Financial analysis for professional test centres in Greece

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Abstract: E-learning and e-certification are two educational activities that changed the way of studying worldwide. Particularly, information technology skills are certified through computer based tests (CBT) in specific professional test centres (PTCs). This paper presents a financial analysis of the PTC branch. Moreover, it examines the feasibility of a case study investment in this market. The proposed valuation framework explores the correlation between cost effectiveness and the quality of e-learning and e-certification. It is a useful tool that can be used in any case of e-learning or e-certification.

Keywords: computer-based tests; computer-based certification; e-learning; e-certification; financial analysis; return of investment; ROI; Greece.

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1 Introduction

Information and communication technologies (ICT) have affected many different sectors in our society. First of all, ICT are heavily used in the public and private sector of almost all countries. Public organisations as well as private companies require employees to possess advanced ICT skills. Governments try to transform their services into e-government in order to better serve the citizen. This huge transition needs employees that know how to use ICT. Candidates for a job in a public agency have to certify their

ICT knowledge. Moreover, in the private sector, many job openings ask for employees holding a certification in ICT skills.

Another sector that has been affected is education. Over the past two decades, academics and institutes of higher education have been diversifying their delivery of instruction through new internet media such as learning management systems, asynchronous distance learning and online classrooms among a myriad of other burgeoning educational technologies (Concannon et al., 2005). Schools and universities have introduced ICT courses in almost all classes. Students must learn to use ICT in order to accomplish their tasks. Word processing, presentations, managing data, web browsing are some very important procedures that students complete using ICT. Furthermore, teachers use ICT to provide knowledge in a more student-centred way. Many teachers have generally expressed openness, excitement and motivation to learn, relatively to the potential benefits of this innovation. Technological transcendence is attitudinal and institutional (Bongalos et al., 2006). Furthermore, students complete their tasks easier and quicker via internet. For example, a study found that 88% of students reported time saving and financial benefits using online submission (Bridge and Appleyard, 2008).

The use of ICT creates new trends in economy. The establishment of new enterprises that offer digital services (software, e-learning, e-commerce, e-banking, etc.) and the evolution of the existing companies that bring ICT in their operation change the rhythm of economic growth. In order to respond to these changes, people who possess the basic IT skills are needed.

This necessity creates confusion between the manager's needs and the curricula in schools and universities. Teachers believe that students must have a global and spherical ICT knowledge. On the contrary, enterprises need employees that have a very good knowledge and practice only in specific ICT tasks. Moreover, teachers aim to develop the analytical abilities of their students and do not intend to improve specific specialised skills. They try to enable students to learn anything new easily and fast. On the other hand, business managers want standby employees with hands-on experience. They prefer employees customised to perform specific tasks.

What is more, the opinions of teachers and students regarding the required ICT skills also differ. Most students want skills which will enable them to acquire a good job; they do not want a strong theoretical background; rather they require a businesslike lecture and a strong specialisation.

Up to recent years, the outline of the ICT courses offered by schools in many countries was specified by the government. Similarly, the outline of the ICT courses offered by universities was specified by the professors and it is well known that there was a variation from university to university. Usually, the opinions of students and business' managers were ignored. Managers in both the public and the private sector want ICT specialists with hands-on experience; they want trained employees ready to tackle ordinary ICT problems.

Furthermore, the managers were not sure about the real ICT skills of the graduates. There was nothing to assure them that a candidate employee had the required ICT skills for the job. This lack of assurance was resolved by some enterprises that authenticated people's ICT skills.

A quick search through the internet shows many ICT certifications that can be separated into two categories. The first category includes the certifications that are managed by the vendors of these technologies. Large enterprises like CISCO, IBM and Microsoft sponsored programs that certified individuals regarding the usage of their

products. The second category consists of third-party commercial organisations and vendor neutral interest groups that sponsor certifications like ECDL/ICDL and Certiport. Moreover, there are governments, universities and professional chambers that provide certifications in cooperation with the vendors. To conclude, certifications can be offered by many different agencies.

Usually, the exams for these certifications are performed through computers or internet that is why this procedure is called e-certification. In order to organise the exams vendors have two choices:

a the development of a test centres' network

b the qualification of independent centres as professional test centres (PTCs).

The second option is the most common.

A PTC could be a university, a school, a private tuition centre, a public or private organisation. There are specific requirements that a PTC has to correspond in order to perform exams. In European countries, the most common PTCs are the private tuition centres. Independent centres offer computer-based testing to people who are interested in certifying their ICT skills. These computer-based tests are issued by the certification organisation. Thus, if someone passes the tests, he is certified by that specific certification organisation.

In order to make more understandable how the system works, let us give an example. Suppose that someone wants to get the ABC-ICT certification. If he just wants to take the exams, he arranges with a PTC when to take the exam. On the appropriate date, he visits the PTC and sits the exam. In addition, if he also wants to attend some preparatory courses regarding the ABC-ICT certification, he arranges them according to his level. He attends the classes and then takes the exam. Consequently, a PTC can offer two products:

a courses regarding the content of the exams

b the exams' organisation.

The purpose of this paper is a financial analysis for the PTC's marketplace. Moreover, it investigates what a new enterprise has to do in order to make a successful investment in this sector.

Previous papers on e-certification and e-learning could be classified into three categories. Papers in the first category compared the new online learning and testing methods with the previous traditional methods. Papers in the second category evaluated the success of online learning and testing with respect to learning and economical level. Regarding learning, it was examined if learners learned easier, faster and more pleasantly. At the economic level, it was examined if an organisation or an enterprise gained or lost from an investment in this new technology. Finally, papers in the third category performed an economic analysis of the marketplace of online testing and learning.

There are many papers in the first category, most of them stated that e-learning would be more effective if it is applied with caution (e.g., Bates, 2005). Some previous studies showed that lower-performing individuals will be disadvantaged when carrying out computer-based assessment (Noyes et al., 2004). On the contrary, most studies found that the use of ICT in learning and testing has significant positive influence on students' performances (e.g., Chang and Tseng, 2008). Another approach is the combination of the new technology with the traditional learning and testing methods called 'blended

learning' (e.g., Rossett, 2003). In order to move towards best-practice, we need an in-depth understanding of not only the structures and techniques which support blended learning but also of the cultural and social contexts in which they are embedded (Orton-Johnson, 2008). Teaching effectively for blended learning, whether the dominant mode was distance or on-campus learning, required careful design and preparation, with expectations of student interaction online explained and designed to complement the dominant mode and required as part of assessed tasks (Stacey and Gebric, 2007). Moreover, it is very important to identify the factors for a successful implementation of e-learning. A very good example is the research for the patterns and factors that influence e-learning implementation in Thailand's universities (Siritongthaworn et al., 2006).

The 'right amount' of e-learning to offer in a curriculum is crucial; too little and we are not helping students to learn appropriate lifelong learning skills, but too much, and the students will start to complain that they had not signed up for a virtual degree, and that they want more face-to face opportunities (Davis and Fill, 2007). In order to ameliorate students' interactivity with e-learning, new systems have been developed such as mobile learning systems (Shen et al., 2008; Economides, 2008; Economides and Nikolaou, 2008).

There are also many papers in the second category concerning the learning level evaluation. Learning evaluation methods are adopted by e-learning to measure its effectiveness, such as student course experience questionnaire (SCEQ) (Ginns and Ellis, 2008). Other studies used statistic tools to show the effectiveness and the usage of e-learning system (e.g., Cramer et al., 2007). There are five modes of instructional interaction in distance education settings: learner-teacher, learner-learner; learner-content; learner-interface and learner-individual (Chiou and Chung, 2003). Regarding learner-teacher interaction, the perceived lack of interaction leads some instructors to state that online instruction lacks humanisation (Yueh, 1999). Students' and teachers' perceived lack of interaction also tends to reduce their perceptions of learning effectiveness (Walls, 2005). Regarding learner-learner interaction, a survey among students taking online courses at the State University of New York found that students' satisfaction with the course and their learning performance were positively correlated with the greater interaction with other students (Swan, 2002). Regarding the other interaction modes, it could be noted that an instructor has to teach the course at two levels:

a one that deals with course content

b one that deals with the mechanics of using the technology associated with the delivery of the class (Gilcher and Johnston, 1988).

The same happens with students. They are required to learn at two levels. Before attending to the course content, students must learn to interact with the technology used to deliver the course (Hillman et al., 1994). Another issue in e-learning is how ICT can be used to move students from being dependent on teacher feedback to being able to generate their own feedback on learning (Nicol, 2007; Moridis and Economides, 2009a; 2009b).

While e-learning has been studying for some time, e-certification is a sector with few researches. E-assessment was defined by Ridgway et al. (2004) as the use of electronic technologies to drive student learning assessment. E-assessment should encourage the rethinking of curriculum, e-learning and technology and explain that e-assessment is

flexible and supports the assessment of higher order thinking, social skills, and group work through such means as digital portfolios (Ridgway et al., 2004). In addition, Martell and Calderon (2005) believe that e-assessment is an ongoing process that involves planning, discussion, consensus building, reflection, measuring, analysing, and improving based on the data and artefacts gathered about a learning objective. Moreover, Kellough and Kellough (1999) identified seven purposes of assessment:

1 improve student learning

2 identify students' strengths and weaknesses

3 review, assess, and improve the effectiveness of different teaching strategies

4 review, assess, and improve the effectiveness of curricular programmes

5 improve teaching effectiveness

6 provide useful administrative data that will expedite decision making

7 to communicate with stakeholders.

A very good implementation of e-assessment was investigated by Byzzetto-More and Alade (2006). The implementation took place at a mid-sized institution of higher education located in the rural Eastern Shore of Maryland in the USA. The programme being profiled includes computerised longitudinal testing, online diagnostic testing, competitive networked simulations, rubrics, student discussion transcripts, taped presentations and electronic portfolios (Byzzetto-More and Alade, 2006).

Stevens and Jamieson (2002) combined three teaching tools (WebCT, Mindtrail and EVE), in order to examine the learning and the assessment procedures in a postgraduate course, via the academic staff and students perspectives. Both sides perceived that the implementation of these tools was useful. Furthermore, Georgouli (2004) introduces an intelligent self-assessment agent of WADIES called WASA. WASA offers alternative teaching strategies in order to sustain the student in understanding as deeply as possible the different concepts of the subject matter (Georgouli, 2004).

At the economic level, research followed the principals of the e-business models. E-business models that can be used in e-learning revenues are classified into three main categories (Mendling et al., 2005). Models in the first category are advertising revenue models which are also applicable for e-learning websites (Hoppe and Breitner, 2004). Models in the second category include a sponsorship revenue model which depends on donations and other goods from individuals or organisations. Finally, the third category models are indirect revenue stream because most of the e-learning objects are not for selling (Mendling et al., 2005). In addition, there are some papers that analysed cost efficiency using either a cost-benefit or a return of investment (ROI) analysis for e-learning and e-certification (Phillips, 1996) and breakeven point analysis (Whalen and Wright, 1999). For example, the effectiveness of an e-teaching project at the University of Illinois was measured using such methods (Wentling and Park, 2002). Also a cost analysis model was used for the establishment of an e-learning organisation (Mantzari and Economides, 2004). However, the result through the financial analysis might be acceptable at the economical level but unacceptable at the educational level. Activity theory was used by another study to specify how networked computers are embedded in universities and to interpret their use by staff and students in a particular context of financial restraint (Vandenberg, 2005).

For example, a project might be feasible in a specific number of students but learning can not be effective in this number of students. We cannot forget that our priority is education and learning. So we cannot measure only the economic feasibility of the project. Several studies (Capper and Fletcher, 1996; Carter, 1996; Trevor-Deutsch and Baker, 1997) led to the conclusion that in many instances, the distance training mode was as effective as conventional classroom training and showed no difference in learning outcomes. Even though its fixed costs were higher than other classroom-based programmes, distance training courses were found to be cost-effective due to increased enrolments, increased student access to quality programmes and resources and other benefits (Ludlow, 1994).

In the third category there is a shortage of papers that analyse the marketplace of e-learning and e-certification. The main reason for this shortage is that enterprises do not provide information easily. Clarke et al. (2001) suggested performing an economic analysis of the computer based tests (CBT) industry in the USA based on five indirect indicators:

1 number of state-mandated testing programmes

2 aggregate sales of tests

3 revenues of four testing companies

4 prices of test booklets, answer sheets and scoring services

5 references to testing in the education literature.

In this paper, we develop a valuation framework to analyse the PTC market in Greece. Using financial analysis, we examine the status of the PTC market and the critical factors for a successful investment. In the next section, we present the framework. In the sequence, we analyse a case study. Then, we discuss the results. Finally, we conclude and suggest directions for future research.

2 Valuation framework

In order to develop an integrated framework regarding the PTC marketplace, we consider two issues:

1 a financial analysis of the PTC market

2 a feasibility analysis for a new entrant in the PTC market.

2.1 Financial analysis of the PTC market

The financial analysis of the PTC market is a very difficult project. The following problems come out:

1 First of all, there is no specific branch. The PTCs are part of the private education branch.

2 Some PTCs do not only offer computer lessons and exams but they also offer lessons for foreign languages and preparation for the entry exams into the universities.

3 Most PTCs are not very big firms, so they do not have to create a balance sheet. This is a major problem because we can hardly find financial information about these companies.

In order to solve these problems in the case study, we used relevant financial information regarding the private education branch that we can find by ICAP's index which provides commercial and financial data about companies.

We made a research in person with the owners of the PTCs in order to collect information about the branch. We develop our research in the trade centre of Thessaloniki, which has a population of more than one million citizens. In the trade centre, there are almost 20 PTCs. We used this sample as the tested branch and we made a cost-benefit analysis for the past three years. This means that we did not use the cost for the establishment but only for the operational expenses during these three years. Through this cost benefit analysis (CBA), we can estimate the situation of the PTC market in the centre of Thessaloniki. This was not a random decision; the purpose was to facilitate the comparison with the new entrant in this branch that follows in the next section. Table 1 shows the estimated costs and benefits.

Table 1 CBA for a PTC

Costs	*Revenues*
Rent	Students' registration fees
Operational costs	1 For lessons
1 Water	2 For Exams
2 Telephone	
3 Electricity	
4 Internet connection	
5 Heating	
6 Equipment depreciation	
7 Wages	
Marketing costs	
CBT payment	
1 CBT's annual fees	
2 CBT's exam fees	
Other costs	

Firstly, we take into account the rent because the majority of the PTCs rent a place. Operational costs are the payments that a PTC must pay in order to operate properly. CBT payment is a specific charge for this market. Every PTC has to pay 1,000 € to ECDL every year to have the right to organise exams and to use the name of ECDL in his marketing. At this point, we must explain that there are six CBT enterprises. ECDL is the leader firm of the CBT branch with more than 70% of the market. As a consequence, we consider that a PTC cooperates with ECDL. The second charge is related to the duration of the exams. ECDL has to sent a supervisor for the exams and the PTC has to pay him 16 € per hour. In the valuation, we also show the results if a PTC decides to corporate

with another CBT firm and we make a comparison. Regarding the other expenses, we include all the costs that may not be considered elsewhere.

The revenues of the PTC are coming from the registration of new students. We separate students in two large categories. The first category includes the students that pay to attend lessons for the IT skills. The second category includes the students that pay to take the exams. There is a big possibility that a person belongs in both categories but this is not a problem in our study because we measure the money that a PTC earns from both activities.

2.2 Feasibility analysis for a new entrant in the PTC market

First of all we have to demonstrate some characteristics of the new PTC:

1 *Target group*: The majority of the customers are adults from 18 to 40 years old. This happens because ECDL certification is needed by individuals who search for a job primarily in the public sector and secondly in the private sector.

2 *Region*: Based on the target group we must decide where we will establish the new PTC. We need a place that is close to activities which attract many people and mainly young. A very good region is the centre of Thessaloniki because it is close to the universities and accessible by all the citizens using the public transportation. This is the reason why we decided to make a financial analysis of the PTC market in the centre of Thessaloniki.

Various financial tools would be used to investigate if an investment is profitable. Here, we use four methods.

1 *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 *benefit-cost ratio*.

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.

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

where

t: the time of the cash flow

N: the duration of the project

r: the discount rate

C_t: the cash flow (the amount of cash) at that point of time.

3 *Internal rate of return (IRR)*: IRR is the discount rate that makes the project to achieve a zero NPV. A project is a good investment proposition, if its IRR is greater than the rate of return that could be earned by alternative investments (e.g., investing

in other projects, buying bonds, even putting the money in a bank account). Thus, the IRR should be compared to an alternative cost of capital including an appropriate risk premium.

When NPV = 0

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

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 expanses and taxes

N: the duration of the project

t: the time of the cash flow

IRR: internal rate of return

4 *Break-even analysis (BEA)*: BEA finds the point where the total revenue equals the total costs associated with the sale of the product (TR = TC). If the product of a 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 CBT and prospective students for a specific price.

3 Case study

In this section we demonstrate the results of our case study by using the valuation framework above.

3.1 Financial analysis of the PTC market

In the previous section, we presented Table 1 to be used for the financial analysis of the PTC market. Based on Table 1 and our investigation of the PTCs at the centre of Thessaloniki we create Table 2. It contains the average costs and revenues of the 20 PTCs during 2006–2008. Using Table 2 we can analyse the PTC branch.

Table 2 shows that there were some problems at the PTC branch. In 2006, the profit was 55,932 €. If we compare the profits and the costs, we can see that the branch offered great opportunities. ROI has a great value (67%) which means a very big profitability for the branch. In 2007, the branch had a big decrease in profits but PTCs were still at a good financial status. ROI was 20%, a very high percentage if we take into consideration the small profitability in Thessaloniki. Finally in 2008, the branch seems to have many problems. First of all, the profit decrease was almost 100% and as a result the ROI is only 1%. In the next section, we will discuss the reasons for this situation and the evolution of the PTC branch.

Table 2 CBA PTC branch in the centre of Thessaloniki

Year	*2006*	*2007*	*2008*
Costs			
Rent	24,000	25,200	26,400
Operational costs	50,900	52,340	53,770
Water	600	620	640
Telephone	3,500	3,600	3,400
Current	3,000	3,100	3,230
Internet connection	250	250	260
Heating	550	570	540
Equipment depreciation	3,000	3,000	3,000
Wages	40,000	41,200	42,700
Marketing costs	5,000	5,000	5,000
CBT payment	2,728	2,920	2,792
Annual payment	1,000	1,000	1,000
Exam payment	1,728	1,920	2,176
Other costs	1,000	1,070	1,100
Total costs	83,628	86,530	89,062
Revenues			
From lessons	125,000	90,000	72,000
From exams	14,560	14,040	17,680
Total revenues	139,560	104,040	89,680
TB–TC	55,932	17,510	618
Profit 06–07% change	–69%		
Profit 07–08% change	–96%		
ROI	67%	20%	1%

3.2 Feasibility analysis for a new entrant in the PTC market

In the previous section, we explained some characteristics of the new entrant in this branch. Based on these characteristics in this section, we proceed to a financial analysis. As for the new entrant in PTC market, we present the cost – benefit analysis and then we demonstrate the results using the other financial tools. Before presenting the results, we explain some extra characteristics of the new PTC. Firstly, we decided that the new PTC will have 13 personal computers for lessons and for the exams. The number 13 is not a random number. We found out that usually, the PTCs own ten to 15 PCs. So, 13 is the average number of PCs in these PTCs. Secondly, every examination will last four hours. It is the most appropriate period of time as sometimes the exams last two hours and some other times six hours. Moreover, there is a supervisor in the exams from CBT which costs 16 € per hour for the PTC. Based on these elements and our research for the costs, we create Table 3, which shows the cost – benefit analysis for a new entrant in the PTC market.

Table 3 CBA PTC branch in the centre of Thessaloniki

Fiscal year	*Benefits from lessons*	*Benefits from exam*	*Total benefits*	*Cost of pre-production*	*Fixed costs*	*Operational costs*	*Funding costs*	*Marketing costs*	*CBT payment*	*Other costs*	*Total costs*	*Discount factor*	*Discount total costs*	*Discount total benefits*
0	40,000	7,800	47,800	15,000	17,000	40,000	1,000	6,000	1,960	1,000	81,960	1	81,960	47,800
1	60,000	10,400	70,400	1,000	17,600	43,000	1,000	4,000	2,280	1,000	69,880	0.77	53,753.85	54,153.85
2	80,000	15,600	95,600	800	17,900	45,500	1,000	5,000	2,920	1,000	74,120	0.59	43,857.99	56,568.05
3	80,000	18,200	98,200	1,200	18,100	47,000	1,000	5,500	3,240	1,000	77,040	0.46	35,066.00	44,697.31
4	80,000	20,800	100,800	1,100	18,500	48,000	1,000	6,000	3,560	1,000	79,160	0.35	27,716.12	35,292.88
Totals	340,000	72,800	412,800	19,100	89,100	223,500	5,000	26,500	13,960	5,000	382,160		242,353.9	238,512.1

3.3 Cost-benefit analysis

We decided for the discount rate to be 30% because the amount of the investment is not big, thus the risk is smaller. We have two revenues; one from the lessons and one from the exams. For the first one we considered 400 € as fees and for the second one 10 € per test. These amounts of fees are the averages that the PTCs at Thessaloniki centre charge. We can find lessons from 350 € to 450 €. The price depends on the PTC owner, the number of the students in the class and the hours of the courses.

3.4 Benefit/cost ratio (BCR)

Through Table 3 we can measure that *BCR = 0.98*. This value means that the total outflows are bigger than the total inflows. Of course, the value is very close to one. This means that if the estimation was very pessimistic, there would be a small possibility for the BCR to be bigger than one.

3.5 Payback period

For the five-year cost-benefit analysis, the result was very disappointing. The investor cannot recover his investment. An analysis that considers more years could have given different final results but the unexpected factor would be bigger so the results would not be very accurate.

3.6.1 NPV

Table 3 has the necessary values to measure the NPV (*NPV* = 3,841.86). As we can see, NPV is a negative number. This negative number means that the investment is not acceptable and probably the investors will lose money.

3.6.2 IRR

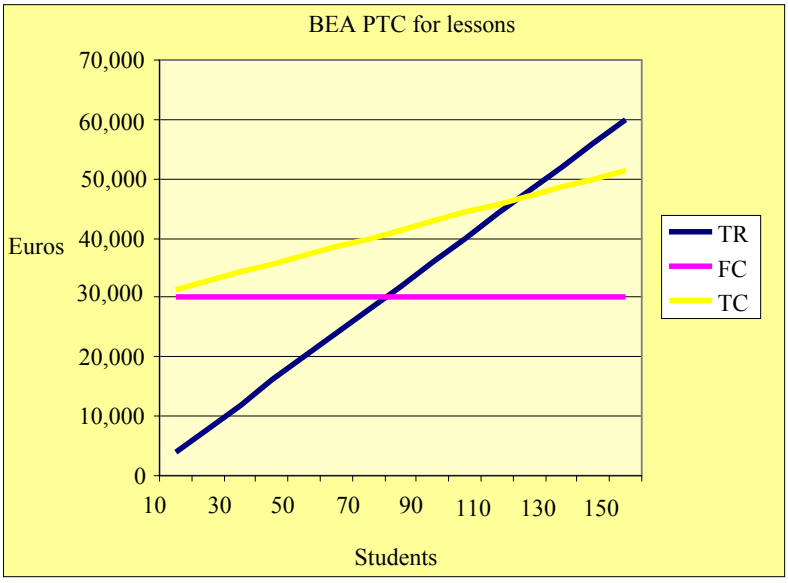
NPV becomes zero when the discount rate is *IRR = 24.6%*. IRR is smaller than the discount rate of 30%. As a result, this project offers fewer profits than the acceptable. Of course, there is a possibility that an investor will be satisfied with this percentage and realise the investment.

3.6.3 BEA

It has been explained that the PTC has two major inflows. The first one is from the lessons and the second one from the exams. We believe that it is wiser to do break even analysis for both separately.

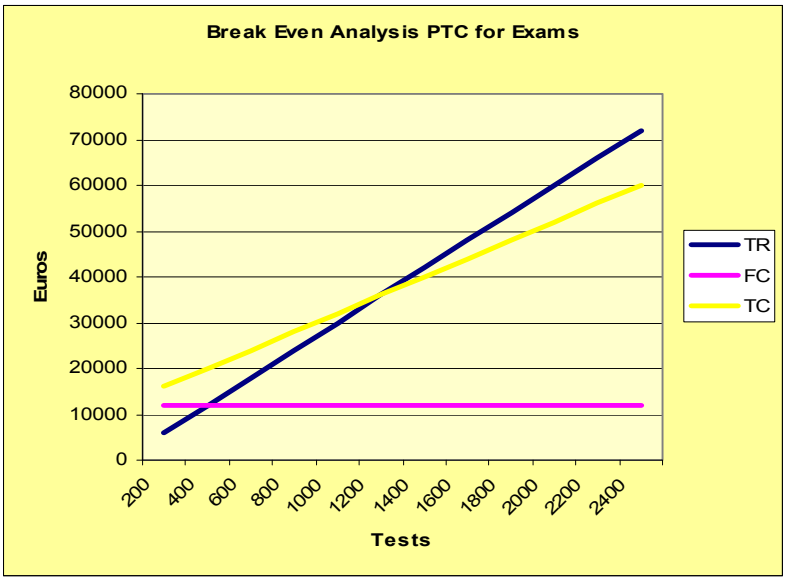
- BEA for lessons gives the following equation: *400x = 1,000*x/7 + 30,000*. When, the fees are 400 € for every student to participate in a classroom, the total costs are 1,000 € for the teaching in a classroom until the end of the lessons. We divide it with seven because there are approximately seven students in every classroom. Finally, we add 30,000 € because these are the fixed costs for a fiscal year without the exams. If we solve the equation, we find that $x \approx 117$ *students*. If the PTC has less than 117 students in a year it will make a loss. We can see better the results in Figure 1.

Figure 1 BEA of PTC regarding lessons (see online version for colours)



- BEA for exams gives us the number of tests that a PTC must organise in order not to have a loss. The equation is: *30x = 20x + 12,000*. Where the fees for every student are 30 € to give a test and the fees that a PTC has to pay to ECDL for each test are 20 €. Finally, the fixed costs per year for the cooperation with ECDL are 12,000 €. After solving the equation we find that the PTC has to organise *1,200 tests* per year in order to equalise the benefits with the costs. Figure 2 presents the result from the equation.

Figure 2 Break even analysis PTC for exams (see online version for colours)



If we suppose that every student takes seven exams (seven units) then the ideal number from the first BEA will give us 819 exams. Consequently, a PTC needs 381 more tests to avoid the loss from the exams. This is not impossible, because as we said before, there are many test takers that sit the exams without attending lessons. According to our field research, test takers constitute only the 40–50% of the students who participate in the lessons. Thus the numbers are very close to reality. To conclude, a new PTC needs 117 students for the lessons and 55 more students for the exams only, in order to balance the benefits with the costs.

4 Discussion

The valuation enables us to reach some useful conclusions. The case study was a financial analysis of the PTC market in the centre of Thessaloniki. We concentrated on this specific PTC sample because it is homogeneous. It is clear that the costs, the pricing and the number of customers depend on the district. Recently, this PTC market exhibits a continuous decrease in profits. The reason is that, many students decide to study alone at home and go to a PTC only to take the exams. As a consequence, a PTC looses a lot of money due to the decrease of lessons' revenues. Moreover, many investors saw the great profitability of the branch and decided to invest in it. As a result, there are many PTCs currently not only in the centre of Thessaloniki but in other districts too. This means that there is a high competition and the fees decreased. It is estimated that many PTCs will close down and only the strongest ones will survive. These economic results have also educational consequences. The competition drives PTCs to reduce the costs. They offer courses with fewer hours for the same amount of knowledge. They offer fewer or none educational material such as books and CDs. They try to find teachers with lower skills because they are inexpensive. Furthermore, many PTCs use only demo tests and poor e-learning material without teaching assistance in order to minimise the costs. Moreover, most students are interested in passing the exams and not attending a full educational programme. So, the PTCs change the way that they offer the lessons. The PTCs offer few preparatory lessons and plenty of previous test questions and tips for success. This means that students do not really learn the basic ICT-skills, rather they only memorised some questions-answers for the exams. Of course this situation from the educational point of view is disappointing.

Finally, the previous analysis shows that a new PTC during this time period is not a very good investment. The branch has many problems. It is possible that in two or three years the investment will be a good idea due to the following reasons:

1 Many PTCs will close, thus the competition will decreased. In addition, it is expected that both the prices and the number of students will increase.

2 The new investment must be oriented towards exams and not towards lessons. This means that the PTC must possess a big classroom with more than 15 PCs, in order to maximise the profits from the exams. The PTC could also have another smaller classroom up to eight PCs for lessons and practice.

3 We did a feasibility analysis for a PTC that organises exams only for ECDL. Perhaps in the future, other CBTs will change the actual situation of the branch. As a result, cooperating with another CBT may provide lower costs due to smaller annual

charge. Table 4 presents the CBT companies and the profits that a PTC has from each one of them.

Table 4 PTC's profits per student when cooperating with specific CBT

	ECDL	*KEYCERT*	*Cambridge*	*INFOTEST*	*ACTA*	*ICT*
Student registration	20	60	0	0	25	15
Test unit	12.5	16.25	20	20	13	15
Certification	5	10	20	10	0	10
Profits by student	112.5	167.5	140	130	103	115

Table 4 shows that ECDL offers much less profits per student than other certification companies. Based on the results of the previous section, we can see that a PTC loses a lot of money. For example, we measured that a PTC needs 170 students in break even point. If this number of students takes the exams for ECDL certification, the PTC will gain: *170 * 112.5 = 19,125 €*. But if the PTC preferred the most profitable KEYCERT certification, then it would have benefits for the same amount of students: *170 * 167.5 = 28,475 €*. The difference is 9,350 € and if we add the 1,000 € that a PTC has to pay to ECDL (this charge does not exist for other certificates), then the loss would be 10,350 € every year. It is obvious that the cooperation with the right CBT is very crucial. We believe that in the future this great loss will drive some PTCs to cooperate with other certifications organisations too. For the moment, most PTC's afraid to cooperate with other CBTs since ECDL is the most popular. ECDL tries to take advantage of this situation and requires exclusive agreements from the PTCs. This means that a PTC could cooperate only with ECDL. The other firms did not accept this situation so they accused ECDL at the competition commission.

5 Conclusions and future research

E-learning and e-certification are two methods that drive education at another level. More and more knowledge will be learned and certified through ICT. The estimation of the benefits and the costs from these procedures is a very demanding work. In this paper, we have presented a comprehensive framework for financial analysis and applied it to a case study. First, we performed a financial analysis of the PTC branch in the centre of Thessaloniki. Moreover, we presented a feasibility analysis for a new entrant in this specific PTC branch. This study is the first work that tries to estimate the situation in this market. Our framework could be used in other countries or other examples of e-learning. The certification of ICT skills using computers and internet is imperative. Furthermore, the use of ICT for certification is developing in other areas too (e.g., foreign languages). It is obvious that in e-certification, PTCs play a major role so their financial analysis is very crucial. This research would help to understand a part of the e-certification situation. The cost effectiveness of PTCs affects the learning approach. An assessment centre is not a physical place like the name implies, but rather is a suite of exercises that are designed to replicate real life and require participants to engage in a simulation. Participants are assessed based on their real time reactions and performance (Liam et. al., 2003). This definition is realised only if the assessment centre is a successful investment. A successful investment is a guaranty for an effective and useful implementation of

e-certification and e-learning. Moreover, it reflects to economy. Firstly, it affects the financial condition of existing enterprises in the field. Secondly, it gives the opportunity for new investments by the establishment of new enterprises as a test centre or as a new certification organisation. The impact of cost effectiveness in e-certification is important but other issues of e-assessment like security, fairness and reliability have to be studied. In conclusion, we discussed these results, presented the consequences at the educational and economical level and gave some ideas for future potential research.

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