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## THEORETICAL ISSUES ON ENVIRONMENTAL ACCOUNTING INFORMATION SYSTEMS IN HOSPITALITY EDUCATION

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**Abstract:** In a competitive environment the application of Information Technology Systems by tourism companies can increase future prosperity and financial growth. The purpose of this paper is to measure the natural assets and to calculate the environmental benefits, as well as, the associated costs, so as to include all the above in the financial statements (balance sheet and profit & loss account). It is crucial to point out that the installation of a Green Accounting Information System requires evaluation of human assets (students and professors), availability of space, value the benefits, as well as, estimate the necessary installation costs. Literature suggests that although many information systems of environmental management have been developed, no significant progress was made on the growth of green accounting information systems due to the inherent difficulty for the monetary expression of environmental accumulated costs and related natural resources.

*Key words:* Accounting Information Systems, Environmental Information Systems, Hospitality, Tourism Education.

**Sažetak:** TEORIJSKA PITANJA O INFORMACIJSKIM SUSTAVIMA RAČUNOVODSTVA OKOLIŠA U OBRAZOVNIM PROGRAMIMA ZA HOTELIJERSTVO. U konkurentskom okruženju primjenom sustava informacijske tehnologije turistička poduzeća mogu jačati svoj budući prosperitet i financijski rast. Svrha je rada izmjeriti prirodne vrijednosti, te izračunati ekološke koristi kao i pripadajuće troškove, a radi uključivanja istih u financijska izvješća (bilanca i račun dobiti i gubitka). Ključno je istaknuti da prilikom uvođenja informacijskih sustava računovodstva okoliša treba procijeniti ljudske potencijale (studenti i profesori) i raspoloživi prostor, te utvrditi koristi sustava i odrediti troškove njegovog uvođenja. Iz literature se može zaključiti da, iako su izrađeni brojni informacijski sustavi za menadžment okoliša, nema značajnijeg napretka na širenju informacijskih sustava "zelenog" računovodstva zbog inherentne teškoće monetarnog izražavanja akumuliranih ekoloških troškova i s njima povezanih prirodnih resursa.

*Ključne riječi:* računovodstveni informacijski sustavi, ekološki informacijski sustavi, ugostiteljstvo, obrazovanje iz turizma.

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## 1. INTRODUCTION

In view of the fact that tourists have to visit the place of production of services in order to consume the output, it is inevitable that tourism activity will be associated with environmental impacts. For a more comprehensive evaluation of sustainability and growth, the field of financial accounting needs extension, in order to include the use of natural assets and calculate potential losses of the income process in the Greek tourism sector.

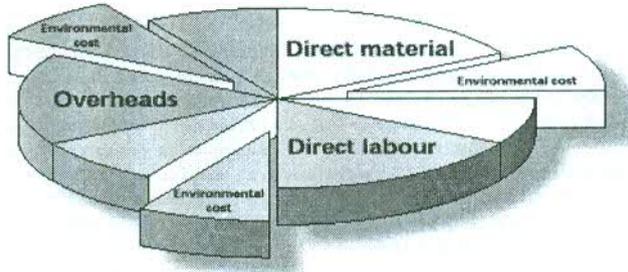
The environment is the fundamental ingredient of tourism environmental preservation and improvement programs are an integral part of many development strategies: The environmental impacts associated with tourism development can, also, be considered in terms of their direct, indirect and included effects. These impacts can be positive or negative. It is not possible to develop tourism without incurring environmental impacts, but it is possible by correct planning to manage tourism development, in order to minimize the negative impacts while encouraging the positive ones.

## 2. DEFINING ENVIRONMENTAL EXPENDITURES AND REVENUES

The financial accounting theory identifies and records tangible and intangible assets at the lowest price between historical and present value. However, the above theory does not evaluate the use of natural and environmental resources, as well as, the losses in the income which are caused by the reduction of natural capital. Moreover, until today a lot of environmental resources like, water and air continue to be considered as 'free goods' without appearing in the financial statements.

In the financial accounting operation<sup>2</sup>, the production and distribution of products or the offering of service requires, among other things, the utilisation of direct materials, direct labour, Manufacturing Overheads Costs (M.O.C.), administrative and sales expenses, as well as, Research and Development costs. On the other hand, the environmental expenses<sup>3</sup> while constituting part of the production and administrative expenses are not recorded in specific accounts but are debited as general expenses (Exhibit 1).

Exhibit 1: Environmental Expenditures



<sup>2</sup> Garrison, R. and Noreen, E. (2003), *Managerial Accounting*, 9<sup>th</sup> ed., Irwin McGraw-Hill, NY, U.S.A., pp.45-65.

<sup>3</sup> Gray, R. Bebbington, J. and Walters, D. (1995), *Accounting to the Environment - The Greening of Accountancy, Part II*, Paul Chapman Publishing, London, U.K.

The environmental accounting theory<sup>4</sup> tries to restore the above picture in 'T' accounts by including the Profit and Loss statement environmental revenues, as well as, expenses. The former is the income from the disposal of waste, as well as, income from the recycling of produced goods. The later refers to expenses for the redress of environmental damage from contagious emissions or oil slicks.

The connection between natural-green and financial accounting can be achieved by adoption of environmental management and information systems which more and more are essential in order to link the environment and the economic performance of an enterprise.

The green-environmental accounting can be useful in deciding about issues like, distribution of environmental cost and green taxes. Generally, the recipients of prepared green accounting information are the people inside the company who practice the administration and manage the corporate funds (managers, owners of firms). Also, recipients can be people outside of the company (investor, creditors, tax authorities, local residents) who have direct or indirect interest in the company. All of the recipients need reliable information in order to:<sup>5</sup>

- determine the environmental opportunities and limit the additional expenses that do not provide added value,
- estimate the environmental expenses that are found in M.O.C.,
- identify environmental opportunities to produce net income,
- execute and maintain a environmental system of administrative information (Environmental Monitoring and Information System-E.M.I.S.) with the incorporation of environment in other aspects of operations management,
- determine the expenses and the future yield of application of E.M.I.S.,
- formulate the methods of cost accounting and pricing of environmental products, and to
- design an environmental production process for goods and services.

Most environmental costs discussed<sup>6</sup> in the paper are characterized as 'internal'. However, there are certain types of costs that are considered as 'external' or 'social'. The former, can be described as conventional, incompatible (potential hidden) and tangible, causing an economic impact in the company. The later, are environmental expenses for which the enterprises are not responsible for and these expenses do not have any direct economic consequence<sup>7</sup> for their financial progress (Exhibit 2).

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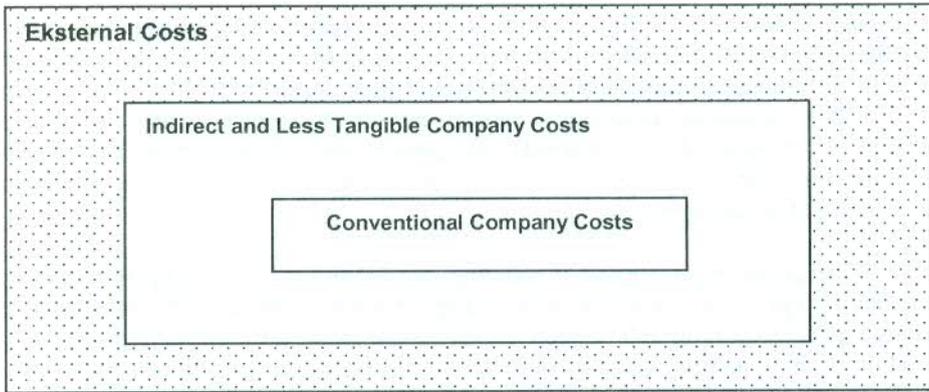
<sup>4</sup> Hill, S. (1999), *Environmental Accounting*, Working Paper for Chapter XX in Dixon Thompson et al., *Environmental Management*, pp.159-210.

<sup>5</sup> Ginoglou, D., Tahinakis, P. and Thriskou, C. (2003), *Green Accounting as an Information System*, p.22.

<sup>6</sup> Welford, R., & Gouldson, A. (1993) '*Environmental Management and Business Strategy*', London: Pitman, UK.

<sup>7</sup> *Ibid.*, note 5.

**Exhibit 2: Types of Costs**



The environmental cost is often included in different parts of the accounting system and it is difficult to collect the necessary green information that is required for the decision-making. The enterprise seeks to achieve the environmental objectives, such as the reduction of green expenses, the increase of income and the improvement of environmental output. Then, the enterprise needs to predetermine, measure and present the environmental costs created by environmental activities.

The line between the external and internal expenses is often subtle, particularly with the fast altered regulations and the increasing requirements of market aiming at the protection of environment.<sup>8</sup> Consequently, it is important for the companies to recognise and comprehend the factors that create the external environmental costs.

The environmental costs, traditionally, are accumulated as general administrative expenses and are considered as extraordinary and unexpected creating difficulties in their identification and measurement. Thus, there is the tendency to separate them from the corresponding products, processes or activities that cause them.

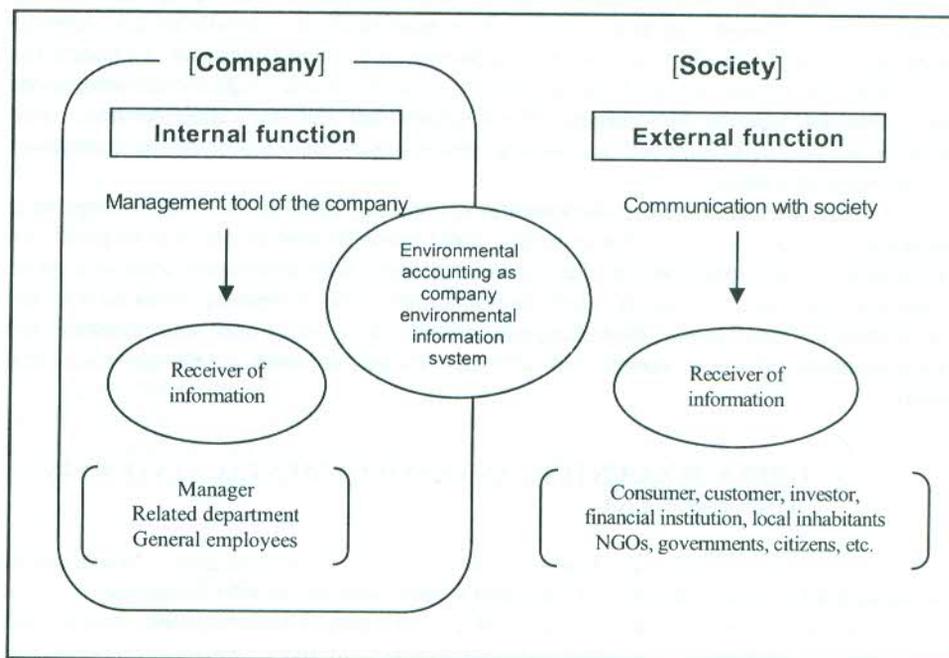
The operations that are expected to be influenced by the environmental accounting are categorized as 'internal', as well as, 'external'. In the former, the environmental-green accounting helps the management of environmental expenses and the analysis of effects related with the cost of environmental measures. Also, it promotes efficient and effective investments in the environment.

In the later, the system influences<sup>9</sup> the reception of decisions of interested contracting parts. Since the information can be used as an element for environmental classification of enterprises, as well as, an element of income, the values applied by environmental accounting reflects the stabilization of stocks and the smooth supply of capital (Exhibit 3).

<sup>8</sup> Darnall, N., Rigling, D., Gallagher, R. and Amaral, A.D. (2000), *Environmental Management Systems: Opportunities for Improved Environmental and Business Strategy*, Environmental Quality Management, Wiley Publishers, London, UK, p.153.

<sup>9</sup> Ginoglou, D., Tahinakis, P. and Thriskou, C. (2003), *Green Accounting as an Information System*, *Proceedings of Academy of Business and Administrative Sciences International Conference*, Vancouver, BC, Canada.

**Exhibit 3:** Function of Environmental Accounting System



Upon announcing environmental accounting information to the external users, such as consumers, investors and local residents, the two types of operations should be shown in a balanced way. The data base of environmental accounting that is developed by an enterprise is supposed to be common, either used internally or externally. For the internal use, the objects that are important for the enterprise are selected and are used as required. For the distribution of information externally, the cohesion and the resemblance are required for the information via the utilization of directive on the benefit of precise information for the users.

The healthy operational administration requires<sup>10</sup> the measurement of environmental expenses, as well as, the results of environmental measures. The enterprise should measure and analyse the amount of money invested and the environmental cost with regard to the environmental conservation and the knowledge of effects of investments. These factors are exceptionally important for the enterprises, in order to improve the efficiency of application and the reception of reasonable environmental decisions. The measurement of environmental cost and the consequent results of environmental measure are useful for the growth and the operation of a precise environmental administrative system. In other words, the environmental accounting can be used as an indicator for the evaluation of results of environmental measures and the management of their environmental performance.

The analysis of environmental expenses and the results of environmental measures can be used as an internal administrative tool to an environmental

<sup>10</sup> Hamilton, C. and Lutz, E. (1996), *Green National Accounts: Policy uses and Empirical Experience*, Environmental Economic Series Paper No.39, pp. 145-156.

administrative system. The announcement of environmental cost becomes a measure for the evaluation of environmental behavior of the enterprise. Through the announcing of the content of environmental cost and its proportion in the operational activities the receivers of financial information can be informed of how an enterprise can handle the environmental conservation. A lot of enterprises have already prepared and announced environmental reports. The number of enterprises that announce their environmental cost using the environmental accounting process increases and a lot of enterprises recognize it as a need.

The application of environmental accounting suitable for each enterprise is developed, basically, via a lot of trials and improvements by each enterprise. An application of environmental accounting system is not fully developed. Each enterprise conducts experiments which need improvement. The proposed process for the installation of the above environmental system is to recognize and measure the environmental effects of operational activities, as well as, evaluate the environmental results.

### 3. GREEN ACCOUNTING AND ENVIRONMENTAL SYSTEMS OF MANAGEMENT

The Environmental Management System (Environmental Management Systems-E.M.S.) is ensemble of processes and policies which determine how an enterprise will manage the possible effects in natural environment, health and prosperity of citizens.<sup>11</sup> The program creates a system that evaluates, registers and expresses in quantitative terms the environmental impacts on all aspects of an enterprise.

The adoption of environmental administrative systems by enterprises can generally change the relationship between the economic performance and environmental yield. The enterprise that applies E.M.S. has the ability to redesign its organization, in order to reduce its unfavorable impacts on the environment. Moreover, with the adoption of high quality E.M.S., it is likely that the enterprise discovers cases of reduction of the use of natural and monetary resources.

The Total Environmental Accounting and Management System (T.E.A.M.S.) is an application of database on recording, handling and confirming quality and reporting environmental elements. The significance of this program is to establish the balance of each individual chemical substance. The elements are registered in a database, for further environmental submission of reporting and handling. Thus, the environmental reports can be presented at any moment. These used sums portray the quantity of waste emitted. From the entry of consumed sums of chemical substance the program calculates the sums that are removed.

The T.E.A.M.S. program has been developed in accordance with the international models for the environmental management (US, ISO 14001). By this program, the manager of an enterprise has the complete control of the collection, recording and the use of environmental elements, qualitative assurance and access to all the levels of production and distribution of environmental reports.

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<sup>11</sup> Freimann, J. (2009), *Environmental Management and Information Systems*, Principles of Environment and Resource Economics, 2<sup>nd</sup> ed., Logman, London, UK.

The program facilitates the complete documentation of environmental effects from the operations of an enterprise. Also, it helps in documenting results of corrective measures. Furthermore, it contributes to the complete awareness of environmental location of enterprise and constitutes an administrative tool that shows desirable environmental objectives are achieved.

In the same direction, the Geographic Informative System (G.I.S.) constitutes a fundamental component of environmental management because it is capable of recording, registering and treating geographic data.<sup>12</sup> The effective environmental management involves the collection and analysis of elements from dissimilar sources. The G.I.S. allows the precise, efficient and repeated trial of administrative strategies, in order to evaluate their appropriateness before its application. Also, the G.I.S. can be linked with an environmental program, as T.E.A.M.S, providing an efficient source of flows for the model and effective means for the observation and analysis of results.

The problem with the environmental information systems is the unavailability of proportional entries (information). For example, if we want to define materials of productive process, including work in process as well as raw materials, the components should be known. All the programs presented above show that even the suppliers cannot or are not always willing to provide environmental information because of competition.

#### **4. ACCOUNTING INFORMATION SYSTEMS IN HOSPITALITY EDUCATION**

All forms of development will bring with it impacts upon the physical environment in which it takes place. Environmental preservation and improvement programmes are now an integral part of many development strategies in hospitality education and such considerations are treated with much greater respect than in the past. In order to study the physical impact of tourism it is necessary to establish:

- a. the physical impacts created by tourism activity as opposed to other activities,
- b. what conditions were like before any activity took place, in order to derive a line of comparisons, and
- c. what indirect and induced of environmental impact are associated with tourism activity.

The environmental impacts associated with tourism development can, also, be considered in terms of their direct, indirect and induced effects. It is not possible to develop tourism education without environmental impacts. However, it is possible with correct planning to manage tourism development in order to minimise the negative impacts while encouraging the positive ones.

Once the environmental consequences of our actions are recognised, this information can be incorporated at all levels of decision/making, in order to ensure the effective use of the planet's finite resources. Environmental awareness during the production and consumption processes may, also, bring long-term economic and social benefits. For example, the effective use of scarce resources, particularly energy-related

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<sup>12</sup> Jasch, C. (2001), *Environmental Management Accounting: Procedures and Principles*, Institute for Environmental Management and Economics, U.K.

resources, can result in lower marginal costs of production. On the other hand, the careless use of resources during either the production or consumption processes can add to social resentment of tourism development.

In some cases attempts have been made to construct tourism/environmental balance sheets, in order to assess the net effect of tourism development in respect to the environment. The report found that the specific beneficial effects of tourism activity on the physical environment include:<sup>13</sup>

- (a) Environmental improvement schemes to create more attractive areas for visitors, including urban regeneration, reclamation projects and conservation schemes.
- (b) The adaptation and restoration of redundant buildings for tourism and visitors use.
- (c) Increased provision of recreation and sporting facilities for use by both locals and visitors.
- (d) The restoration of historic buildings and ancient sites.
- (e) Improved infrastructure, including roads, footpaths and transport services.
- (f) The generation and encouragement of sympathetic design and an appreciation of environmental quality in the development process.

The environmental costs associated with tourism development were perceived to be:<sup>14</sup>

- (a) Volume pressure (deterioration of footpaths, disturbance to wildlife, damage to vegetation damage to areas of wilderness and the loss of peace and quiet),
- (b) Traffic pressure (generally incurred at specific locations, includes traffic bottlenecks, parking problems, slow-moving vehicles or caravans on main routes and the pollution caused by increased traffic),
- (c) Visual pressure (some tourism facilities detract from the aesthetic quality because of poor siting, design or inadequate screening),
- (d) Waste pressure (the increased number of visitors in some areas results in increasing untidiness and endangers wildlife through inadequate or thoughtless disposal of litter),
- (e) User conflict pressure (whenever there are scarce natural resources there will be user conflict).

The result was that, although there are widespread environmental impacts associated with tourism activity, they were only regarded as being serious in few specific locations and that careful management<sup>15</sup> could overcome these problems (Figure 1).

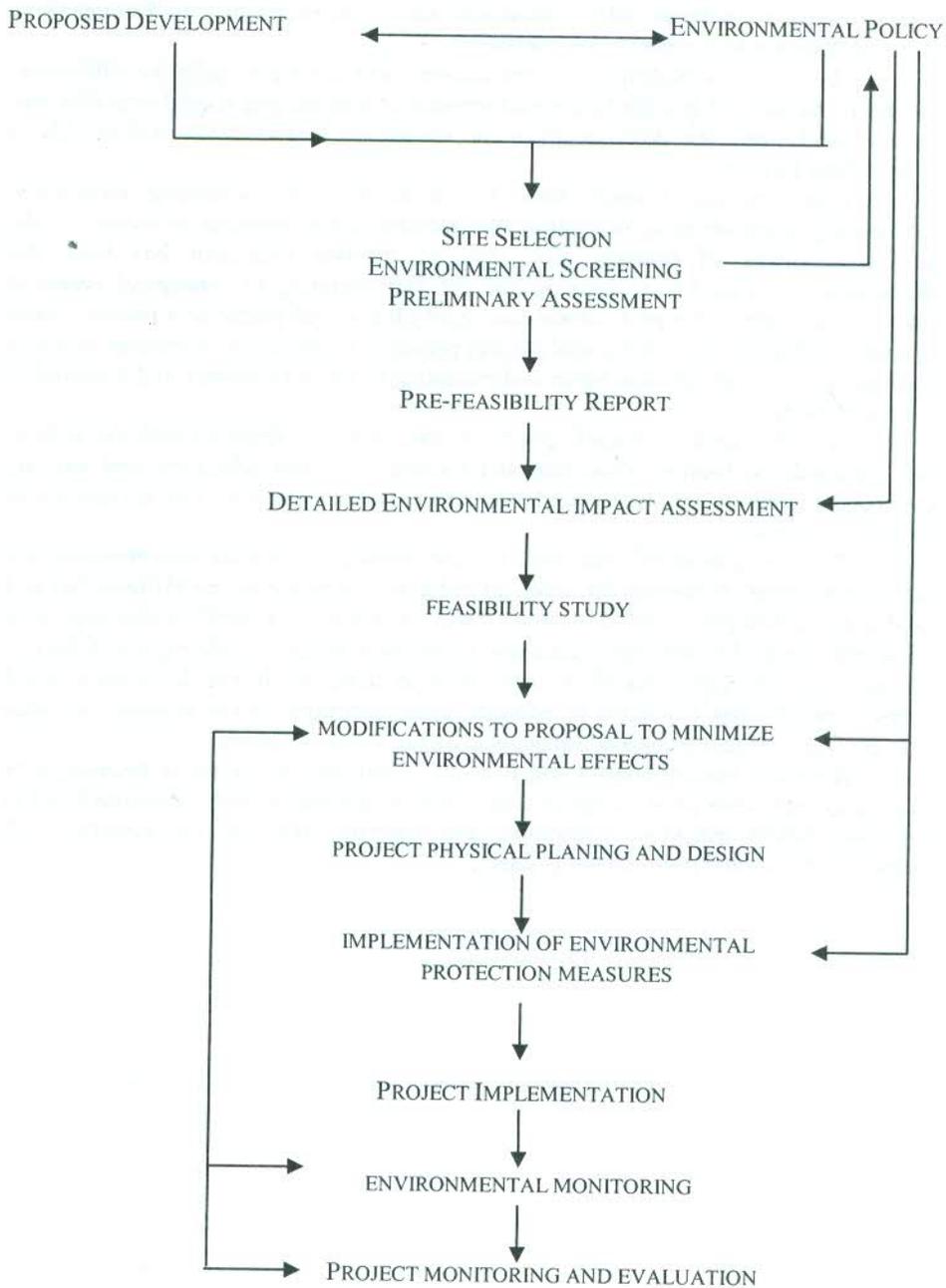
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<sup>13</sup> Cooper, C., Fletcher, J., Gilbert, D., Shepherd, R., and Wanhill, S. (2000), *Tourism: Principles and Practice*, p.452.

<sup>14</sup> Ibid, note 11 pp.462-5.

<sup>15</sup> Cooper, C., Fletcher, J., Gilbert, D., and Wanhill, S. (2000), *Tourism Principles and Practice*, 3<sup>rd</sup> ed., Longman, London, UK.

Figure 1: The Environmental Impact Assessment Process



The challenges facing the tourism industry will be met successfully, only, by a well-educated, well-trained, bright, energetic, multilingual workforce who understand the nature of tourism and have a professional training. A high quality of professional human resources (students and teachers) will allow enterprises to gain a competitive edge and deliver added value to their services.

Tourism is a high-involvement industry where people make the difference. The ability to succeed and the future performance of tourism and related activities will depend largely upon the skills, qualities and knowledge that managers will be able to bring to their business.

Educators and trainers have a role to play by facilitating innovation, encouraging empowerment, motivating the workforce and working to overcome the specific problems of tourism. The core of tourism education has been the encouragement of analytical thinking and the understanding of conceptual issues in order to contribute to the professional and intellectual development of a person. Using computer technology to collect, analyse and present a wider range of tourism statistics facilitates a clearer picture and better understanding of the performance and potential of tourism markets.

A high – quality tourism workforce can, only, be achieved with the help of high standards of tourism education and training. Tourism education and training involves the communication of knowledge, concepts and techniques that are specific to the field of tourism.

Tourism education<sup>16</sup> has been the encouragement of analytical thinking and the understanding of conceptual issues in order to contribute to the professional and intellectual development of a person. Tourism training is more concerned with delivering practical knowledge, skills and techniques. Initially, training was linked to the operations of intermediaries in areas, such as ticketing. In the developing world tourism, training has expanded to embrace many functions as the industry becomes more professional and demands higher standards of its practitioners.

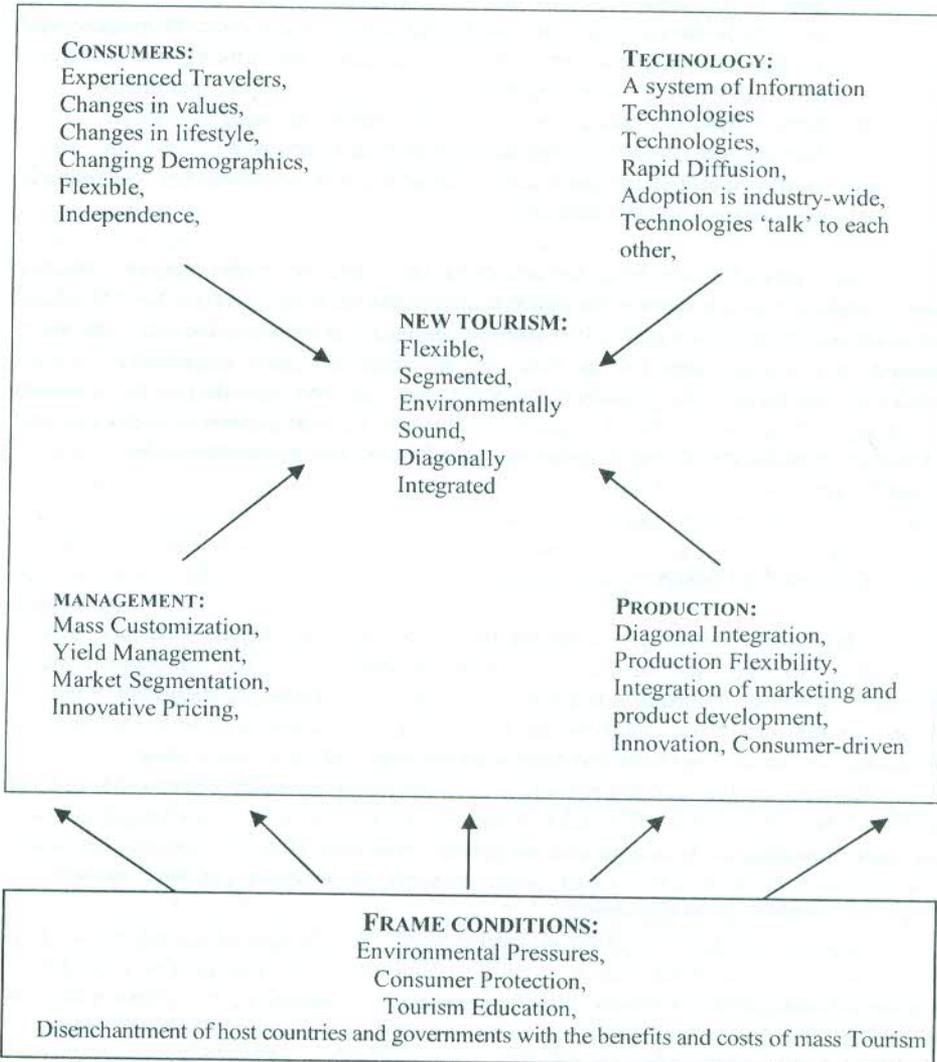
Tourism education is a much more recent activity. This is because only recently governments have recognized the value of tourism to their economies and in particular linked manpower planning and education/training for tourism with competitiveness<sup>17</sup> and productivity (Figure 2).

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<sup>16</sup> Holloway, C. (2002), *The Business of Tourism*, pp. 301-305.

<sup>17</sup> *Ibid.*, note 15, p. 212

**Figure 2: Future Trends in Tourism**



The benefits of both education and training for tourism should be clear to:<sup>18</sup>

- (a) Ensure a high quality of service provided to consumers.
- (b) Add value, raise the quality of personnel and infuse a sense of professionalism and ownership.
- (c) Define the industry and point out the underlying similarities of many different sectors,

<sup>18</sup> Tahinakis, P., Ginoglou, D. and Thriskou, C. (2003), Accounting Information System: A Cost Benefit Analysis for the evaluation of Environmental Activities in Greece, *Proceedings of International Conference on the Black Sea Economic Community and Guuam*, Svishtov, Bulgaria, p.32.

- (d) Understand the interrelationships of the sectors and begin to perceive business opportunities,
- (e) Deliver skills and practical knowledge which boost the performance and productivity of personnel across the industry and linking the education and training with manpower planning,
- (f) Retain staff, provide a career path for employees and, overall, achieve a better use of human resources in tourism industry, and
- (g) Ensure that a destination's tourism product is delivered by local people and not by imported labour.

The types of costs discussed are essential elements for the tourism industry sector, in order to have a sustainable growth. Including environmental costs in financial statements provides a motive for the tourism industry, as well as, for the consumers (tourists), in order to support their everyday activities but most importantly to gain competitive advantage. It is crucial to point out that the installation of a Green Accounting Information System requires evaluation of human assets (students and professors), availability of space, value the benefits, as well as, estimate the necessary installation costs.

## 5. CONCLUSIONS

The environmental-green accounting is an emerging aspect of the accounting science that will influence, in the near future, the enterprises. The adoption of basic elements of green accounting will portray the role of environment in the economy, as well as, render easier the analysis of macroeconomic questions with the help of accounting information systems and thus, lead the economy to a viable path.

Despite the fact that the corporate environmental expenses increase not only in importance but also in monetary units, some enterprises continue to underestimate and enter environmental costs in accounts as general expenses. However, some companies try to connect environmental costs with products or services but the methods of allocation cost used are inappropriate.

When no proper allocation method is used, the manager of an enterprise does not receive reliable information in regard to the real costs and profits in order to maintain or change the products and/or processes. Furthermore, the above situation prevents the effective follow-up of yield of an enterprise, as well as, the right pricing of products and the important activities for the maintenance of competitiveness of an enterprise.

The green accounting still faces a number of problems, such as, the lack of support information, the lack of specialized personnel, as well as, the absence of proportional international accounting models. In recent years, the efforts for the growth of environmental information systems have led to the creation of proportional systems of administration (Environmental Management Systems) which face problems in regard to the treatment of complicated environmental data. The new tendencies that are found in evolution foresee a more proactive environmental planning through the recognition and the reduction of environmental cost and consequently the improvement of profitability of enterprises.

It is important that all stakeholders should be consulted when there are proposals to implement development that will impinge on or detract from the environmental store. These consultations can take many forms but should be undertaken well in advance of any implementations to allow proper time to consider and evaluate opposition and alternative strategies.

Finally, although many information systems of environmental management have been developed, no significant progress was made on the growth of green accounting information systems due to the inherent difficulty for the monetary expression of environmental accumulated costs and related natural resources. That is, future developments should not be evaluated, solely, in economic terms but in a more holistic manner which includes the effects upon local environment. This approach highlights the fact that environmental impacts and environmental audits should become a way of life for business organisations, as well as, governments and individuals. Once the environmental consequences of our actions are recognised, environmental information can be incorporated at every decision-making level to ensure the effective use of the planet's finite resources.

Environmental awareness during the production and consumption processes may, also, bring long-term economic and social benefits. On the other hand, the careless or reckless use of natural resources during either the production or consumption process can add to social resentment of tourism development. This may hinder future development and will certainly detract from the effective use of resources.

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