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## **E-certification: financial analysis and European Computer Driving Licence (ECDL) Hellas case**

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**Abstract:** The difficult economic situation demands very careful investments plans in education. This paper presents a financial analysis of the e-certification branch. It uses financial ratios in order to measure the liquidity, the activity, the debt and the profitability of the enterprises in the branch. Then it applies these ratios to a case study regarding European Computer Driving Licence (ECDL) Hellas. Moreover, it performs a feasibility analysis for a new entrant in the e-certification market. Using cost-benefit analysis the paper measures the benefit-cost ratio, the payback period, the net present value (NPV), the internal rate of return (IRR) and the break-even point for a new investment in the e-certification branch. Finally, it concludes regarding the present and the future of the e-certification branch in Greece. This paper can be helpful in other business cases in education.

**Keywords:** e-learning; e-certification; computer based tests; CBTs; financial analysis; European Computer Driving Licence; ECDL; Greece.

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## **1 Introduction**

Today, when the vast majority of households own one or more personal computers that fit on a desk top or on a lap, the definition of ‘computer literacy’ has much less to do with programming and much more to do with using the computer (Johnson, et al., 2006). So a certification in basic information technology (IT) skills is needed for a candidate to find a job in either the public or the private sector.

A certification is a designation granted by a certification organisation to a person, usually as the result of passing one or more examinations. It indicates that the individual has specific knowledge, skills or abilities according to the opinion of the certifying organisation. This term differs from licence in that the latter is required by law in order to practise certain professions whereas certification is generally voluntary.

Certifications can be classified in several ways, including whether they are generic or vendor-specific and according to the type of duration. Duration types include the following:

- 1 perpetual
- 2 requiring periodic renewal
- 3 for a specific period of time, such as the period of vendor support for the product(s) covered by the certification.

Cantor (2002) defined certification “as a confirmation of one’s adequate knowledge and skills in a specified occupation or occupational specialty.” Further, Cantor (2002) classified IT certifications into two areas:

- 1 certifications issued by industry that are product-related
- 2 certifications issued by organisations or professional associations (Randall and Zirkle, 2005).

Nowadays, public and private organisations urgently need employees who are IT educated and trained. Candidate employees should certify their IT knowledge and abilities. So, they are rushing to acquire such IT certificates. Companies that offer IT certificates have found more profitable to test the examinees using computers. So, e-certification emerged. The use of ICT in test procedure from the certification industry is called e-certification. Today, the number of certifications is impossible to quantify but it is estimated in the thousands (Knapp and Gallery, 2003), with many academic institutions integrating IT industry certification into their curricula (Hitchcock, 2005). Several enterprises [e.g., Adobe, Apple, Cisco, Computing Technology Industry Association (CompTIA), European Computer Driving Licence (ECDL), International Software Testing Qualifications Board (ISTQB), Linux Professional Institute, Microsoft, MySQL, Novell, Oracle, Sun] break in offering such ICT certificates.

Certifications offer many benefits for different groups. For employers, certifications are tools to find easier the appropriate candidate and to update the knowledge and skills of the existing labour force. Generally, employers expect the following benefits from the certified employees (Ray and McCoy, 2000; Weib et al., 2004):

- greater knowledge
- increased productivity
- a certain level of expertise and skill
- improved support quality
- reduced training costs
- higher morale and commitment
- easier preparation for a new position
- fulfilment of job requirements
- increase credibility.

The benefits for the employees include the following (Hitchcock, 2005):

- career advancement
- salary increment
- job diversification
- marketability
- worldwide recognition of expertise in a certain field.

There are also educational benefits. For educational institutions, IT certifications offer an attractive combination of internationally recognised certifications, professional teaching resource materials, industry association and targeted marketing possibilities. For educators, examination objectives and content reviews provide an additional assessment tool for evaluating course and program content. (Ray and McCoy, 2000).

Finally, there are benefits for the certification providers. For companies dominating their market such as Microsoft and Cisco Systems, the payoffs in developing such programs have to do with increasing the size of the market as they are about increasing their share of the market (Koziniec and Dixon, 2002).

However, there are also barriers. First, in some certifications, the absence of unbiased, neutral groups for determining examination content, creating examinations, and sanctioning examiners may create some doubt about certification value. The involvement of vendors may cause some critics to believe that certifications merely tout commercial products. Second, the rapidly changing knowledge base required for success in this field causes some to question the sustained value of certification. Third, educators may be uncomfortable with the pressure to maintain their own proficiency levels and certification status when they teach students who will be seeking certification. Fourth, educators may be uncomfortable with the thought that certification examinations, rather than theory and principles, drive the content of courses and academic programs (Koziniec and Dixon,

2002). Finally, students are more interested to pass the examinations of the certification rather than to learn and to update their knowledge through the courses.

As we mentioned before, the recent trend regarding examinations is to deliver computer-based examinations. So, certification is becoming e-certification. The majority of certifications, including language certifications (e.g., TOEFL), or other professional certifications changed the way of taking examination from hand writing to computer based. E-certification provides many benefits. First, it is easier and quicker to correct the tests. Moreover, companies save a lot of money because the procedure is computer based, they do not need so many employees and they do not spend money for paper material. From the other side, candidates find easier the procedure through the ICT, especially in the IT certifications. It is peculiar to examine the knowledge in IT skills without using ICT in the examinations. Another benefit for the candidates is that they can know immediately their results.

Many companies that issue certifications cooperate with companies that offer a full range of test delivery services. These companies are responsible for the highest standards of security, accuracy, consistency and distribution of the test. For example, Oracle uses internet based testing (IBT) to help enforce its certification training requirement. Thomson Prometric and Oracle are working together to expand the IBT item types to included simulations and also to enhance significantly the Proctor Management System. Oracle has awarded over 200,000 Oracle Certified Professional certifications around the world (Prometric, 2009). This is only an example of many similar case studies.

As it was mentioned before, enterprises authenticated computer based tests in order to qualify for special tasks and safeguard the qualification by a certification process. The certificate should finally be awarded after passing computer based examinations in an independent professional test centre (PTC). For example, the majority of ICT certifications organisations cooperate with enterprises like Thomson Prometric. They developed this alliance because Thomson Prometric offers a very big number of test centres all over the world and a highly secure and consistent process for the distribution of tests, avoiding any possible delivery bias.

This paper analyses the financial situation of the e-certification industry for basic IT skills. It focuses on a European country and analyses especially the leader company ECDL Hellas. First of all, ECDL Hellas is responsible for the accuracy and security of the exam procedure and for the results. ECDL Hellas has created its test distribution network by cooperating with independent PTCs. These independent PTCs are private tutorial centres that offer courses on IT skills.

Recently, ECDL Hellas has certified as PTC various public institutions such as universities and schools. The integration of e-learning into university and school courses is a result of the IT explosion (Selim, 2007). These institutions through ECDL Hellas try to connect e-learning with e-certification, in order to simplify the examination process.

The security is a very important issue for the value of a certification. For example, Cisco presents the enhanced test centre network, which is designed to safeguard the value of Cisco certifications in the IT professional marketplace. Focusing on security, the new test centres will employ advanced security technologies and newly refined procedures. The desired outcome is to protect the integrity and value of Cisco's certification for the certification holders, which will also increase the demand for Cisco training. Test centres will be centrally located and will be operated by Prometric's personnel. For ECDL Hellas, the examinations' supervisors are employees of the same company. This fact caused rumours that many unqualified candidates passed the examinations. The need for

a valid certification on basic IT skills has driven the Greek Government to participate in the examinations' procedure by supervising it. Many European governments or public institutions cooperate with ECDL foundation. ECDL foundation has been also introduced in Italian universities (Calzarossa et al., 2007).

Currently, ECDL certification as well other IT skills certifications are accepted by many European countries. A new industry is born and many opportunities and difficulties have arisen. A financial analysis and the estimation of the benefits and the costs are essential.

So, the purpose of this paper is the financial analysis of the e-certification marketplace. Our study presents the impact of financial crisis. Moreover, it investigates what a new enterprise has to do in order to make a successful investment in the e-certification branch. Specifically, it examines the situation regarding the e-certification marketplace in Greece and focuses on the ECDL Hellas case. First, we demonstrate the methods that we will use. We examine through a financial analysis the status of the e-certification sector and the critical factors for a successful investment. It is the first time that these e-certification issues are investigated.

In the next section, we develop the financial analysis. In the third section, we present the results. In the fourth section we discuss these results. Finally, in the fifth section we conclude and suggest future research.

## **2 Financial analysis**

In order to develop an intergraded view of the e-certification marketplace in Greece, the following two issues are examined:

- 1 a financial analysis of the marketplace in the e-certification market
- 2 a feasibility analysis for a new entrant in the e-certification market.

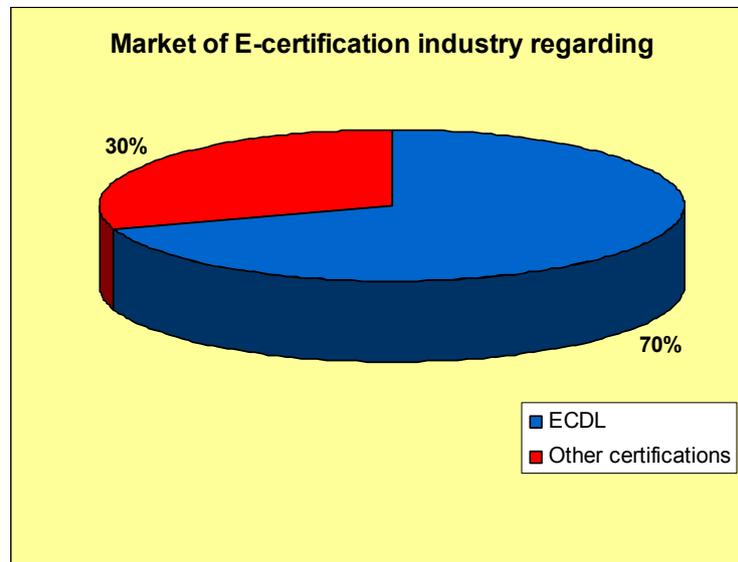
### *2.1 Financial analysis of the marketplace in e-certification market*

In this European country under investigation, there are six recognised enterprises which are acknowledged regarding IT skills certification:

- 1 Infotest which represents Microsoft's certification.
- 2 International Diplomat in IT skills by Vellum global educational services which provides University of Cambridge's certification.
- 3 Keycert which is developed by a private tutorial centre.
- 4 ICT Hellas which is the exclusive representative of Edexcel in this European country. Edexcel is the biggest organisation which provides certifications in UK.
- 5 ACTA which is promoted by a public university.
- 6 ECDL which is the leader in ICT certifications branch.

Data regarding these enterprises were found mainly from their web sites. Figure 1 shows that the e-certification market is a monopoly. Four factors drive to this conclusion. The first factor was the number of cooperating PTCs.

**Figure 1** Revenue of e-certification industry regarding basic IT skills 2002–2007 (see online version for colours)



The second factor was the frequency of the examinations arranged by the PTCs. The third factor was the number of certifications issued by the certification organisation. Finally, the fourth factor was the number of registered students to take the examinations. ECDL is the major company. Let us do a brief analysis of the ECDL. The ECDL is an internationally recognised computer skills certification programme. ECDL was launched in August 1996. Its plan was to gain Europe wide acceptance as soon as possible (Carpenter et al., 2000). About four million certifications have been issued in more than 130 countries. Outside Europe, ECDL is known as International Computer Driving Licence (ICDL). It is exactly the same certification, with the same syllabus and procedures. ECDL is accepted as a standard of core computer literacy. In order to maintain this standard, much work has been done in the areas of validation of tests, quality of tests, testing methods and procedures. ECDL certifies that the holder has knowledge of the essential concepts of IT and is able to use a personal computer and common professional computer applications at a recognised level of competence. ECDL is operated within its member countries by a network of test centres which are managed by a local ECDL licensee. This licensee is usually, although not always, the local informatics or computer society (Miesenberger et al., 2004).

The non-profit ECDL foundation certifies basic computer usage (basic concepts of information technology, managing files, word processing, spreadsheets, databases, presentations, internet and e-mail) through computer based tests. ECDL cooperates with over 1,400 PTCs. Moreover, it performs three times more examinations than all the other companies together. Finally it has provided more than 460,000 certifications since 2000. The success of ICT industry certification systems depends mainly on the wide recognition by industry stakeholders (ESCC, 2004). From this point of view, the success of IT skills certification systems constitutes the general recognition by employers and stakeholders in a specific branch or industry sector (Weib et al., 2004). In order to

understand the situation, usually a prospective student does not ask for a certification in IT skills but for the ECDL. They have connected the name of the ECDL with the IT certification. So it is obvious that ECDL controls easily all the activities in the industry. Thus, a financial analysis regarding ECDL is important.

After this critical description, financial tools are presented that will be used to find the ECDL's performance. Each ratio provides us information about the liquidity, the activity, the debt and the profitability of the ECDL.

**Table 1** Financial ratios

<i>Financial tools (ratios)</i>	
<i>Name</i>	<i>Type</i>
1 Current ratio (CR)	$\frac{\text{Current assets}}{\text{Current liability}}$
2 Asset turnover (AT)	$\frac{\text{Volume of business}}{\text{Total assets}}$
3 Debt ratio (DR)	$\frac{\text{Total liabilities}}{\text{Total assets}}$
4 Return of investment (ROI)	$\frac{\text{Net profit}}{\text{Total assets}}$

- Current ratio (CR): This ratio uses quantities from the balance sheet. It represents the rate that current liability is covered by current assets. So, the larger the value of the ratio is, the larger the safety margin of current creditors is.
- Asset turnover (AT): This ratio presents the rate of total assets' effective use during the fiscal year. Financial analysts prefer large values for this ratio.
- Debt ratio (DR): This ratio counts the percentage of total liabilities to total assets. High values of this ratio indicate a risk for the creditors and a shortage of liquidity.
- Return of investment (ROI): This ratio measures the profitability of total assets.

In order to use these financial ratios, relevant financial information was found in ICAP's index regarding the private education branch. ICAP's index provides commercial and financial data about major companies. The data include the balance sheet as well as the profit and loss account of ECDL.

## 2.2 Feasibility analysis for a new entrant in to the e-certification market

There are several financial tools that can be used to show if an investment is profitable. This paper uses the following four methods.

### 2.2.1 Cost-benefit analysis (CBA)

CBA measures the total expected costs against the total expected benefits. This is an important technique in order to calculate the payback period of our project and the cost-benefit ratio.

**Table 2** Cost-benefits for e-certification investment

<i>Cost benefit analysis (CBA) for an e-certification investment</i>	
<i>Costs</i>	<i>Benefits</i>
Cost of pre-investing research	Register PTC
1 Law and Insurance fees	
2 Consultants fees	
Cost of pre-production	
1 Training costs	
2 Research and development costs	
Fixed costs	
1 Land	
2 Accession of technology	
3 Equipment	
Operational costs	
1 Water	Register students
2 Telephone	
3 Electricity	
4 Internet connection	
5 Heating	
6 Equipment depreciation	
7 Wages	
8 Customer support	
Funding costs	
Marketing costs	
Other costs	

Pre-investing research costs include all the costs for the creation of a business plan. First, an investor needs consultants to perform a market research and to provide her/him all the elements that s/he needs to make her/his decision for the investment. Second, s/he must consult a lawyer and an insurance firm in order to find out if s/he has the right to invest in this branch. Pre-production costs include the expenses that a company has to spend for employees' training and for the development of the products to sell. Fixed costs and operational costs are charges that the majority of firms have to spend for operating. Funding costs are the loans' interest and other expenses that a company spends to find money. Moreover, a company has to spend a lot of money for the marketing (e.g., to find appropriate employees and to find new customers). Other expenses include all other costs.

Benefits for an e-certification company come from PTCs annual fees and from the students' fees that they pay in order to give the examinations. A CBA framework regarding an e-learning organisation was proposed by Mantzari and Economides (2004). In this framework, there was an analytical description of the costs and the expected revenues for an e-learning organisation. In addition to the benefits-costs analysis, the following three extra financial tools are used:

### 2.2.2 Net present value (NPV)

NPV measures the excess or shortfall of cash flows, in present value terms, once financing charges are met. All projects with a positive NPV are profitable

**Figure 2** NPV equation

$$\text{NPV} = \sum_{t=0}^n \frac{C_t}{(1+r)^t}$$

where

$t$  the time duration of the cash flow

$n$  the total time duration of the project

$r$  the discount rate

$C$  the cash flow (the amount of cash) at that point in time

### 2.2.3 Internal rate of return (IRR)

IRR is the discount rate that makes the project to have a zero NPV.

When NPV = 0

**Figure 3** IRR equation

$$\text{Initial Investment} = \sum_{t=1}^N \frac{C_t}{(1+IRR)^t}$$

where

*Initial investment*: the investment at the beginning of the project

$C_t$  the actual cash generated by a company or the amount of cash earned after paying all expenses and taxes

$n$  the total time duration of the project

$t$  the time duration of the cash flow

*IRR*: Internal rate of return

### 2.2.3 Break-even analysis (BEA)

BEA is the point where the total revenue equals the total costs associated with the sale of the product (TR = TC). If the product of our new investment can be sold in a larger quantity than that at the break even point, then the firm will make a profit; below this point it will make a loss. This method is crucial to find the right number of corporate PTCs and prospective students for a specific price.

### 3 Results

#### 3.1 Financial analysis of the e-certification market in Greece

In this section, the financial tools of Section 2 are used. For each ratio, the corresponding values are calculated and a short analysis is given.

**Table 3** ECDL Hellas results

		ECDL										
		Results										
Ratios		2002	02–03%	2003	03–04%	2004	04–05%	2005	05–06%	2006	06–07%	2007
1	CR	0.85	9.41	0.93	–18.28	0.76	36.84	1.04	52.59	1.59	18.00	1.87
2	AT	1.91	–12.62	1.67	37.26	2.29	–2.11	2.24	–25.58	1.67	–19.00	1.35
3	DR	0.89	0	0.89	–5.96	0.84	–13.93	0.72	–20.24	0.58	–23.64	0.44
4	ROI	0.09	14.26	0.10	30.82	0.14	25.06	0.18	90.42	0.33	–38.72	0.20

**Figure 4** ECDL Hellas financial ratios (see online version for colours)

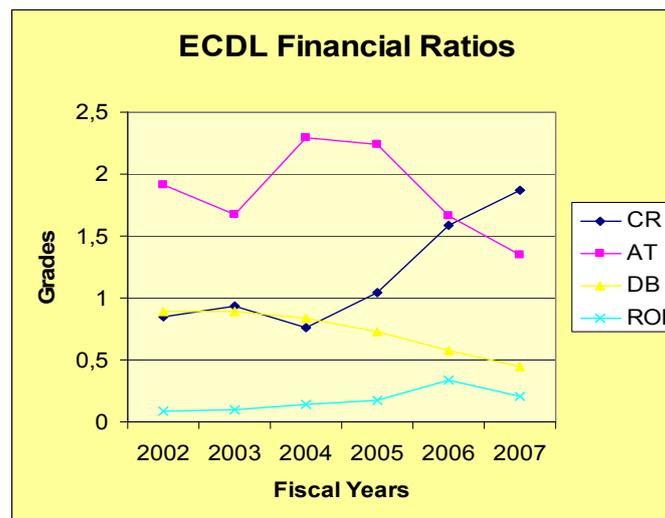


Table 3 and Figure 4 provide some useful results for the ratios.

CR's values show that ECDL Hellas has a great liquidity. Creditors feel safe because the current assets are big enough to cover the current liability. There is a small decrement from 2003 to 2004. This was a result of new liabilities for new investments that were very effective.

AT shows an effectiveness of the total assets. During these fiscal years, the volume of business was almost double of the total assets. The first decrement exists in 2003. After a good fiscal year in 2004 the decrement continued. This may happened due to the introduction of new enterprises in the branch. The first competitor firm entered into the field in 2003. Other firms followed in the period 2005–2007. A decrement of business?

volume was unavoidable. This situation affected ECDL Hellas, but the volume of business was still larger than the total assets.

DR shows that the total assets are greater than the total liabilities. This means that ECDL Hellas is a reliable firm. Its creditors and investors can support it without big risk. Generally, investors prefer companies with low DR and especially when the ratio is below 1. A company with a high DR could be in danger with small liquidity and profitability.

ROI shows that ECDL has a very good profitability. For the first two years, ECDL Hellas had a 10% attribution. In 2004–2006 it had an augmentation by 300% in ROI. In 2007 it had a decrement, but the ratio was still very large. The results show that ECDL Hellas did a very profitable investment which continues to grow without influence by the other companies. In a very difficult economic period worldwide with low investments and low profits and with many companies closed or transferred to low cost countries, ECDL Hellas managed to achieve very large ROI.

Generally, ECDL's ratios show very good results. It is a firm that operates with great liquidity and profitability. Moreover, the AT and ROI indicate that the volume of business is large and it is growing. This situation also confirms that it can find easily new funds in the future to expand its operations. Investors and banks can cooperate with it with very low risk.

The analysis above provides interesting information regarding the past performance of ECDL Hellas. It was not possible to compare the ratios of the ECDL and the ratios of the branch because the other companies are not obliged yet to show the balance sheets as well as the profit and loss accounts. So, it was extremely difficult to find data for this purpose. However, one of the main competitors (ICT Hellas) published the balance sheets as well as the profit and loss accounts for the last two fiscal years. So, it was possible to compare ECDL Hellas and ICT Hellas.

**Table 4** ECDL and Certificate-4 comparison

<i>ECDL and ICT comparison</i>					
<i>Financial ratios</i>		<i>2006</i>		<i>2007</i>	
		<i>ECDL</i>	<i>ICT</i>	<i>ECDL</i>	<i>ICT</i>
1	CR	1.59	0.63	1.87	1.62
2	AT	1.67	0.85	1.35	1.01
3	DB	0.58	1.28	0.44	0.60
4	ROI	0.33	-1.19	0.20	0.29

Table 4 shows that ICT had a great improvement from 2006 to 2007. ICT improved liquidity and profitability. At the same time, AT shows that the volume of business is not enough yet. ECDL Hellas is the major company of the branch. ICT Hellas and the other companies are not yet in position to compete ECDL Hellas. However, financial ratios inform that good and careful investments in the branch could be profitable despite the monopoly of ECDL Hellas. This is very crucial and helpful for the success of the next part of the paper.

### 3.2 Feasibility analysis for a new entrant in the e-certification market

The previous section presented the tools for the feasibility analysis of a new firm in the e-certification market. Index 2 explains the cash flows of a new firm. Based on index 2, the results on index 6 are presented. A new investment must be realised after a lot of consideration and a very careful business plan. Let call this new firm X.

Our analysis is based on the business and financial policies of the companies in the branch. First of all, firm X must determine its goals. Let that firm X wants to acquire the 20% of the market in five years. So, it wants to cooperate with at least 400 PTCs and 25,000 students in five years. 25,000 students correspond to 175,000 tests in five years because the certification has seven different units to be tested. The first thing that firm X has to do is to make deals with PTCs. There are two possible advantages that a firm can have in a market. The first is the differentiation of the product and the second is the low price of the product. In this branch, firm X can not invest in differentiation because the market wants a specific product. So, the strategy that firm X must follow is a low price strategy. A PTC has to pay to ECDL 1,000 € each year. Firm X will not charge for the first year anything in order to create a base of PTCs. Then it will charge 300 € per year. For ECDL, a student has to pay 30 € per test unit. The 20 € are benefits for the ECDL and the 10 € for the PTC. Firm X will propose 15 € per test unit for the PTC and 15 € for itself. This is a very good proposal for the PTC because it can gain 700 € from the annual charge and 5 € per test. It is crucial to achieve a strong cooperation with the PTCs, because the PTCs are the sellers of the certification, so the PTCs must have a motivation to sale the product of firm X and this motivation is the bigger profit.

Moreover, firm X must create a market in the second target group which is the students. ECDL receives 70 € per student for registration. Firm X will make the registration free of charge. This is a great motivation for students. Furthermore, firm X can advertise that its IT certification is updated, business-oriented and more accessible to the test takers. Table 5 summarises the analysis for the price strategy of firm X and the difference with the major competent of the branch.

**Table 5** Price Comparison between ECDL and Firm X

	<i>ECDL</i>	<i>X</i>	<i>PTC benefits</i>
PTC annual charge	1,000 €	300 €	700 € per year
PTC benefits from a test	10 €	15 €	5 € per test
			<i>Student benefits</i>
Students registration	70 €	0 €	70 €

#### *Cost-benefit analysis*

Based on Table 2, Table 6 shows the results from the CBA. Benefits are measured based on the previous analysis for the price strategy. Costs are measured based on the needs of a new firm. An extensive research was made in order to estimate the pre-investing and pre-production costs. The costs for consulting, assurance and other services were investigated. For the fixed costs and operational costs, data were selected from the price

strategy of the firms that offer services like telephone, internet, etc. Moreover, the wages and support services were estimated in order to have an intergraded view of the operational costs. Regarding marketing costs, a research was made for the cost of an advertisement in newspapers, radio, television and the costs for posters and other advertising papers. It was considered that firm X pays 5,000 € funding costs per year. It is a very small charge because there are many financial programs for new companies in European Union. Finally, it was assumed 70% as the discount rate. It was used this large value for discount rate because a new firm in this branch is a high risk investment and to avoid the optimistic forecasts. Based on Table 6, the other two financial tools, NPV and IRR, were measured.

**Table 6** Firm X cost-benefit analysis

<i>Fiscal year</i>	<i>Benefits from PTC</i>	<i>Benefits from tests</i>	<i>Total benefits</i>	<i>Cost of pre-investing research</i>	<i>Cost of pre-production</i>	<i>Fixed costs</i>	<i>Operational costs</i>
0	0	30,000	30,000	12,000	20,000	100,000	110,000
1	600,000	3,000,000	360,000	0	5,000	40,000	12,000
2	90,000	6,000,000	690,000	0	7,000	45,000	125,000
3	105,000	750,000	855,000	0	6,000	50,000	130,000
4	12,000	9,000,000	1,020,000	0	10,000	55,000	130,000
Totals	375,000	2,580,000	2,955,000	12,000	48,000	290,000	615,000

<i>Fiscal year</i>	<i>Funding costs</i>	<i>Marketing costs</i>	<i>Other costs</i>	<i>Total costs</i>	<i>Discount factor</i>	<i>Discount total benefits</i>	<i>Discount total costs</i>
0	5,000	150,000	10,000	407,000	1	30,000	407000
1	5,000	80,000	10,000	260,000	0.588235	211,764.7	152,941.2
2	5,000	120,000	10,000	312,000	0.346021	238,754.3	107,958.5
3	5,000	90,000	10,000	291,000	0.203542	174,028.1	59,230.61
4	5,000	90,000	10,000	300,000	0.11973	122,125	35,919.11
Totals	25,000	530,000	50,000	1,570,000		776,672.1	763,049.4

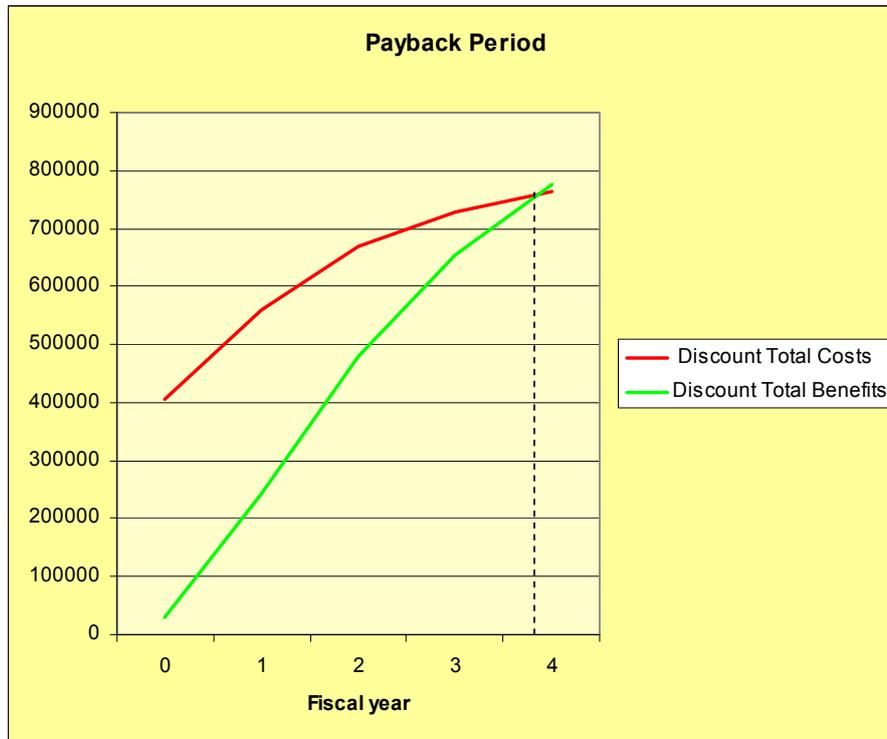
Note: Discount rate: 70%.

### *Benefit/cost ratio (BCR)*

BCR is the fraction of the discount total benefits to the discount total costs. Using index 6, it is calculated that  $BCR = 1.02$ . This value means that the total inflows are larger than the total outflows. Of course, the value is not very large; it is almost 1. So the difference between the total inflows and the total outflows is small.

### *Payback period*

Payback period is the time that the discount total benefits are equal to the discount total costs. Figure 5 shows that this time is somewhere between the 3rd and 4th fiscal period.

**Figure 5** Firm X payback period (see online version for colours)

### NPV

Using index 6, the NPV is calculated. NPV is the difference between the discount total benefits and the discount total costs. So,  $NPV = 13,622.7$  is a positive number. This positive number means that the investment is acceptable and it will be successful with large probability.

### IRR

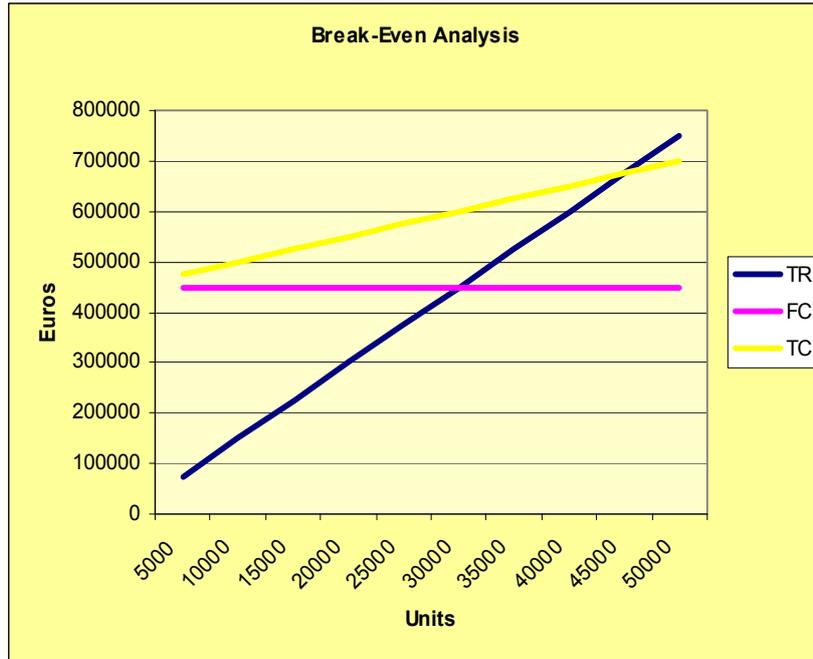
The discount total benefits and the discount total costs are almost equal.  $NPV = 0$ , when discount rate is equal to 72.35%. So,  $IRR = 72.35\%$ . So, IRR is larger than the discount rate (70%) as it was defined it in the previous section. Discount rate is the rate of the return of the investment if the investor had invested in another project. So this project offers larger profits than investing in others.

### Break-even analysis

The firm X receives 15 € per test taken. So, the volume of business will be 15 € times the number of the tests taken. Fixed costs are easily calculated by the CBA. In order to have more accurate results, let make a small decrement to FC because firm X has not only benefits by the tests but also by the annual charge of the PTCs. After the calculations, the production cost of 1 test is estimated to be 5 €. So, the equation to the break-even point

(TR = TC) is:  $15x = 5x + 450,000$  where  $x$  is the number of tests that the firm X produces. The solution is:  $x = 45,000$ . This result means that if the firm does not have at least 45,000 tests per year then the company will operate with loss. Figure 6 shows the same result.

**Figure 6** Firm X break even analysis (see online version for colours)



#### 4 Discussion

The valuation results drive to useful conclusions. The first analysis shows that ECDL is a very strong company and is the leader of the branch. The financial ratios present a very good functionality and great profitability. It is obvious that the other firms or the new entrants have to follow a very careful strategy in order to accomplish their targets and to decrease the power of the ECDL. Of course, ECDL has the advantage of being a large and reputable firm and these characteristics give it the ability to control the market.

Furthermore, a new investment in the e-certification market can be profitable. All the financial tools show that a new firm can be profitable in a period of three to four years. Using a very large discount rate permits the elimination of many possible situations (risks) that could alter the profitability. So, the branch has still many possibilities. The source of customers is huge, and many of them have understood that e-certification is a free market and they do not have to select ECDL for the certification of their IT skills. Other or new companies should follow more aggressive strategies in order to detach a piece of the market from ECDL. A new e-certification company has to follow a low price strategy because it is the only tool that it has to attract new customers. The new e-certification company must create customers in both markets (PTCs and students)

simultaneously. A PTC will cooperate with the new certification firm not only for the better prices but also for new students that will come and ask for this particular e-certification. The new e-certification company must convince the PTCs that the examinations will have enough tests and enough students for a profitable corporation.

From the other side, students could prefer the new certification not only for the better prices but also for other reasons. The new certification must present a very good prestige. This can be done if an investor cooperates with a reputable university or even better with a consortium of universities. Moreover, there is possibility of differentiation of the product. The new e-certification company could move towards the knowledge certification on open source software. It should also create a very strong network of PTCs. This will be the best advertisement. So, it is obvious that the new e-certification company should create demand for the two target groups simultaneously, because the one will help the growth of the other.

Despite the financial crisis, our study shows that a well measured investment in e-certification branch for IT skills will be successful.

## **5 Conclusions and future research**

E-learning and e-certification is the future. More and more knowledge will be learned and certified through ICT. National educational and professional training systems are facing a huge challenge to deliver the skills needed by the economy and society. Industry complains about growing gaps and mismatches between supply and the demand of specific e-skills. For example, USA Labour Department studies showed that there is a dramatic demand for employees proficient in some major software areas. It was stressed the increased importance of certification in the US job market and worldwide (Schlichting and Mason, 2005). The previous statement is supported by the innumerable job announcements which include phrases such as 'A+ certification preferred', 'MOUS certification a plus', and 'preference for network certification'. It is a fact that employers are rewarding applicants who have earned the certifications (Ray and McCoy, 2000).

The purpose of this paper was to investigate the present and the future potential of the e-certification market, especially in IT skills in a European country. It presented a financial analysis of the e-certification market. Then, a feasibility analysis for a new entrant in the e-certification branch in a European country was performed. This paper is the first work that tries to analyse this area. The presented framework could be used as a guide in other countries or other cases of e-certification (e.g., foreign languages certifications, GRE, GMAT). This paper offers useful information to investors, teachers, students and public or private educational organisations for e-certification. E-certification is an attractive area for investment in such a very difficult economic situation worldwide. Although this paper shows that a careful investment could be very successful, many variables should be considered carefully. Furthermore, e-certification is just starting to grow, so its influence in the learning process is not very large yet. However, cooperation between e-certification and public or private educational organisations exists (e.g., Calzarossa et al., 2007). In the future this cooperation will be stronger because e-certification links education with employment. This link is very crucial for the students and for the employers too. It is possible that in the near future students could choose educational organisations that provide e-certifications because they will find a job easier. This progress could drive educational organisations to reformulate their courses in order

to be compatible with certifications' syllabuses. This situation could have an influence to the teachers too. Teachers could try to provide to the students the necessary knowledge in order to pass the examinations of the certification. So, the whole educational activities could be affected.

E-certification is an economic product that influences the way of learning not only because it uses ICT for the examinations, but also because it could change the existing syllabus and learning procedure of a course. A malfunction (e.g., monopoly) in the e-certification branch could affect the adoption level of IT skills and e-learning as well as the quality of education. The existence of many competing enterprises in this field could assure better services (e.g., quality educational resources) and better prices for the customers (students). This paper showed that new investments could take place in this branch. The financial analysis of the e-certification market could show at which levels this branch could affect the economy and the education. Concluding, this paper estimated the effectiveness of an investment in this market.

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