

# Technology Foresight for the Region of Crete using the EASW methodology

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## Abstract

The Science and Technology Park of Crete (STEP-C) implemented a Technology Foresight exercise for the Region of Crete with horizon the year 2015. The methodology that selected for the technology foresight was the European Awareness Scenario Workshop (EASW). The results of this exercise show that the Region of Crete has a serious distance to cover in order to be considered as a knowledge-based economy. The EASW created a vision and an action plan for 2015 that can reach only the half way of this distance. This vision is: “to produce **high quality and differentiated** products and services in the main business sectors of operations consolidating the knowledge that is produced in the research centres of the island and to assure energy independence and self-containment with respect to the environment. Crete will operate as a **Central Provider of Knowledge and Education** in National and International level, offering life-long educational programmes to Greeks and attracting students from the Mediterranean nations, the Middle East, China and India, through high quality educational programmes. Additionally, Cretans will be a **paradigm for their level of awareness, consciousness and tolerance**. An **e-Crete** system will be created in Crete that will be a best practice case study for the use of electronic services and the electronic culture will be diffused in all aspects of civic and business life”.

The main reason that this vision does not reach the level of the knowledge-based economy is the long distance that is necessary to be covered. This distance creates a series of barriers that block the long-term thinking of the participants. These barriers can be identified to: the trap of low to medium technology; the barrier of the degree of participation and responsibility; the barrier of dealing with the every day problems. However, if the Region of Crete, using the action plan that has been proposed reaches this level, then she will be able to look forward with confidence and become very soon a knowledge-based economy

## 1 Introduction

The European Leaders stressed repeatedly the importance of innovation publishing the Green paper on Innovation (European Commission, 1995). At the European Council in Lisbon on March 2000 (European Commission, 2000), as a response to the challenges of globalisation and the new knowledge-driven economy, the European Council called for a challenging programme for building knowledge infrastructures, enhancing innovation and economic reform, and modernising social welfare and education systems. This is encapsulated in the strategic goal set at Lisbon for the next decade: “the Union to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion”.

Three trends underpin the contemporary knowledge-based economy, and in combination make the case for using this terminology (EU, 2002):

- The rise of the “service economy” and intangible investments;

- The emergence of new Information and Communications Technologies and the Information Society;
- New requirements for, and approaches to, knowledge, in “learning organisations”.

There are other features of current developments that also bear on the knowledge-based economy, such as globalisation, which increases the need for change and performance by the firms or the nations, and innovation, which triggers growth and wealth for a society (Cooke et.al, 2000).

The Insular Regions Knowledge Tracker (IN.TRACK) project has been developed under the Regions of Knowledge Action Plan<sup>1</sup> as it has been recognised that insular regions of the union often lag behind the average performance of the European Union’s regions as far as the knowledge and innovation performance is concerned (Cooke and Laurentis, 2002; Dunning,

<sup>1</sup> The project co-funded under the European Commission’s Action Plan ‘Regions of Knowledge’ and STEP-C participated in a consortium with 3 more insular European Regions, the Canary Islands, the Madeira and Sicily

2000). There are many reasons for this lag such as the geographical isolation, the distance from the decision centres, the lack of economies of scale, the concentration of economic activities in very few sectors and so on (Cooke and Laurentis, 2002; Danell and Persson, 2003; Diez and Esteban, 2000; Leydesdorff and Cooke, 2004; Morgan and Nauwelaers, 1999).

This paper presents the Foresight exercise that has been realised for the region of Crete under IN.TRACK project. The IN.TRACK project aims at the development of a coherent strategy for building and sustaining a knowledge-based economy and society structure on the four Islands' regional districts. These four island regions are: Canary Islands, Sicily, Madeira and Crete.

On chapter 2 of the paper the methodology that has been used is presented. Chapter 3 presents the current status of the region of Crete according to the knowledge-based economy and its potential development in the future. The vision for the status of Crete on 2015 is presented next. The actions that are proposed to be realised during the next few years in order to achieve this vision are illustrated on chapter 5. Finally, weaknesses of the followed methodology, the barriers that appear in order to achieve the proposed vision and general conclusions are discussed on chapter 6.

## 2 Methodology

On 3 December 2004 the Science and Technology Park of Crete (STEP-C), which is the IN.TRACK Partner for the region of Crete, organised a Workshop that based on the European Awareness Scenario Workshop (EASW) method. This methodology introduced by the European Commission on 1994, originally to be used for Urban Development projects<sup>2</sup>. However, the methodology proved very powerful and transferred to other areas of economic activities, such as the technology foresight.

The aim of the workshop in Crete was to start a Knowledge based economy initiative for Crete. The objectives of this workshop were to:

- Bring the different stakeholders of Crete (Policy makers, Business people, Academics and Citizens) in a meeting where the Knowledge Economy concept would be discussed and its potentials would be analysed in order to create a common understanding for the need to move to the direction of the Knowledge Economy;
- Identify a regional common vision for growth under the concept of the Knowledge Based

Economy in a horizon of 10 years (on the year 2015);

- Design an action plan, agreed among the stakeholders, that would lead to the vision of a Knowledge Based Economy for Crete in the year 2015.

The EASW methodology achieves a bottom-up methodology for the design of the vision and the action plan which has been developed by and agreed among the regional key stakeholders – who are considered as experts in their respective fields – and not by some “external experts”, unaware of the local situation. Thus, the steps forward are realistic and the region's stakeholders are more willing to participate in such a plan, because they develop an ownership feeling (Figure 1).

Before the EASW an analysis of the current situation has been developed in order that the distance that Crete has to cover to be identified. The analysis considers two dimensions regarding the knowledge-based development of the region:

1. Level of participation of the local actors of the system and the degree of clustering of activities;
2. Level of research and innovation that takes place in the region.

## 3 The present status and potential development

The position of Crete appears to be low as far as participation and clustering is concerned, while it is medium-low with regard to research and innovation, considering that existing public research and education infrastructures comprise an important potential.

From the analysis performed and from the above classification it can be concluded that the present position of Crete in terms of the EU knowledge economy and society development strategy is as follows, which schematically is presented in Figure 2:

- a low to medium level in innovation & research parameter because expenditure is less than 1%, most capacity is supported by public funds with no significant involvement of the private sector, it is mostly oriented to high technologies and scarcely related to local needs but with good impact at national level (ICT spin-offs success) and involvement in the European Research Area projects.
- a low to medium position regarding participation & clustering, because there is very low interaction between research and technology capacities themselves (public research centres and universities) and between them and the civil society networks, both in the social and economic spheres. It is also a low position due to the lack of continuous learning education. But it is a medium position if we consider that the Cretan society is

<sup>2</sup> for further information:

<http://www.cordis.lu/easw/home.html>

highly networked with associations and groups of interest.

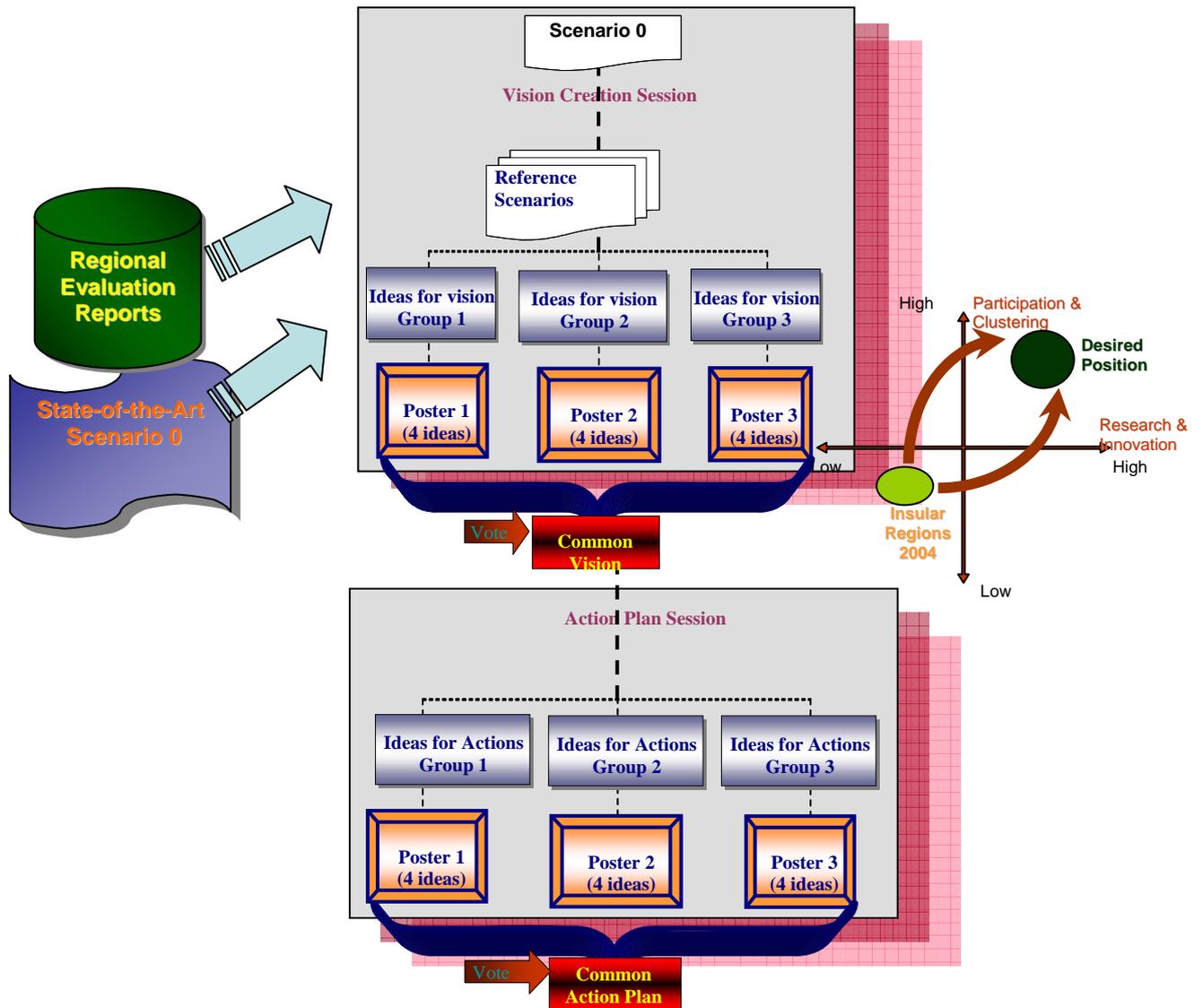


Figure 1. The EASW methodology

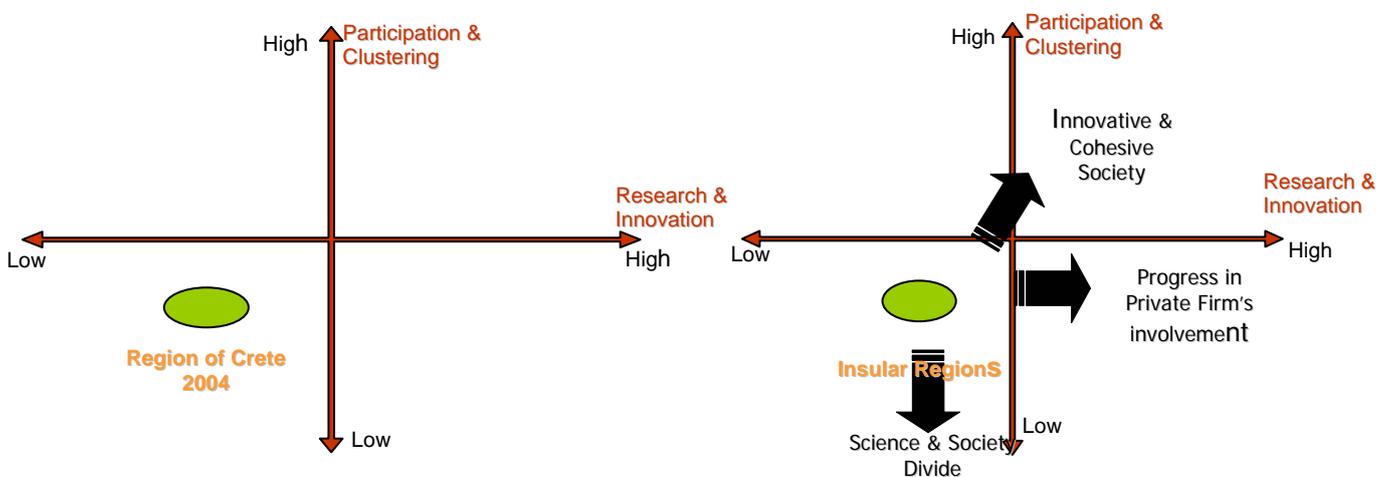


Figure 2. Crete's Current Status and potential transformation

### 3.1 Reference Future Scenarios

The analysis of the current situation in Crete, according to the Knowledge-based Economy, creates a series of possible scenarios for the years ahead. These scenarios, which are used as reference for the EASW participants, depend on the development of the main factors of the Innovation System of Crete. These main factors that the workgroup has recognised to be tackled in order to achieve a knowledge-based development are:

- **Research and Technology Development (RTD) policy.** The research is mostly oriented to high technologies, which however, do not reflect the needs of the local economic activities. There is no long-term plan, as the research projects reflect the national and European funds, which have a maximum of three year duration.
- **Participation of local actors & Spin-offs.** The diffusion of the research results to the private sector is very low and the research institutes and universities remain isolated from the general activities of the island. The general public lacks technological culture and the local businesses do not demand and are not prepared to pay highly educated and skilled employees. At the same time, although few spin-offs have been developed in the last years, the graduates do not have an entrepreneurial culture. This comes as a result of the lack of such direction in their programmes in secondary or tertiary education.
- **Education.** Most part of the workforce has a low general level of education, which limits the receptivity to innovation. University graduates tend to emigrate to look for suited jobs. Long life education is very low. Programmes to attract researchers and university professors have been implemented in the past, but do not continue.
- **Infrastructure.** The major research and education infrastructure is concentrated on the main north cities of the island. However, their infrastructure lacks beyond comparison to their growth. General infrastructure is in low quality and the everyday life suffers from this status.

The development of these factors may lead to the following reference scenarios (Figure 2): Science and society divide; Progress in private firms' involvement; and Innovative and cohesive society. The desired scenario is the 'Innovative and Cohesive Society' one, that is described in the next session.

### 3.2 Innovative and Cohesive Society

This is the scenario of knowledge society building in Crete. It generates added value of local resources, which are represented by the variety of human and material capacities of the island and it stimulates their internal and external connectivity and clustering. It starts by integrating all local players – regional

authorities, private sector, academic & RDT institutes, social partners and civil society – to establish a regional strategy. The strategy focuses on the strengths and opportunities of Crete and puts efforts in education, technological support and innovation of the local sectors, the promotion of new business creation and networking among actors. The main characteristics are:

- **Research policy.** Research policy is oriented to high technology areas that will bring the long-term growth and the radical innovations, but also to the low-to-medium technology capacity that is necessary to support the local business in order to enhance their competitiveness through quality and differentiation. RTD centres are involved in basic and applied research and private funding is involved actively in these activities. The dissemination of these activities involves all the actors of the system.
- **Education.** In education, the existing effort in tertiary and postgraduate education is combined with new development of life-long learning programmes offered by universities and associations. Undergraduate programmes link to enterprises and civic associations in order to fill the gap of technology transfer and stimulate graduate employment. A series of measures are introduced to interconnect science and society. For example, facilitation of students to 2-3 months practices into associations and enterprises, the former obtaining as many credits as in courses; seminars and postgraduate diplomas are developed to cover the needs of firms' employees.
- **Spin offs.** Development of infrastructures and programmes to allow young people develop their ideas to new businesses. The creation of new supportive organisations such as business incubators inside the cities or in significant areas, where these new initiatives could be supported by paying low rent and by finding the necessary support for the early stages of development, is the norm. Adequate space to host specialised parks (related to local needs and sectors), integrated in the territory of the region, are also provided.
- **Economic Growth and Quality of life.** Infrastructures are developed in the whole island and they help the local population stay in their areas, as well as communicate and trade in competitive manner with the rest of the regions. The geographical position and the life style become an attraction for highly qualified people from Greece and abroad to come to work. Moreover, the ability of the region and its research centres to innovate, attracts foreign businesses to invest in Crete.

## 4 The common vision

During the EASW the participants developed the following vision for Crete 2015:

*“The region of Crete will produce high quality and differentiated products and services in the main business sectors of operations, i.e. in agriculture, tourism and services, consolidating the knowledge that is produced in the research centres of the island and assure energy independence and self-containment with respect to the environment. Crete will operate as a Central Provider of Knowledge and Education in National and International levels, offering life-long educational programmes to Greeks and attracting students from the Mediterranean nations, the Middle East, China and India, through high quality educational programmes. Additionally, Cretans will be a paradigm for their level of awareness, consciousness and tolerance. An e-Crete system will be created in Crete that will be a best practice case study for the use of electronic services and the electronic culture will be diffused in all aspects of civic and business life”.*

This vision requires a high participatory culture from all the stakeholders of Cretan region and the creation of a cohesive society that involves high research activity and innovation. At the end of the session everybody agreed with the above vision, although it is far from today’s status. The participants realised, though that in order for this vision to be achieved, proper actions from all the actors of the region of Crete are required.

According to the project’s team however, this vision is an intermediate stage for Crete to achieve the status of Knowledge based economy and society, where the major economic activity will be based on innovation and high research and will be diffused to all members of the society. This is evident especially from the several references to the need of producing high quality products and services. The quality concept is essential in the developed countries, but they have moved to compete in aspects such as the differentiation of design; the level of innovativeness; the speed of design and development of new products; and the means for transferring the voice of customer inside their businesses to create mass customised products. Another area that shows this vision is an intermediate one is the concentration on the ICT, whereas at the same time international scientific and technological interests have moved to biotechnology, nanotechnology, energy production through hydrogen cells, or other emerging areas and converging technologies (EU, 2004). Although the Cretan research centres have a strong presence on these areas, their importance has not been yet realised by the rest of the region’s stakeholders. This creates a gap that is necessary to be bridged before the island is ready to move to the knowledge based economy.

## **5 Actions for the future**

During the EASW the participants studied the common vision in thematic groups in order to create the

necessary actions to realise it. The process brought forward five actions that prioritised as the immediate and the necessary in order to move to the direction of the Knowledge Based Economy. These actions are presented briefly in the next sections.

### **5.1 Infrastructure**

The actions according to the improvement and expansion of infrastructures have several directions, such as: hard infrastructure creation of roads, ports, airports, waste management etc.; telecommunication infrastructure creation and expansion, especially of wireless communication and networks; energy infrastructure for the achievement of energy independence of the island; soft infrastructures expansion like academic and research facilities, university villages and student accommodation; modernisation of all existing ‘hard’ or ‘soft’ facilities; and utilisation of the infrastructure’s capacity by identifying new uses.

This action is essential to begin immediately; as a matter of fact, it is necessary to build on the existing infrastructure expansion program that took place in the last few years because of the Olympic Games 2004 infrastructure design and the Structural Funds from European Union. The main problem of the design and implementation of infrastructure projects until now was that the major projects were designed centrally by the ministries at Athens, without the regional authorities having any decisive involvement. Additionally, the finance of infrastructure is expected to be public (with EU’s participation) while the private sector finance is negligible, basically because the regulations do not allow such an intervention.

Thus, this action demands, first of all, a simplification of regulations and then decentralisation of decision making according to infrastructure design, building and exploitation. This will speed up the procedures conception of the idea to the realisation of the project. Further more, this drift of responsibility brings about the direct involvement of the local authorities, who know better the needs of the local communities, but it also increases the responsibility of the citizens, who have a more direct relationship with the local authorities than with the central government. This action however, requires the initiative on behalf of the central government to assign these responsibilities to the local actors, the creation of the necessary structures in the local authorities and the training of local staff, issues that, for the moment, appear as barriers for the implementation of this action.

The decentralisation of decision making should include the research and educational infrastructure. Therefore, universities and research institutes need to be able to take decisions for the design and development of new

departments and build them using public, European, or private funding. Additionally, the institutes should be able to create supportive facilities, such as university accommodation, and exploit it as additional financial revenue. The universities and research institutes require the development of appropriate regulation that will allow them to exploit these facilities charging fees, for firms that may want to use their laboratories, or to create departments for the management of student accommodation and specify rent rates according to the quality of the services.

Furthermore, the islands infrastructure should be designed in a way that their capacity is utilised. For example, the various departments of the universities should be concentrated into a campus in order to reduce operational cost and improve services to students. New services should be added that would take advantage of new infrastructure. For example, the tourism infrastructure could be used as student accommodation during winter, or there could be e-government services that would use the wireless telecommunication networks. The hard infrastructure such as roads and ports should be designed with the main scope to support the exports of products and therefore reduce the cost of transportation and to improve the accessibility of the visitors of the island to any site of interest. At the same time, the improvement of infrastructure enhances the quality of life of the island residents.

There should be some focus on ICT infrastructure in order such technologies to be diffused into all aspects of civic and business activities. The local authorities should take advantage of these technologies, in combination with the structural funds, and transform all the existing and new services to electronic ones, leading the way to an e-Crete direction.

Finally, the infrastructure construction should be of the highest quality and technological standards, because the aim of the island is to move all its operations to the highest segments of markets, e.g. tourism sector or research facilities. Thus, proper audit procedures with appropriate standards should be developed and the realisation of the projects should be evaluated strictly under this code.

The steps of this action show that first of all the decentralisation of the responsibility for design, development and control of the infrastructure projects is necessary. This requires a political decision and training of local authorities. These actions however do not require high investment. The main costs of these activities apply on the necessary equipment and personnel for the local authorities, universities and research institutes, so as to be able to take on the new responsibilities.

It appears that the main barrier for this action is the central government that may not be willing to transfer these tasks to the local stakeholders. Additionally, the success of the activities depends on the ability of the local authorities to design the proper infrastructure, to involve alternative finance sources and to control their quality. Another barrier is that the local authorities need to become familiar with a different mentality, that of programming for long-term large scale activities and not, as has been the case so far, for short and medium-term, small to medium scale projects. This lack of experience might delay the start of realisation of infrastructure projects in the first years.

## **5.2 Development of Agricultural Sector**

The agricultural sector, although it has been declining in importance according to the regional GDP in the last decade, still constitutes one of the major sectors of activities in the island. In the last few years, some of the producers have moved to higher segments of the market, i.e. to organic production and differentiation of products, but there is still a lot of work to be done in order to be part of a knowledge based economy. The suggestions of the thematic groups for the necessary actions include training of the people who are involved in this sector; design of new niche areas of production; and exploitation of the unique characteristics the Cretan products have, in order to enter into the international markets.

The action plan starts with the use of the knowledge produced by the research centres of the island, in order to identify the new products and markets that the agricultural sector might serve in the future. To realise this, it is necessary to create an "Agricultural Business Intelligence Unit" that will produce strategic studies for the medium-to-long-term forecasting of the market trends and will search for alternative products and cultivations. This unit will link the research centres and the regional authorities and will provide centrally a strategic planning guide for the people who work in the agricultural sector. Yet its base will be at the research centres in order to create the link between the latter developments in the sector and the practitioners.

The second action that is necessary is the continuous training of the people who work in the sector, according to new trends, products, practices and cultivations. This is possible to be realised with the cooperation of the tertiary educational institutes, the research centres and the local unions. This action is necessary in order to utilise the capabilities that the new production practices and products have to offer.

The use of new techniques and products and the creation of well trained people will result in the expansion of the production cycle, as well as the production of higher quality products. However, it is necessary to reverse the present trend which leaves the

rural areas without young people to work in the sector. To achieve this, it is necessary to continue implementing the policies of supporting young persons who get involved in agricultural activities, by subsidising their first investments. Additionally, the development of sophisticated ICT infrastructure to the direction of the e-Crete concept will provide to all rural areas the ability to have access to knowledge. This will help to keep young persons in these areas and develop agricultural related or other activities that will take advantage of this infrastructure.

Finally, the “Agricultural Business Intelligence Unit” shall create standardisation norms in order to make it possible to create a ‘Cretan Product’ label. This label will refer to all the agricultural and stock raised products of Crete. It will refer to quality standards and the brand of the so-called Mediterranean Diet. This label will be the base for the creation of an advertisement and promotion plan for the Cretan products, which will create an internationally recognisable brand name for them. Having this tool, the agricultural unions will be able to exploit the unique characteristics and the quality of their products towards entering the international markets.

The focus of these actions is on the implementation of a medium-to-long-term strategy that will take advantage of the unique characteristics of the Mediterranean Diet, according to a healthy life style, the increase in the quality of the products and the movement to higher margin segments of the market. Additionally, these steps lead to the extroversion of the sector, using the economies of scale that the unions could offer and the new internationally recognisable brand name of Cretan Products that will be created by the Agricultural Business Intelligence Unit.

A potential barrier for this action could be the inertia that people working in the sector show to change in new areas of products and practices. This however will be easily bypassed when the first outcomes appear for the pioneers of the sector. The Cretan agricultural sector has shown in the past that it is one of the most agile ones in Greece and has switched onto different cultivations much earlier than other regions have. A second barrier is the lack of coordination between the regional authorities and the research centres for the creation of the Agricultural Business Intelligence Unit. This unit will require financial aid that needs to be obtained from the European Structural Funds and National Funds. As the present Structural Fund comes to the end, it is necessary this action to be programmed for the new one (2007-2013). The funding of such an activity should be covered by national financial aid. A final barrier for the success of this action is the lack of motivation for young people to remain and work in the agricultural sector. To reverse this situation, it is necessary to provide high quality of life to the rural areas and thus, the previous action of improvement and

development of infrastructures in the region is essential.

### **5.3 Development of Tourism Sector**

Tourism is a sector that has showed a continuous growth during the last decade. The businesses involved in the sector show maturity and invest on quality services and higher margin market segments. However, there are several things that need to be done in order for this sector to be integrated in a knowledge based economy. The proposed actions include studies of the market and the creation of new and alternative products and services; promotion of the tourism services of Crete independently from the national efforts of promotion; the certification of the quality of services in all tourism businesses; the major involvement of ICT in the sector; and the creation of a quality and continuous improvement culture to all the participants in the tourism sector.

The search for alternative tourism services and the improvement in the quality of the existing services are actions that need to be a continuous process. This first action requires a central design, which could be accomplished by the chamber of tourism businesses. They should prepare a report for the current situation of the tourism industry on the island, for all the offered services such as accommodation, transportation, restaurants-cafes-bars, cultural events, historical sites, sports, health tourism, agro tourism, business-conference tourism, extreme sports tourism, cruises etc. The above study would identify the gaps in this sector of the island, making it possible for opportunities of new investment to appear. The latter, in turn, will be analysed by the chamber, that will carry out the strategic studies for each one of them, that will have to be replenished annually. The development of the alternative services identified by the strategic studies would eventually expand the tourist period to 12 months per year, instead of the 5-6 months that is now the case. To achieve this, it is necessary to support tourism activities in the mainland of the island, the terrain of which is basically mountainous and, at the moment, isolated from the main tourist centres located on the seaside. This however, requires the improvement of the infrastructure of the island that links the success of this plan to the first action plan.

The quality of the services should be audited by an internationally recognised organisation and be comparative to international businesses. Additionally, this audit could be used as a tool for the promotion plan of the tourism sector of Crete. The quality assurance could be integrated into the quality label for the agricultural products, creating a competitive advantage, which would be internationally recognisable and used for the promotion plan of the Cretan Diet.

The promotion and advertisement of the Cretan tourism sector should be designed and realised by the regional authorities in cooperation with local businesses and the chamber of tourism firms. The promotion plan should be directed to higher margin segments such as business tourism, luxurious, thematic etc. The promotion will be continuous and target the main tourism markets such as West Europe, USA, Japan, China etc. The realisation of the promotion should be combined with an effort to attract tourists independently and not through the tourist agents who promote mass tourism. This however, may produce several retroactions from these agents who will try to sustain their position, bearing the danger to create a flow to the competitive destinations such as Cyprus, Turkey, etc. Therefore, this action should be very carefully designed and its pick should not be developed until the alternative services are available and the movement to the high quality sector is clear.

The use of ICT in the tourism business is already widespread, but bearing in mind that new opportunities appear through the technology development every day. A continuous study of these opportunities should be analysed and suggested through the strategic studies. The initiative however, should be originated from the firms, which will implement a business strategy that includes the idea of e-tourism and the use of information technologies in their businesses. The latter might be aided by the research centres involved in the development of the future of ICTs, which could design original e-products for the Cretan firms, providing them with a competitive advantage. Furthermore, local authorities could develop e-services that promote the historical sites and the local interest points, as well as the local businesses through the internet or info-kiosks.

Finally, a plan for the creation of a quality culture to all the involved persons in the tourism industry is necessary. This requires the training of all personnel that works in the sector and the realisation by them that attitude improvement will have multiple benefits for the sector. For example, the visitors of the island act as a mean of promotion, which means that if they have a positive experience they will recommend Crete as a destination to other people. The improvement of services however, requires the improvement of infrastructure, both hard and soft. This infrastructure will help visitors to move on the island, to discover the beauties and the interesting sites, but also to feel safe and secure and enjoy a high quality of life.

The barrier for this action is mainly the prerequisite change in attitude of all the participants in the sector. Yet, the recent experience from the Olympic Games of 2004 shows that people with a collective strategic aim can meet the standards and even exceed them. Thus, the training and the shared vision of wealth through tourism can give the required result. A second barrier is the synchronisation and realisation of the previous

described action, the expansion and improvement of infrastructure. The link is essential in order for the businesses' strategic design to have the maximum effect. Finally, the organisation of the regional authorities and the cooperation with the chamber of tourism businesses may appear as one more barrier. In this case, these organisations need to prepare so as to offer the expected services and to design the future of the sector. Additionally, the firms should start making long-term plans that will focus on high quality and high margin segments of the market and should disengage from the low cost competition with neighbouring countries.

#### **5.4 Research and Education**

This action requires the support of the existing and the creation of new areas of research and education. Crete is a region where several research institutes and universities have been developed during the last 20 years. However, the results of these activities do not seem to be integrated into the region's economy. This may be the result of a general attitude of the people who, after graduating from the local universities, do not tend to stay in the island; do not lean to the creation of entrepreneurial ideas and taking risks. On the other hand, this may happen because of the directions of research that focus on basic research, the measurable results of which may appear after many years.

The proposed plan provides a two-way direction activity. The first direction aims to the integration of the local needs into the educational programmes and to the design of new ones according to the course that the Cretan economy takes, and to the new technological developments. Thus, new departments are proposed to be developed at the local universities, such as Chemistry and Food & Drinks Technology, Tourism management, Mediterranean studies. Entrepreneurial studies need to be included in all the educational programmes in order to create a seed for future risk taking activities. Additionally, the programmes could identify the needs of the local industries and provide educational programmes for their employees and staff under a fee. The second direction aims to the diffusion of research results into the society. This direction connects with the next action that is proposed for the creation of an open and aware society. The activities of the research centres should be disseminated in order to break the barriers between the society and the institutes and to avoid the creation of misunderstandings between the different actors of the region. This could be achieved through promotion of the work to the local press and media. In addition, open days, there should be organised where secondary education students would be invited and the activities of the research centres and of the university departments would be presented. New schemes of scholarships could be implemented in order to provide the necessary help to

students with financial problems, as well as to promote postgraduate studies. Finally, workshops with the participation of the major industries should take place to identify their needs and to show them the abilities that research laboratories have, in order to help them with their every day problems.

In order to create an international interest for the academic and research institutes it is important for them to be assessed under a commonly accepted standard and to be possible to be compared with other institutes. Thus, the discussion taking place in Greece at the moment, at the ministry of education, should be completed and then its conclusion be implemented. This will help universities and research centres to identify their weaknesses and improve, in order to compete in the international market.

Furthermore, a proposal was made regarding the creation of independent activities in the universities, that will benefit from the international educational market by attracting international students. Such activities could be the creation of an "International Postgraduate Centre", which will have English as the working language; the development of tele-education programmes; the expansion of the Open University; the organisation of summer schools and international conferences. In addition, alternative services and infrastructures could be created, financing the core educational and research functions, such as student accommodation; art centres; university villages (campuses) that reduce operational costs and concentrate services according to the location. In order to begin these actions however, the regulations that refer to the operation and governance of universities and research institutes is necessary to change. The change needs to be directed toward the independence and decentralisation of decision making. Thus, until this regulation is constituted, the institutes will be constrained from making the required changes.

A new direction for research has also been proposed, that is necessary to be taken in order to enhance interest from industries. At the moment, the research activities focus on basic research and the involvement of the private sector is negligible. The latter – especially the financing of research projects – requires the development of links between the research institutes and the firms and the creation of an understanding and trust culture. This action may be implemented through a new programme that is supported by National and Structural Funds named "Regional Innovation Poles" and is scheduled to begin in the early 2006. The focus of these new research areas will be on applied research and on problems and interests of the Cretan firms have, as well as on convergent technological areas, such as the biotechnology – agricultural – food & drinks sector; nanotechnologies and new materials on construction industry; ICT – health – tourism etc.

The barrier of these activities, as mentioned earlier, is mainly the regulation for the operation and governance of universities and research institutes. As long as this regulation does not change towards the direction of decentralisation and independence of the institutes, the proposed actions will never be implemented fully. Therefore, it depends on the central government to take initiative, but also on the will of the local authorities to exert pressure towards this direction. Additionally, the new services and operations need to be supported by the development of the necessary infrastructure. This may take time to be designed and developed, with a continuous concern of how to finance them. The diffusion of activities and the redesign of educational programmes can start immediately and become a continuous process.

## **5.5 Open and Aware Society**

All the above actions are necessary for the creation of a knowledge based economy. However, they cover only one dimension of the framework of a knowledge based economy. The second dimension has to do with the participation and awareness of the public in order to enjoy the benefits from these activities in their way of life. The purpose of all these activities is the wealth of the citizens, yet, if the results do not get diffused, they will not be successful in the long-term.

The actions that are proposed for the creation of an open and aware society are based on educational programmes with pedagogic nature. The aim is every person to require the best in any aspect of their everyday life. Thus, they should require having the highest quality of infrastructure, the highest public services, the highest standards of education and the highest standards of living in an environment that should not be destroyed by uncontrollable development. They could have a culture of continuous learning and participating in educational and training programmes throughout their life. Moreover, the society would be open to new ideas but also to new immigrants who would be integrated into the society through special training programmes. In general, the links between the different actors of the system need to be always open and the knowledge to flow from one to the other without any barriers.

The assessment of the implementation of all the proposed actions should be continuous. The objectives of the development however should also be reassessed and adapted to the new needs. Thus, a new unit is proposed to be developed with the participation of local authorities and the chamber of commerce and industry of Crete. This unit will collect data on the economy of Crete and the social standards of living. The unit will be able to create annual strategic studies for each sector of the activities, assess their development and collaborate with the Agricultural

Business Intelligence Unit and the chamber of tourism for the common study of these areas. This unit, named Cretan Business and Social Intelligence Unit, will be based at the chamber of Heraklion. Additionally, it will take advantage of the training activities of the chamber in order to develop training programmes for the local businesses and the public sector. The Cretan Business and Social Intelligence Unit will be one more actor that will disseminate the strategic aims of the region and be a continuous link between the applied research institute and the private sector.

This action is characterised as ‘soft’ action, thus it is not capital intensive. The main barrier for its success is that, because its nature, it requires a long term horizon, which makes it easy to be put aside, as the immediate result will be negligible. Therefore, a central, long term and independent of the ruling party design of this action is necessary by regional authorities.

The realisation of this action is directly related to the achievement of the objectives of the rest of the actions that have been identified in the previous sessions.

### 5.6 Action Plan for Crete 2015

The action plan for Crete 2015 is summarised to the following:

*“In order to achieve the desired vision for Crete 2015 it is necessary to introduce a continuous improvement and expansion programme of the infrastructure of the island, which will help the efforts for agriculture and tourism sectors’ development and differentiation. Additionally, new areas of research and educational programmes should be designed and developed to cover emerging and convergent fields and spin-off activities in the direction of the ‘new economy’ should be enhanced. All these activities however should be associated with the demand for the high quality of life of the local society and the results should be diffused immediately to the general public through dissemination programmes so that an open and aware society would eventually be formed”.*

In order to realise this action plan the involvement and cooperation of all the region’s stakeholders is necessary. Additionally, it is essential that the decision making and control is transferred to regional authorities, according to infrastructure and local needs design; to the local academic and research institutes, according to the research and educational needs. Additionally, the development of private initiatives and the citizens’ awareness to exert pressure towards the required direction are necessary. It is also essential the plan to be implemented independently of the changes in the central government or the local authorities. Thus a strategic agreement is necessary as the proposed actions have a long-term horizon and the actions are characterised by a continuous improvement culture. Whereas all actions are interconnected so that a failure

in one side may affect another, especially the infrastructure and the ‘soft’ awareness action seem to be the base that supports the rest.

The actions that are proposed reflect the intermediate dimension of the proposed vision for Crete. The participants identify that the region starts from a relative low position comparing to the developed ones on international level. Thus, a strong and stable status is primarily necessary to be created in order to move further. The realisation of these actions will break the barriers that are set by the trap of low-to-medium technology, the lock in short-term planning and the difficulty of participation. Especially for the latter, the region’s actors seem ready to take the responsibility for the design, development and control of a long-term strategy for all the areas of a knowledge based economy.

## 6 Conclusions

This section sums up the results from the foresight exercise that took place in Crete during 2004.

One of the challenges of this exercise was to bring the different stakeholders of Crete together, so as to discuss for the knowledge economy and the future of the island. The EASW meeting, aiming to create a common vision for Crete 2015, sought to break the barriers of short-term thinking, turning it to a long-term thinking and planning. The main barriers that block this thinking have been identified to be: the trap of low to medium technology; the barrier of the degree of participation and responsibility; the barrier of dealing with everyday problems (Figure 3).

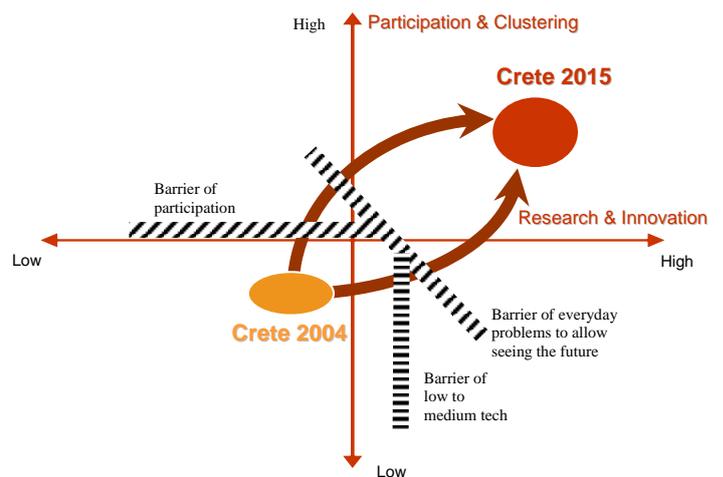
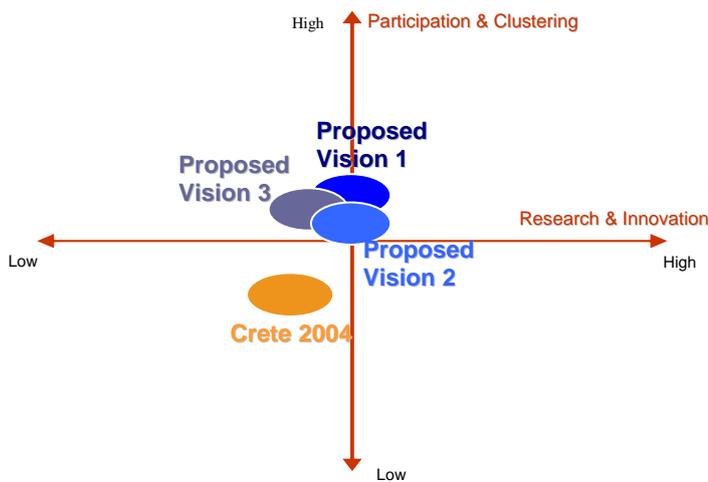


Figure 3. The barriers of thinking

The three role groups that were formed at the workshop came up with several proposals, for their vision for the future, which, however, do not break completely the barriers of thinking. Furthermore, some of the proposals are similar (for example, the infrastructure expansion and improvement, the quality of products and services etc.), showing that all the actors of the system confirm that several basic needs of the region have not been met yet. Thus, the produced visions are characterised by the project team as intermediate ones (Figure 4), that are necessary and realistic to be achieved and consolidated before Crete makes the leap to a Knowledge based economy and society.

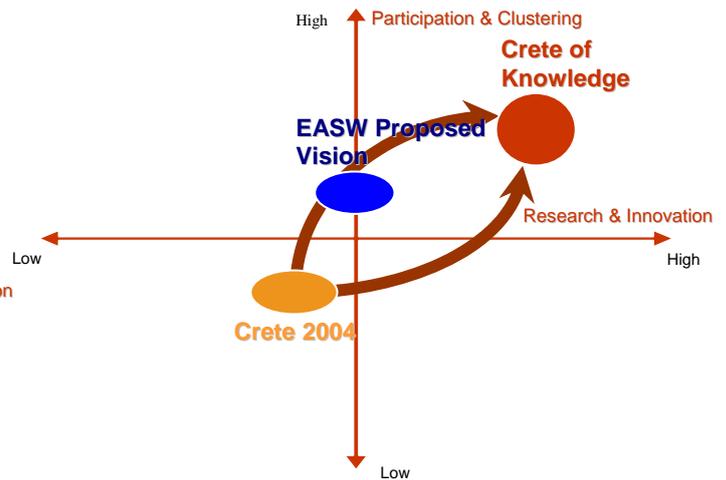


**Figure 4. Positioning the proposed visions**

The vision of Crete 2015 proposed by the participants of EASW in Crete is an intermediate one that will create the stable base in order Crete to move to a Knowledge Based Economy (Figure 5). In brief this vision is to produce high quality and differentiated products and services in the main business sectors of operations, i.e. in agriculture, tourism and services, consolidating the knowledge that is produced in the research centres of the island and to assure energy independence and self-containment with respect to the environment. Crete will operate as a Central Provider of Knowledge and Education in National and International level, offering life-long educational programmes to Greeks and attracting students from the Mediterranean nations, the Middle East, China and India, through high quality educational programmes. Additionally, Cretans will be a paradigm for their level of awareness, consciousness and tolerance. An e-Crete system will be created in Crete that will be a best practice case study for the use of electronic services and the electronic culture will be diffused in all aspects of civic and business life.

The action plan that will realise this vision is summarised to the following:  
to introduce a continuous improvement and expansion programme of the infrastructure of the island, which

will help the efforts for agriculture and tourism sectors' development and differentiation. Additionally, new areas of research and educational programmes should be designed and developed to cover emerging and convergent fields and spin-off activities in the direction of the 'new economy' should be enhanced. All these activities however should be associated with the demand for the high quality of life of the local society and the results should be diffused immediately to the general public through dissemination programmes so that an open and aware society is eventually formed.



**Figure 5. The proposed vision as intermediate stage to a knowledge based economy**

The description of the steps necessary to be followed to achieve this action plan shows the complexity and the interrelation that exists between the different actions. This complexity brings about the necessity for collaboration between all the actors of the system in a continuous base, in order, primarily, to stick on this strategy on a long-term basis, and second, to realise these actions in a parallel manner.

The main barriers that have been identified for the implementation of the proposed action plan are:

- The central government initiative for decentralisation of decision making, design, development and control of infrastructure projects and strategic planning;
- Decentralisation of decision making and governance of academic and research institutes;
- Training of local stakeholders to assume responsibility for design, development and control of large scale actions;
- Involvement of private sector to the finance of infrastructure and, most importantly, to research projects;
- Depopulation of rural areas and the willingness of people to stay in the island;

- Inertia of people to change and the creation of a continuous improvement and high quality culture;
- Coordination of research centres and local stakeholders for the creation of a two-way flow of information;
- Finance of new initiatives – private sector involvement.

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The realisation of this action plan is necessary to be monitored. Thus, the project team proposes the 'Observatory of Innovation and Entrepreneurship of Crete' that has been developed in collaboration of the Region of Crete and STEP-C ([www.innocrete.gr](http://www.innocrete.gr)) to be responsible of monitoring and producing annual reports for the level of the implementation of this plan.

### Acknowledge

The authors would like to thank the IN.TRACK partners for their support and fruitful cooperation.  
 The authors would like to thank the participants of the EASW.  
 The authors also want to thank the European Commission's 'Region of Knowledge' for the co-funding of the IN.TRACK project.

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