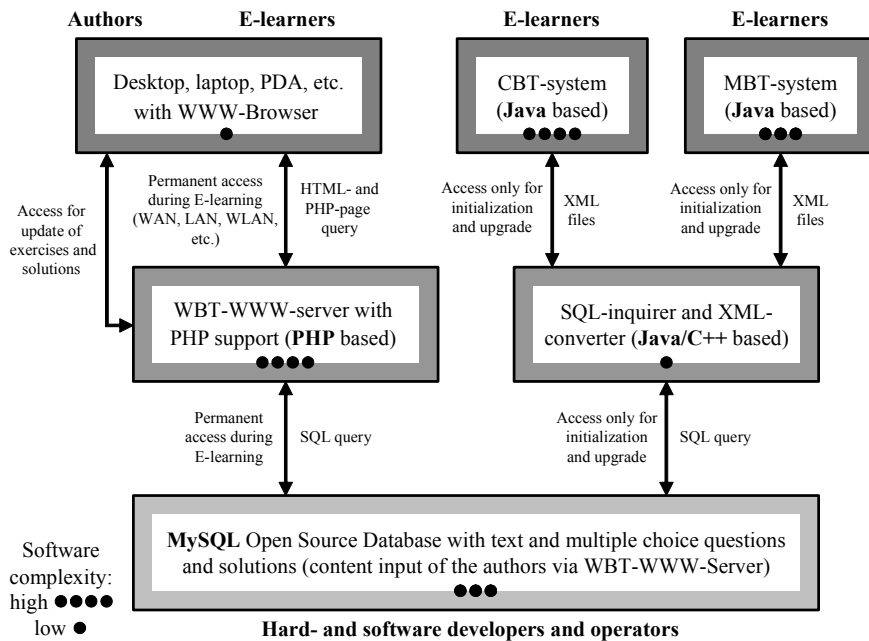


Fig. 6. Architecture of the e-learning platform IWI-ELP

IWI-ELP is an optional, free offer for students being very well accepted. The customer delivered value for the students is relatively high and both, text and multiple choice exercises are available. At present IWI-ELP is accessible only as WBT solution. The WBT prototype is constantly enhanced. A new data model is already designed and basing on this the IWI-ELP is extended to a CBT solution as well as to a MBT solution, see Figure 6 for the IWI-ELP architecture.

The IWI-ELP architecture clarifies that it considers important design features ensuring reusability on different hardware and thus reducing costs significantly. It consequently separates content, i. e. exercises and solutions and technology. This makes it possible to reuse content stored in a MySQL database and convert it via XML-files to fit the particular software solution (CBT, WBT and MBT). Furthermore the data model is sustainable in terms of extensibility and scalability. This way the number of potential users of IWI-ELP can be enhanced with comparatively few additional resources.

Content is administered by lecturers based on a predefined scheme. Exercises and solutions can only be completed in a predetermined way. This reduces errors and makes the content administration efficiently. The Institut für Wirtschaftsinformatik as provider of IWI-ELP concentrates on its core competencies in terms of designing, developing and permanently updating the e-learning system.

7 Conclusions and further work

Different business models suitable for e-learning providers exist. They base on combining core activities with revenue sources based on the particular market model. The assumption only simple computer based e-learning applications can be exploited successfully is incorrect. Large potentials for combining several revenue sources with economies of scale and low provision costs can be realized by offering e-learning services.

Sustainability leads to medium- and long-term success. It bases on concentrating on core competencies, pursuing right target groups, finding suitable revenue models, and designing the appropriate products. The definition of the three partial models of a business model has to base on interdependent decisions equal in importance. The business model has to be consistent. Customer-orientation, quality in combination with branding, cooperation with strong partners, the creation of win-win-situations and adaptivity and scalability of business models are keywords for sustainability leading to cost-reduction and increasing revenues. Sustainability depends on the success of aligning this combination with the needs of the target groups. Lacking sustainability of business models for e-learning providers is mainly caused by inconsistencies in their definition and/or realization.

To foresee future trends is difficult. Considering the development of the conditions of (e-)learning as well benefits as use of e-learning will increase rapidly. Today, the following reasons suggest sustainable business models also for complex e-learning products:

- Meaning and importance of knowledge permanently increases. High-quality learning content and applications are needed which also allow the transfer of knowledge into practice. This makes the advantages of e-learning even more valuable.
- Working and educational environments are changing. People have to adapt quickly – and often on their own initiative – to frequently and rapidly changing knowledge and technologies. The qualification of employees is more and more important. Life-time learning is one keyword of modern job profiles. Learning products which allow fast and easy diffusion and update of information are needed.
- Globalization is omnipresent. Companies are expanding worldwide and are outsourcing functions and activities to other countries with different requirements. Mobility of people is important in this context. Learning products are needed which allow learning any time and everywhere, i. e. mobile. This bares enormous potentials for hardware providers who provide specialized mobile learning hardware, e. g. applications for laptops, personal digital assistants and smartphones.
- Societies and especially learners are changing. The readiness to pay for education already increases in Germany and Europe, and a further increase is likely.

- Technical conditions are changing. The development and enhancement of technologies enables price reductions. Hardware, software and network fees decrease. This improves the relation between costs and benefits of e-learning.

Considering these reasons, it is necessary to review existing business models systematically. Sustainable business models for e-learning can be derived. Reference business models can be composed for different e-learning products. Using a reference business model can enhance an e-learning-provider's opportunity to market his product more efficiently. In this context, a supplementation of (reference) models for e-learning focusing the pedagogical and/or the technological dimension of e-learning, e. g. like ELM, should be seriously considered.

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