
MDG-F2067
Harnessing Sustainable
Linkages for SMEs in
Turkey's Textile Sector

IRACs
Best Practices Report

Prepared by ITKIB DESTEK Inc.
February, 2011

**UN Joint Program MDG-F 2067 Harnessing Sustainable Linkages for SMEs in Turkey's Textile Sector
International and National Innovation Research and Advisory Centres Best Practices - Analysis Report**

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Executive Summary

Within the scope of “MDG-F2067 Harnessing Sustainable Linkages for SMEs in Turkey’s Textile Sector” Joint Programme to increase competitiveness of SMEs in textile and apparel sector, establishment of Innovation Research and Advisory Centre (IRAC) has been aimed.

In this context this report provides comprehensive information about best practise examples of national and international research centres and recommends a Research and Advisory Centre Model upon the results of the analysis.

The report is composed of five sections;

- ❖ Section 1 - Objectives and Project Context
- ❖ Section 2 - Types of Innovation and Research Centres in Turkey
- ❖ Section 3 - International and National Best Practices
- ❖ Section 4 - The Model
- ❖ Section 5 - Areas of Research and Interest

Types of Research Centres in Turkey

In Turkey establishment of Research Centres is strongly supported by the government. TUBITAK and State Planning Organisation (SPO) plays constructive role and provides universities with government funding to increase research and innovation studies as well as the cooperation between industry and universities.

However the Centres supported by SPO are at macro scale and focused on thematic areas where advanced research can be conducted. Establishment of these centres require comprehensive feasibility studies examining technical and physical infrastructure investment in the long term.

Apart from above mentioned macro scale Research Centres, almost all universities have University Research and Application Centres (URAC) operating under the university structure. The Centres are recognised by the Council of Higher Education following the official submission period.

Research and Application Centres are established to work in the specific areas where aimed activities cannot be undertaken by the existing structures of the universities. Establishment of URAC is based on detailed preparation study justifying the need for the Centre.

In line with the objectives and analysis of the best practices, *establishment of University Research and Application Centre* through submission to the Council of Higher Education is strongly recommended by this report.

Best Practices

In consideration with the Project objectives, in the selection of the research centres priority was given to ones refer to environment, corporate social responsibility, institutionalization structuring in supply chain and sustainability of mentioned areas.

Therefore selection of the Research Centres was based on the following criteria;

- ❖ Operating under a university structure,
- ❖ Working with and working for textile and apparel clusters,
- ❖ Achieved increasing collaboration between industry and university,
- ❖ Provides advisory services on sustainable development, corporate social responsibility and supply chain management specifically in textile and apparel industry,

International Best Practices

Research and Advisory Centres are selected from China, Spain, Sweden and America due to examined textile and apparel industry developments in these countries and supportive role of the university textile research centres in industry development.

- ❖ The Hong Kong Polytechnic University Institute of Textiles and Clothing
- ❖ Donghua University (Textile University of China) Research Centres
- ❖ INTEXTER Institute of Textile Research and Industrial Cooperation of Terrassa, Spain
- ❖ University of Boras, Swedish School of Textiles, the Textile Research Centre
- ❖ North Caroline State University, College of Textiles, the Nonwovens Institute, Nonwovens Cooperative Research Centre

National Best Practices:

- ❖ Aegean University Textiles and Apparel Research and Application Centre
- ❖ Anadolu University Tourism Research and Application Unit
- ❖ Akdeniz University, Entrepreneurship and Business Development Research and Application Centre

The Model

As it has been stated earlier this report strongly recommends establishment of a Research and Application Centre operating as textile *and apparel enterprise development information and advisory point* in the areas where university and industry requires support for business transformation through innovative set of actions (research, trainings, counselling and advisory services, information dissemination and promotion etc.).

A lot of effort has been paid in analysing period of the best practices in order to understand the most appropriate model for Turkey. It is obvious that textile and apparel industry should urgently take CSR, Supply Management and sustainable development in their agenda. Textile and apparel industry in Spain, China, USA and Sweden has been sustaining competitive advantage only because they changed their business approach. Technical research is required but business transformation approach is not less important.

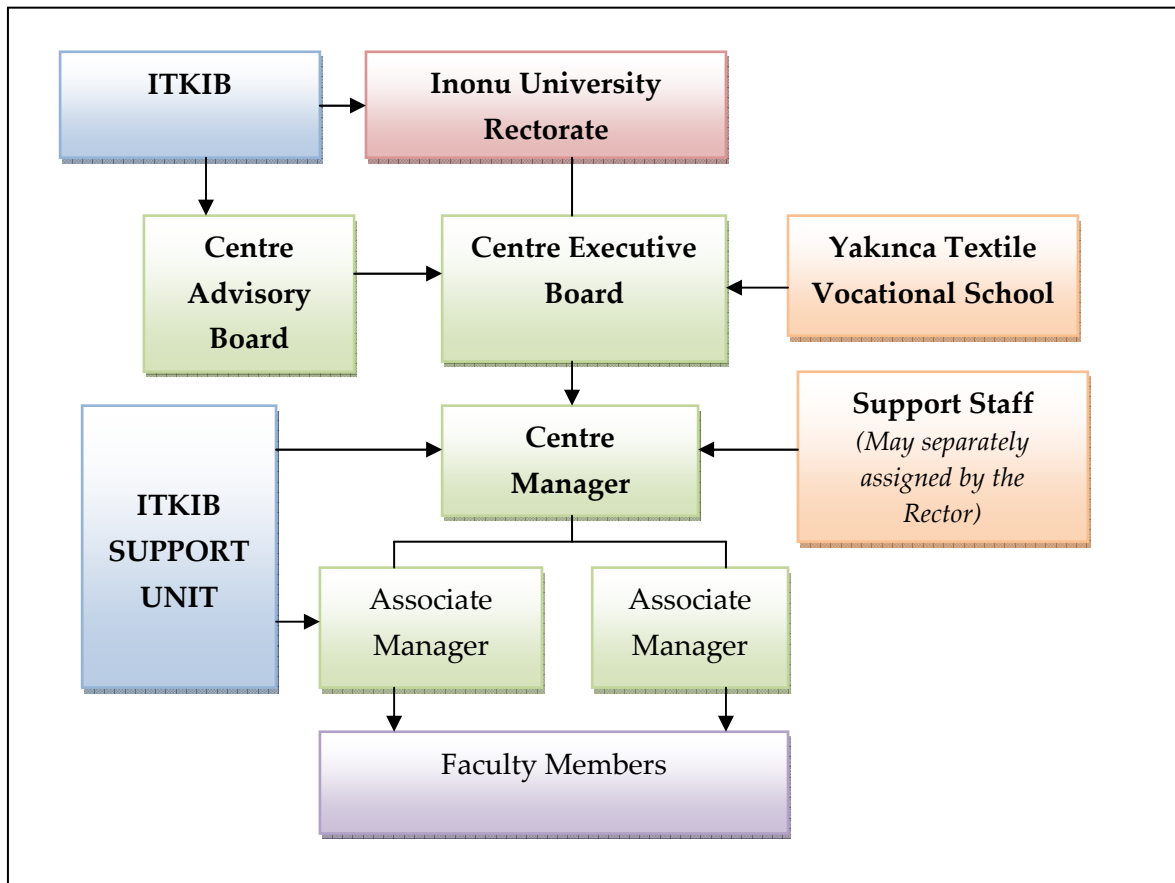
In the light of the findings report recommends establishment of Research and Application Centre giving weight to advisory services on enterprise development.

In this regard, the report also argues the name of the Centre and recommends “Inonu University Textile and Apparel Enterprise Development and Collaboration Research and Application Centre”

Even they called institutions the administrative and organisational management of international research centres has very similar structure with Research and Application Centres established in Turkish universities.

Upon the review of best practises and in line with the Project objectives below organisation and Management Structure is recommended;

Organisation and Management Structure of the Centre



Areas of Research and Interest

The Centre can support the creation of a viable industry-wide framework for high quality business management (in labor-management cooperation, productivity and quality up-grading, environment, human resources management, working conditions and occupational safety and health) for a sustainable development of the textile industry. Beside CRS in textile industry the Centre can provide wide range of trainings and information on institutionalization of textile supply chain.

Like the firms in other industries, textiles firms are also realizing their responsibility towards the various parties associated with them and the environment. The Centre can provide information and advisory services focusing on below specific CRS topics:

Social (people)

- ❖ Better working conditions and increased workers motivation
- ❖ Decreased overtime and decreased reworking
- ❖ Increased productivity and increased wages
- ❖ Improved health & safety, less illness and accidents
- ❖ Improved (company) image
- ❖ Increased ability to attract and retain quality employees

Environmental (planet)

- ❖ Reduced raw materials and energy inputs
- ❖ Eliminated toxic materials use
- ❖ Reduced quantity and toxicity of emissions and waste (water) outputs

Economical (profit)

- ❖ Reduced costs on input materials and energy
- ❖ Reduced (wastewater) treatment costs
- ❖ Increased production revenues
- ❖ Better product quality
- ❖ Enhanced reputation and brand value
- ❖ Increased efficiency and productivity
- ❖ Increased total income
- ❖ Increased sales and customer loyalty
- ❖ Attracting and retaining quality investors and business partners

5.3.1.2. Specific Activities

- ❖ Through establishing mechanisms for joint problem solving, the Centre can help enterprises identify areas of improvement and formulate action plans.
- ❖ The Centre Undertake studies for promoting good labor and environmental standards and practices, meanwhile, building the capacities and capabilities of the university to deliver comprehensive and integrated training/advisory and information services to enterprises that wish to voluntarily implement labor and environmental application programs.

- ❖ The Centre can serve small and medium sized enterprises from the textile sector and provide information/seminars, one-to-one counseling and advisory service in below areas:
 - ❖ Quality and productivity - improvement of quality and productivity which aims to benefit enterprises economic development;
 - ❖ Environmental management - introducing environmental techniques and cleaner production methods and promoting establishment of environmental management system;
 - ❖ Workplace protection - health and safety issues - how to identify and minimize risks to workers and factories; and
 - ❖ Human resources management - how to strengthen workplace relations between workers and management and how to establish sustainable improvement mechanism.

- ❖ Research and analysis understanding supply chain network structure, the supply chain business processes
- ❖ Working with companies to understand weak points in supply chain and propose set of actions for supply chain management
- ❖ Providing information and advisory services on;
 - forecasting demand based on information such as market research,
 - placing and receiving customer orders,
 - purchasing between supply chain partners,
 - processing orders internally,
 - identifying new sources for capacity and/or inventory when needed,
 - managing inventory,
 - planning production,
 - managing distribution (shipping),
 - communicating between supply chain partners and
 - supporting customer service.

Section 1- Objectives and Project Context

1.1. Introduction

Within the scope of “MDG-F2067 Harnessing Sustainable Linkages for SMEs in Turkey’s Textile Sector” Joint Programme to increase competitiveness of SMEs in textile and apparel sector, establishment of Innovation Research and Advisory Centre (IRAC) has been aimed. In this context this report advises on the best model for the centre establishment and administrative structure in the light of the best practices examined in Turkey and other countries; China, Spain, Sweden and America.

The report provides information in two main areas:

1. Analysis of best practices in research centres; five in other countries and three in Turkey with the priority given to ones refer to environment, corporate social responsibility, institutionalization structuring in supply chain and sustainability of mentioned areas.
2. In the light of the findings of the analysis, a model proposed as the centre based in Malatya and others established in Adıyaman, Kahramanmaraş and Gaziantep. Within this proposal administrative structure, job descriptions and related legislation of the universities also provided.

Figure 1: Map of Malatya, Kahramanmaraş, Adıyaman and Gaziantep



Findings of the report are mainly based on desk research and interviews undertaken with the representatives of research centres and Higher Education Council. Over the course of the report preparation period the following centres in Turkey and other countries have been analyzed:

International Best Practises

- ❖ The Hong Kong Polytechnic University Institute of Textiles and Clothing
- ❖ Donghua University (Textile University of China) Research Centres
- ❖ INTEXTER Institute of Textile Research and Industrial Cooperation of Terressa, Spain
- ❖ University of Boras, Swedish School of Textiles, the Textile Research Centre
- ❖ North Caroline State University, College of Textiles, the Nonwovens Institute, Nonwovens Cooperative Research Centre

National Best Practices:

- ❖ Aegean University Textiles and Apparel Research and Application Centre
- ❖ Anadolu University Tourism Research and Application Unit
- ❖ Akdeniz University, Entrepreneurship and Business Development Research and Application Centre

Beside above mentioned Centres, as successful example of implementation Harran University Solar Energy Research and Application Centre has also been reviewed and interviewed.

Rationale for selecting above centres:

There has been set of criteria foreseen for to select the centres to be analyzed as the examples of best practices. It is also important to state that studies on the centre started after the consultation with ITKIB Project Team and following their confirmation. Below points played important role for the selection:

- i. At least one centre working in the area of textiles and apparel sector,
- ii. Centres actively and efficiently working and foster transfer of knowledge and support competitiveness,
- iii. Centres plays a catalyzing role, enhancing collaboration between university and industry through a multi disciplinary approach,
- iv. At least one centre providing consultancy services to their target in the areas of sustainable development.

International examples were selected among all of the world's main textile universities and their research centres after a long and detailed review.¹

¹ Appendix 1- List of World's Textile and Research Universities

1.2. Project Context

The Joint Program entitled “ MDG-F2067 Harnessing Sustainable Linkages for SMEs in Turkey’s Textile Sector” was launched on 11th of November 2010 in Malatya with the participation of Istanbul Textile and Apparel Exporters Association (ITKIB), Embassy of Spain, participating UN agencies UNDP, ILO, UNIDO, Malatya, Kahramanmaraş, Gaziantep and Adıyaman Governorates and Municipalities, Malatya, Kahramanmaraş, Gaziantep and Adıyaman Chambers of Commerce and Industry, Inonu University, , local NGOs and local private sector representatives of textile industry.

Discussions with the Government and the national partner ITKIB helped develop the priorities of this Joint Program, and select Malatya, Kahramanmaraş, Gaziantep and Adıyaman as pilot provinces. Since the overall strategy of the JP is targeting the entire value chain while focusing on the regions in which replicable business models can be created, JP primarily focuses on Malatya with activities reaching also the neighbouring provinces of Kahramanmaraş, Gaziantep and Adıyaman. The rationale for focusing primarily on this region and specifically on Malatya is as follows:

Malatya, Kahramanmaraş, Gaziantep and Adıyaman are all textile intensive provinces with low per capita incomes and high unemployment rates. They need support for improving industry specific processes as well as livelihoods.

Malatya is located conveniently between other provinces specialized in the manufacture of clothing, thus the dissemination of best practices will be fast and efficient.

The depth of textile and clothing value chain in Malatya allows the introduction of innovative practices in different segments of the value chain, thus represents an excellent pilot case that accelerates the achievement of similar concrete results also in other parts of Turkey.

Malatya is located conveniently between other provinces specialized in the manufacture of clothing, thus the dissemination of best practices will be quick and efficient.

Malatya is an important growth pole in the region; attracting investment and labour force from the surrounding provinces. On the supply and demand side of labour market Malatya provides important opportunities that can be considered as a pilot case.

Innovation Research and Advisory Centre, IRAC will be established at Inonu University as a **multi-disciplinary centre** which will serve the textile sector in a number of fields, including *innovation research in textile industry, CSR, sustainability, social conduct, environmental and gender issues, decent work, clustering and VCMP.*

Section 2 – Types of Innovation and Research Centres in Turkey

Studies for the establishment of research and innovation centres take substantial place in Turkey's political and economic agenda. The 2023 vision foresees being the first ten economies by 2023 is leading government institutions specifically State Planning Organisation to support establishment of research centres.

2.1. Research Centres in Public Institutions and Universities

As it is stated in the Ninth Development Plan, to reach the goal of the globally competitive Turkey transforming to knowledge society, increasing innovation capacity of the private sector and gaining further capabilities in science and technology and transforming this capability into economic and social benefit is the vision set by NDP. In line with this goal SPO supports large scale research centres in the universities where private sector needs can be meet regionally and at country wide.

Through Project Announcement of the SPO every year, project proposals are submitted by universities and public institutions. To evaluate the submitted proposals SPO forms an evaluation committee and also scientific panels in the related and specific areas.

During the evaluations priority is given to the areas which have been decided by the Development Plan and Science and Technology High Council. These areas are; nanotechnology, biotechnology, new era nuclear technologies, hydrogen and fuel cell technologies, ICT technologies, aviation and defence technologies, energy, food and water research and technologies.

The research centres project and the related investment can be group into two areas;

- i) Advanced Thematic Research Centres
- ii) Central Research Laboratories

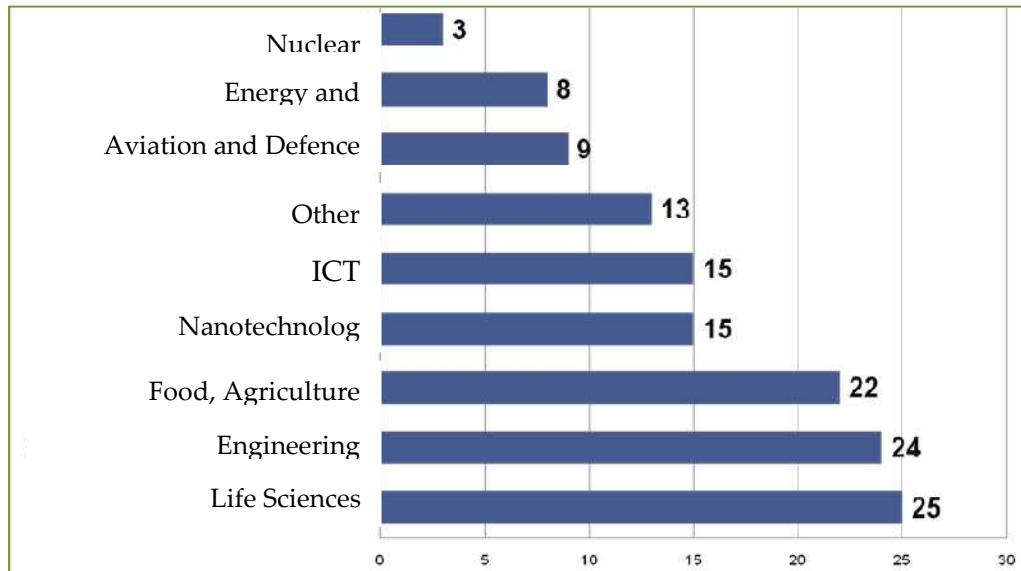
2.1.1. Advanced Thematic Research Centres (ATRC)

Establishment of Central Research Laboratories or Advanced Thematic Research Centres could be considered in the long term plans and submission of such project through a smaller scale research and advisory centre.

To support and provide investment to the project, the universities and/or public institutions which are already – relatively- developed in scientific research with the required number of human resource, certain level of specialisation and leading role in that area is the criteria for the centres. Through these centres creation of means, enabling advanced research, developing researchers and contributing the collaboration between private and public sector is aimed.

These centres can be established through a project and scale of the projects is quite big. The projects have the budgets from a million TL up to 78 million TL.² Within this programme The Science and Technology Research Centre (IBTAM) has been established in Malatya Inonu University in 2005 with 16 million TL. University Industry and Public Sector Collaboration Development Centre (USKIM) has been established in Kahramanmaraş Sutcu Imam University in 2008 with 15 million TL.

Figure 2 – Advanced Thematic Research Centres established between 2003 and 2010



Source: SPO, Science Technology High Council Meeting, Presentation, December 2010

2.1.2. Central Research Laboratories (CRL)

Especially in the university recently established and lack of research infrastructure, SPO Programme aims to establish structures as laboratories enabling research projects. Among the main objectives of these centres, attracting more qualified human resource, making education through applications, disseminating research culture and establishing platforms where university and industry projects can be formed take important place.

Through this programme SPO also aims to transform laboratories which were established in the past and could not be efficiently used, into a transparent, open to all researchers use Central Research Laboratories. In this context in 2010, 43 and in 2009, 11 Central Research Laboratory has been taken under this investment programme. In 2011 it is aimed to initiate 18 projects.

Within the scope of the JP when the objectives, the scale and especially the time is considered establishment of such research centres could be considered at a long term period. Such project can be submitted by a smaller scale research centre structure in the upcoming months.

² Further information can be found at Annex: 2 – SPO University and Public Institutions RD Centres, SPO, 2010 December

2.2. University Research and Application Centres (URAC)

Research and Application Centers (URACs) are established to execute activities which could not be directly undertaken within the university structure. URACs establishments are seen Rectory or faculties, institutions or vocational schools. URACs can be classified as;

- Research and Applications Centers operating under the Rectorate
- Research Centers operating under Dean's Office, Institutes and Departments
- Research Centers operating within the protocols

Center aimed to be established under a rectorate, university should consider and more importantly obey the rules and procedures defined with the Higher Education Law 2547. The Law defines the objectives and provides the regulation on how all higher education organisations will be structured, defines the roles and responsibilities of the personnel under the related university bodies. The Law covers upper organisations, all higher education institutions, affiliated institutions, their activities roles and responsibilities.

The Law defines Research and Application Centres as; Research and Application Centres are higher education institutions where application and research need of different areas as well as the required preparatory and supportive activities for some vocational branches can be executed.

Important Notice: When the universities are reviewed it is seen that there are centres operating under faculties, institutes or departments and not submitted to CHE. These centres were established towards the end of nineties and not dependent to rectorate. By 2002 The Council of Higher Education (CHE) sent official letters to universities declaring that CHE does not recognise these centres officially and all require submission. These Centres are now operating as parts or interest groups under the university units and has no any administrative rights³.

2.3. University Industry Research Centres (USAM)

In the meeting of TUBITAK Science Council dated 07.09.1996; University Industry Research Centres Programme (USAM) has been accepted to increase collaboration among universities and industry through developing technology and research.

Within this programme, through resource provided from the government and the industry, establishment of research and industry centres aimed to meet R&D needs of companies, educating skilled human resource, increasing research potential of the universities and ensure sustainability by the services (including consultancy services) USAMs provide the industry. The Programme was executed by TUBITAK and six USAMs have been established; Eskişehir Anadolu University, Ceramics Research Centre (SAM), Ege University Textile Research Centre (TAM), Cukurova University, Adana University Industry Research Centre (Adana USAM), Middle East Technical University, USAM, Istanbul Automotive Technology Research Centre, Ankara, Biomedical Technologies Centre. However in 2006 TUBITAK has left the USAM model and decided to broke-up the established centres.

³ Interview with METU Research Coordination Office, 23.02.2011

Section 3 – International and National Best Practices

3.1. International Best Practices

3.1.1. Overview of Textile Clusters in China

China is the world's largest producer and exporter of textile and apparel. With its abundant supply of low-cost and skilled labour, the country has attracted textile and apparel manufacturers from around the world to set up production bases. The textile and apparel clusters are primarily located in the coastal regions. Since raw materials and other processed apparel products are much cheaper in China and their qualities are increasingly up to the global standards; the textile and apparel clusters in China have become principal sourcing bases for textile and apparel products. However, the current development status of the apparel industry, like many other industries, is characterized by surging operational costs, increasing competition and reducing profit margin. As a result, more apparel manufacturers are moving out from the relatively high-cost coastal areas to the inland regions. Relocation of the apparel industry/clusters is being observed.

Latest development of textile and apparel clusters in China

Cross regional cooperation

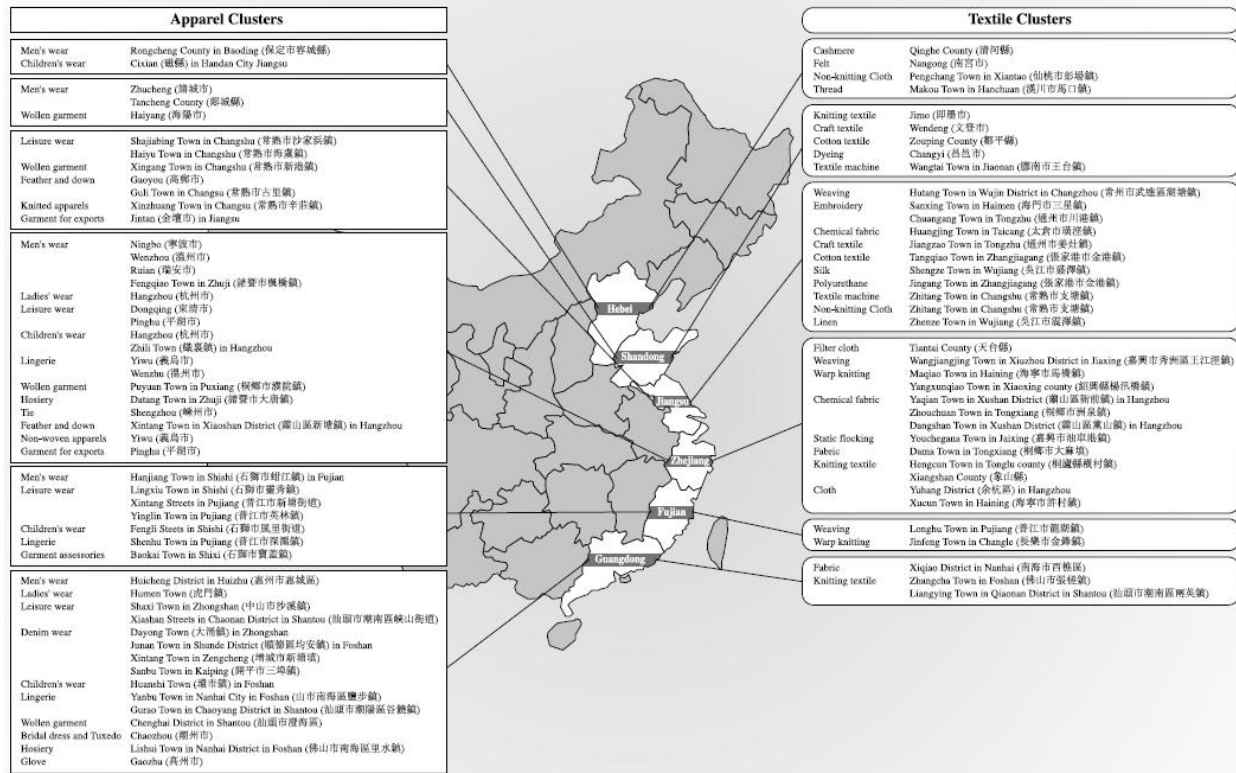
With growing sophistication of *information system and supply chain management*, cross regional cooperation among enterprises in different textile and apparel clusters is being observed. This takes place mostly in the less established clusters. Many experts believe that specialization of the enterprises in the clusters gives rise to cross regional cooperation. Indeed, specialization and cooperation coexist and help spur the growth of the clusters.

Information system and supply chain management, cross regional cooperation among enterprises in different textile and apparel clusters is being observed.

Relocation of textile and apparel clusters

Industrial relocation is gradually taking place in China. The continual surging land and labor costs, rising costs of raw materials and energy in the coastal regions have prompted many enterprises to relocate to the relatively less expensive inland areas. Some enterprises even move their production to other lower cost countries in Asia. Thus, it is expected to see the formation of some new textile and apparel clusters (with the presence of many Chinese enterprises) in other Asian countries. This may pose some new challenges for the existing apparel enterprises/clusters in China.

Figure 3-Major Textile and Apparel Clusters in China



Source: China National Textile and Apparel Council, Li & Fung Research Centre

3.1.1.1. Research Policy and Implementation in China

Evolution of technology transfer: from Centre to Research Consortia

Technology transfer by university is gradually changing. Today in China government policy strongly supports technology transfer through establishment of joint development laboratories, incubators, and research consortia.

New characteristics in university's technology transfer

Spin-off organizations co-established by university and local firms are usual. It is used to have university managing company, now university as a stockholder. University and firm are more deeply involved in transferring process. Firms are from simply buying technology from cooperative research, joint venture, commitment project, patent license, etc.

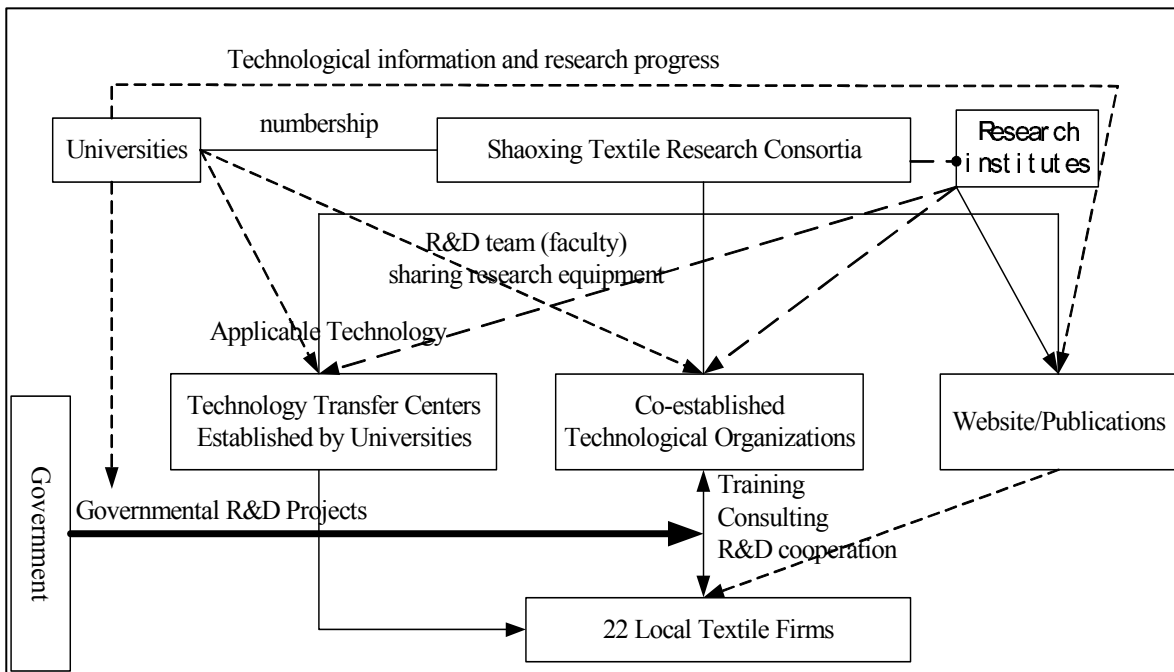
In China the technological gap between university and firm is shrinking firms are becoming highly request in technology level and marketable. Government financial support is increasing again, and university is more concentrates on academic research. Local government plays critical roles in establish such transfer channels.

Establishment of Textile Research Centre Alliance:

As it is stated earlier in China Research Alliances are now promoted and supported through central and local governments. Shaoxing Textile Research Alliance is given in this report as an example which Joint Program can review for the future studies to combine IRACs in Malatya, Kahramanmaras, Adiyaman and Gaziantep.

Shaoxing Textile Research Alliance has been established by 3 local governments, 6 universities, 4 research institutes and 22 local textile firms in 2006. Aim of the alliance is transferring applicable technology, promoting research cooperation, improving research capacity of local textile cluster. The consortia undertake 70 governmental R&D projects, and 10 cooperative R&D projects, all input 40 million RMB R&D expenditure, and obtain 400 patents in 2006-2007.

Figure 4: Research Consortia



Source: University Technology Transfer in China, Institute of Small and Medium Business Development, Prof. Chi Renyong, Presentation

3.1.1.2. The Hong Kong Polytechnic University Institute of Textiles and Clothing (ITC)

The Hong Kong Polytechnic University (PolyU) is the major provider of academic training and the principal research organisation dedicated to the textiles and clothing industry in Hong Kong. It has accumulated rich experience in technological research resulting in major achievements. Indeed, the Institute of Textiles and Clothing of PolyU is internationally recognised as one of the top three world-class research centres in this field.

The mission of ITC is to serve the Hong Kong community through the provision of quality educational programmes, research, consultancy and professional services in fashion and textiles. The activities are anticipated to extend to neighbouring regions and the international arena. These are planned in line with the University's vision to become 'a preferred university offering preferred programmes and producing preferred graduates' and the achievement of PolyU's mission of 'Academic Excellence in a Professional Context' through the pursuit of its seven strategic objectives as stated in the University Strategic Plan for 2008 to 2012.

Goal and Objectives

The goal is to become a world class academic department in fashion and, textile education, research and knowledge transfer with the following taken as the key objectives for ITC from 2009/10 and onwards:

- ❖ to provide professional education covering the whole spectrum of activities in fashion and textiles, and develop "all-round" graduates with vision and a global outlook, *a sense of social responsibility*, critical and creative thinking ability;
- ❖ to conduct research to create and *disseminate knowledge to the* academic community, commerce, *industry, society* and the world at large;
- ❖ to complete the review of academic programmes in fashion and textiles, and further develop the 4-year BA programme curriculum for implementation in 2012/13;
- ❖ to further enhance learning and teaching in both teaching methodology and practice, the implementation of outcome based learning (OBE), maintain and upgrade an environment that facilitates learning, with an aim to stimulate students' learning interest;
- ❖ to *collaborate with partners* on the development of preferred continuing education in fashion and textiles;
- ❖ to become an area of excellence in fashion and textile education and research, regionally and internationally; and
- ❖ to lead and enhance the development of the fashion and textile industry.

ITC offers a wide range of professional services that are specifically designed to meet the needs of individual clients. The extensive experience of our staff at both the local and international level and the state-of-the-art facilities within the Institute ensure the *delivery of the highest level of consultancy services for the fashion and textile industry* in Hong Kong and the region.

ITC aims to provide opportunities and solutions *for the fashion and textile industries through technical and business consultancy, contract research and joint ventures*. ITC provides a wide range of professional and consultancy services to industry in areas such as technological advancement, product and process development, quality management, technical investigation and tailor-made training programmes. In addition, we aim to assist the industry in aspects of new design, product development, and technical and business strategies.

*Visit The Hong Kong Polytechnic
University Institute of Textiles and
Clothing Web Site at
<http://www.itc.polyu.edu.hk/en> and
www.hkrita.com*

3.1.1.3. Donghua Textile University Research Centres



Donghua University (DHU), formerly China Textile University, was founded in 1951. Located in the downtown area in Shanghai and adjacent to Hongqiao Economic Development Zone, DHU is one of the state-key universities directly under the Ministry of Education of China. Its feature disciplines, such as Fashion Design, Textile Engineering, International Trade, Material Science, and Information Technology have received high reputation both domestically and internationally.

DHU is a multi-disciplinary university with a wide range of undergraduate and graduate degree programs across a vast field of disciplines including engineering, economics, management, literature and art, laws, science, and education. It has 16 colleges and schools, offering 50 undergraduate programs, 61 master's degree programs, 29 doctoral degree programs, and 5 postdoctoral research programs, among which are 6 state key disciplines and 7 Shanghai municipal key disciplines. Academic achievements have found applications in areas such as aeronautics, military science, new material, architecture, and environment protection. The number of patents granted and under application ranks the highest among Chinese colleges and universities.

So far, DHU has established cooperation with over 80 well-known overseas universities, research institutions and enterprise. DHU also successfully held international conferences and forums in the fields such as textile, fashion, and material.

1. Research Centre for Dyeing and Finishing of Textiles

Authorized by Ministry of Science and Technology, Research Centre for Dyeing and Finishing of Textiles of Donghua University was founded in June of 2000. The centre is mainly engaged in the research of textile dyeing & finishing and processing, and the engineerisation and application of its significant findings. While assimilating new dyeing and finishing technologies around the world, the centre is devoted to technical innovation in this domain. While offering the training of high-qualified technicians and administrators, the centre opens the education program for both master degree and doctor degree applicants and postdoctoral researchers. Depending on the strong textile discipline groups and scientific developmental capability of Donghua University, the centre has been in a leading position in China in high-grade cotton fibre dyeing and finishing technology, ecological textile dyeing and finishing technology, high-grade and mixed fibre of multi-component dyeing and finishing technology, the dyeing processing technology new environment-friendly fibre and its relating products, anhydrous dyeing new technology and new dyeing and finishing auxiliaries and finishing agent. Some of those technologies have ascended into international advanced level. *To meet the market demands, Funded by Donghua University, Shanghai Handa Dyeing and Finishing Technology Co. Ltd., an independent legal entity qualification was founded to meet the market demands.*

2. New Fabrics Quick Response Center

The New Fabrics QR Centre cooperated with *Oriental International Textiles Import and Export Corporation* of Shanghai in establishing Technological Information on Oriental Fabrics and Product Research Centre, whose main tasks include:

- ❖ Collect information on textile industry at home and abroad *to establish a multi-functional data* base.
- ❖ Test and analyze the new fabrics overseas to interpret their composition and key manufacturing techniques.
- ❖ Independently produce new fabrics in accordance with the trend to participate in the competition of international market.
- ❖ Hold exhibitions of domestic or international fabrics and textile fibers to promote academic exchanges.
- ❖ Form membership system to attract fabric suppliers and enterprises covering fields ranging from material production, spinning, fabric manufacturing, dyeing and finishing to clothes, transforming research fruits to commodity products.

3. Twenty first Century Green Fibre Research Centre

“The New Fabrics Rapidly Response Centre” and “The Technological Information on Oriental Fabrics and Product Research and Development Centre ”were established by our university and the Oriental International Textile Import and Export Corporation in Shanghai. The tasks of the centre go as follows:

- ❖ To collect various information on the textile industry at home and abroad, and establish multi-functional information database.
- ❖ To test and analyze the latest fabrics overseas and to interpret their composition as well as the key techniques in production.
- ❖ To create a number of leading textile products and participate in the international competition according to the trend of international textiles.
- ❖ To hold seminars and exhibitions of domestic and international textile fibres and fabrics, organize academic exchanges, and attend international expositions.
- ❖ Form the membership system *to recruit suppliers from raw materials production, spinning, weaving, dyeing, and clothing to fabrics enterprises*, transform research fruits into commodities, *expand the* technical development of the centre and the *production base*, and play a *vital role in the product chain :raw materials > semi-finished materials > finished materials > final products>consumers*.

4. Chemical Fiber Engineering Research Center

The Chemical Fibre Engineering Research Centre is a school-level research centre with outstanding technology and products. There are professional researchers from Department of Material Science, of Automation, and of Mechanical Engineering. It mainly engages in researches on chemical fibres, textiles, automation and mechanical engineering as well as the promotion of products.

The centre boasts great strength of engineering research and product development with three professors, six associate professors and senior engineers, and over ten masters and doctors. Many national scientific and technological projects of it have won awards in China.

Besides research on new materials and technologies, the centre also emphasizes commercialization of research findings. More than 50 projects have been finished to realize the industrialized production of functionalized fibres, and many bases like experimental base, production base of chemical fibres, processing base and marketing base have been established.

All the staff in the centre aim for solidarity, struggle, innovation and pragmatism and keep enhancing the research ability. We sincerely welcome you to join us for the common development.

5. Development Centre of Automotive Textile Materials

Various materials are used in auto manufacturing, metal material, rubber material, and textile material, a material the application of which is on the rise. Its serving as both decoration and reinforcement has developed very fast. Statistics show that automotive textile material accounts for 1/3 of all the industrial textiles and in recent years, it has reached the highest percentage, 35% of industrial textiles in Western Europe.

Development of the auto industry provides a developing opportunity for the textile industry in China. However, the automotive textile in the country is in a seriously short supply and most of it depends on imports because our industry of automotive decorative textile started late. In the past, the basic material of the interior automotive decoration was artificial leather and there was no professional manufacturer of automotive carpet in China for a long time. Until the late of the 1980s, there emerged the first fabric manufacturer of car seats. Up to now, there have been dozens of manufacturers producing fabrics of interior automobile. Nowadays, textiles account for over 50% of interior automotive fabrics. Textile fabric has replaced artificial leather as the basic interior decorative fabric in top-grade automobile while in low and middle-grade automobiles it has been adopted gradually.

Decorative Textile for Interior Automobile (DTIA) is a high-technique production with strict demands for its stuff and complicated processing skills. In countries with advanced auto industry like the USA, Germany and Japan, the research of DTIA has been drilled deeper while the research and production in our country are just on the threshold. In recent years, with development of the auto industry, many enterprises in our country have developed this kind of textiles and achieved a certain progress.

6. Textile Technology Development Centre for Building Materials

Since Ninth Five-Year Plan, the building material industry has been regarded as one of the four pillar industries of our national economy.

Urbanization is a major step for the economic development of our country. Since dwelling places are in great need, there will be lots of transformation work, including rural housing and public buildings, which constitutes a big market.

The goal of construction industry is to develop "intelligent structures".

According to the Eighth Five-Year Plan *intelligent structure is light-duty, energy-saving and safe.*

Investment in capital construction helps encourage not only the present but also the long-term development of our national economy. According to the economic plan, building material industry is of great significance in developing national economy. The goal of construction industry is to develop "intelligent structures". According to the Eighth Five-Year Plan *intelligent structure is light-duty, energy-saving and safe.* Intelligent structure also demands increasingly

comfortable environment of living and work, which is embodiment of the sustainable development in buildings.

This development trend of construction industry involves application of advanced technology in traditional building materials, which calls for the multi-disciplinary research, study of textile included. Donghua University thus shall broaden her research field to promote innovation of science and technology in textile industry, which is also necessary for the development of national economy. In such a background, we deliberated with the Science and Technology Committee of Shanghai Municipal Construction and Management Commission and its companies on the development of new building materials around 1998

7. Technological Development Centre of Agricultural Textile

Agricultural textile, a new industrial product, is an important material to change backward agriculture and extensive operation mode, whose application constitutes a part of great importance in agricultural modernization. Textiles are widely used in agriculture in some developed countries.

At present, foreign agricultural textiles mainly include textile materials for agricultural covering, substrate materials in plant growth, greenhouses, farmland and water conservation and other sectors. Varieties and quantities of agricultural textiles are on the rise in the developed countries. There should be a high demand in China, a large agricultural country with development of agricultural science and technology.

However, the fact is that a considerable disparity exists between marketing share and ideal potential market.

3.1.2. Overview of Textile Clusters in Spain

In this part of the report Catalonia has been taken as the case region for textile industry in Spain and the report under current title has benefited from the Catalan Textile Industry Case Study prepared by the Competitiveness Group one of the leading companies in world working on cluster development.⁴

A company's *environment changes* faster than ever and few managers would not be aware of the need for constant innovation. Today market intelligence, total branding, design, retailing, real state, *supply chain management* and logistics are indispensable success factors for any clothing company. Clothing is thus a completely new business for many that embark in this venture transforming from a manufacturing past. Although alert to new product technologies, technical textiles, etc., entrepreneurs and executives in the clothing industry should not disperse their efforts, focus on developing these skills and demand their associations and institutions to support them in these areas.

The main implication is that there is no good or bad sector. It has taken very long to the European Union on textiles to update documents and cases on textiles and there are plenty on biotechnology, aerospace, etc. However, Zara and Mango are two of the fastest growing multinationals headquartered in Spain and they are textile companies. Only Mango employs over 1,500 people in their Catalan headquarters not having manufacturing (the entire Igualada cluster employs 3,800 mostly in manufacturing) and grow double digit every year. Although they manufacture abroad they retain the higher value added activities in Spain transforming low value added manufacturing jobs into marketing, design, retail, logistics, outsourcing, etc. high value added jobs. They also contribute to the economy being clients of sophisticated IT, retail designers, logistics providers, etc.

The textile sector, once the foundation of the local economy, has given way to more modern industries but is still significant. It accounts for 7% of Catalan industrial output, which represents 38 per-cent of Spain's total production. Catalonia is also a leader in the Spanish tannery industry, accounting for 60% of Spain's total production and 55% of its exports. During 2005 the industry generated a turnover of €4 billion. According to the National Institute for Statistics (INE) it employs approximately 94,400 people – 2,8% of total employment in the region.⁵

The Catalan textile industry powered by the steam revolution started developing in the region in 1830. Given a high dependency on raw materials coming from America and a weak local market, made being located near a port critical, both to source and export goods.

⁴ Competitiveness Group Srl www.competitiveness.com For further information please contact with Turkey Business Developer, Ms. Yeliz Cuvalci at yeliz.cuvalci@competitiveness.com

⁵ The Catalan Clothing Industry, Competitiveness Group Srl, 2008

3.1.2.1. INTEXTER Institute of Textile Research and Industrial Cooperation of Terrassa

Institute of Textile Research and Industrial Cooperation of Terrassa (INTEXTER) is *a basic unit* in the Universitat Politècnica de Catalunya (UPC), with its own administrative and functional structure. Its activities are addressed to encourage *research and industrial cooperation* in all the fields of the textile area and others related with it.

INTEXTER was declared as an official institution on the 10th June 1964 and was designated Cooperating Laboratory by the Junta de Sanejament of the Generalitat de Catalunya in 1987. INTEXTER was appointed on the 20th December 1996 by the Generalitat de Catalunya as a cooperating institution of its *Environmental Department* for the granting of the EU *eco-label* to the following products: a) bedding and T-shirts and b) detergent for home laundering.

INTEXTER activities cover two complementary areas which extend from the research and technology development of products and processes to the establishment of the most adequate mechanisms to open new ways of technological transfer and cooperation with Industry through research and technology development projects.

Another objective of INTEXTER is the training of technologists and researchers which is done by imparting lectures in the Doctorate Courses. The following activities are carried out:

- ❖ Industrial and research projects
- ❖ Technical assistance
- ❖ Analyses and tests
- ❖ Quality control
- ❖ Product faults
- ❖ Professional expertise and technical reports
- ❖ Standardization
- ❖ Course, symposia, workshops, conferences
- ❖ Publications and technical education
- ❖ National and international relations

Under the program “Profit Textile/Confeció 2007” (2005-2007) launched by the Spanish Ministry of Industry, Tourism and Commerce the Technological Innovation Centre (CTF) participated in the research project on textile technology “Nanoalgodón”. The CTF was established in the campus of Terrassa of the Polytechnic University of Catalonia with the support of the Generalitat de Catalonia and CIDEM. The objective of the project is to investigate nanotechnologies applicable in textile for UV protection. The project carried out by joined efforts of CTF, Technological Centre LEITAT, the Spanish International Textile Association (AITPA) and the Catalanian Institute of Nanotechnology.

3.1.3. Overview of Textile Clusters in Sweden

Technical textiles and textiles for industrial use are expanding sectors in Sweden. Sweden has a solid foundation of development and production of technical textiles and an aggressive interdisciplinary experimental textile and design research. Nearly half of Sweden's textile production is in technical textiles.

Geotextiles, fabrics for airbags and the automotive industry, felts and fabrics for use in paper and pulp production, hygiene articles, parachutes, filters for air and liquid purification, and sails are some examples in this innovative branch. Sweden is also a world-leading producer of fabrics for greenhouses⁶.

Not only for textiles also for regional economic development, VINNVÄXT Program by VINNOVA has played important role for Sweden. Programme promotes sustainable regional growth by developing international competitive research and innovation environments in specific growth fields including textile industry.



University of Borås plays significantly important role for textile development in the country not only for improving technical textiles in terms of technical research but also supports enterprises in sustainable development and business development areas.



With Borås as a centre, a cluster around textiles both on a regional- but also national level has been developed. Textile and Clothing companies are traditionally based in the region and there are also many entrepreneurial trading companies with a long tradition of risk investment in new technology.

Figure X: Location of the Sweden Textile Cluster

⁶ Smart Textiles, the Swedish Clothing and Textiles Industries Association

3.1.3.1. The Swedish School of Textiles, University of Borås, CTF Textile Research Centre

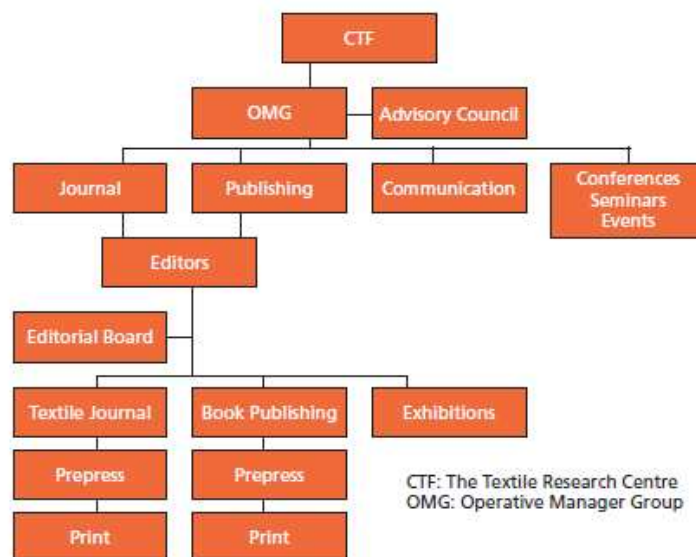


Since its start in 1998 the Textile Research Centre, CTF, has worked to gather international and national actors who want to reinforce research in the textile and fashion sector. The CTF is attached to the Swedish School of Textiles, THS, at the University of Borås. Through active work the CTF is now of central importance to the research and the artistic development work carried out at the Swedish School of Textiles. Seminars, conferences, publication of journals and other works, and creation of research networks are items from the program.

The vision of the centre is; development of innovative design with the help of modern technology giving consideration to environmental, esthetic, financial and ethical requirements.

Today the Swedish School of Textiles has some 10 professors and 20 postgraduate research students. Its intentions are now to develop and strengthen the CTF as an arena and as part of the infrastructure for research and artistic development work. To achieve this, a re-examination of activities, organization, communication, and financing has been carried on. Purpose The purpose of the activities of the CTF is to promote Nordic research in textile and fashion through making research results and information available to all professional groups in the textile field. The CTF strives to provide an overall picture of this kind of research by highlighting design and craft as well as technology and management and the unique combination of these subject areas represented by the Swedish School of Textile and its partners. Thus, CTF activities include hosting lectures, seminars, and conferences along with reflecting current issues and presenting discoveries through publications and contacts with the media.

Figure 5: Organisational Scheme of the Textile Research Centre



Source: CTF, Textile Journal, 2008

At the Swedish School of Textiles the creativity of art is combined with the ingenuity of technology. This combination is the common thread for textile research conducted in a variety of themes within four main research areas:

- ❖ Design
- ❖ Technology
- ❖ Management
- ❖ Craft

3.1.3.2. Research Projects

1. Fashion

Design rationale in fashion design, unfolding the design process in fashion design through practice grounded design research.

2. Knit on Demand

Fine knitted, collar, round neck - in the future "Steal Granny" a hyper modern knitting machine will make your design ideas come true, right at the store.

3. Smart Textiles

In what way will the introduction of Smart Textiles change the notion of a "textile" product?

4. The Design of Prosperity

A series of seminars and workshops conceived by The Swedish School of Textiles, University of Borås.

5. Technical Textiles in the Building Industry

Technical textiles have been studied and implemented in the building industry with great success. The basic aim of the project is to achieve a self-cleaning surface on building materials by the use of technical textiles.

6. Fashion and Interaction Design

Fashion design has its foundation in the design and production of garment.

7. The Dressed Body and its Aesthetic Consequences

Creation of Meaning and Coherence

8. Nordic Innovation Center

NICe supports a new network of excellence through start-up funding. The coordinator for NEST is SmartWearLab of Tampere University of Technology.

9. Global Strategies of Fashion Enterprises

Aimed to identify, assess and where feasible, measure the factors that are instrumental in fashion and textile enterprises' success in a globalized setting.

The current project, **Success or survival – strategies of fashion and textile enterprises in the globalized economy**, is aimed to identify, assess and where feasible, measure the factors that are instrumental in fashion and textile enterprises' success in a globalized setting. The *competitive performance of a company in continued globalization depends much on its adjustments with the complex system or environment surrounding it; complete innovation in product, process & supply chain from all perspectives*; high degree of responsiveness and ability to mitigate risks in the process (resilience).

The project aims to comprehensively devise methods to focus on perceived consumer value, collaboration and concurrent redesigning; as required; to understand the critical success factors for the company leading to market orientation. It is aimed to provide essential contribution to the development of a research profile of the University of Borås within the areas of textile – design, technology and management.

The success or survival of an enterprise in the present world is an interesting presumption. With increased volatility of the surrounding market – flooded with innumerable rapidly changing market dynamics – the situation is really complex. This is tossed up with the ever changing consumer demand characteristics.

In the European perspective, the industrial jobs have declined, imports have soared, many brands and enterprises have failed or disappeared but at the same time there has been emergence of some strong fashion brands, great marketing & management strategies & concepts and innovations. Why is it such? Why have such diverse developments have taken place? How did some firms manage while others collapsed?

In such a turbulent scenario the present research is expected to critically evaluate the major success factors necessary to be winning out of the situation. Certainly the project aims to investigate upon several dimensions like aspects and effects of a global economy on the success and survival of textile and fashion enterprises in Europe; the need to be more responsive, resilient and collaborative in the value chain and to embrace flexibility, innovation to nurture and meet consumer demands.

Broadly, the work plans to phase out its proceedings under four broad areas, viz. Globalization, Competition, Innovation, and Customer Focus.

9.1. Globalization

“We should no longer be trying to compete in international markets on the basis of low cost, low value-added manufacturing, but rather through innovative, high technology products and processes” - CBI Policy Statement on Manufacturing and Globalization

“The world is shrinking day by day turning into a global village!”

Globalization has diversified impacts on the world economy characterized by rising level of import penetration, competitive force development, structural changes in industries etc. There are diverging viewpoints on the costs and benefits of the process of globalization. Its current wave places increasingly heavy emphasis on the importance of human capital as a factor determining long-run economic growth. However, counteracting concepts related to global demand for high skill services and high value-added manufacturing output remains strong too.

Globalization of production has been mainly examined from a quantitative economic perspective rather than viewing its qualitative impacts. Recent propositions suggest that outsourcing and off-shoring of manufacturing capacity is believed to be less profitable as it affects the critical relationship between product innovation, design and manufacture.

ZARA, is a common example of a fashion enterprise, which has successfully exerted total control on its relatively shorter supply chain to generate quicker response to changing trends and customer demands. It is thus very critical to understand the globalized setting of market turbulence, competitive situation, technological turbulence, international trade relations etc. and its impact on the Textile & Fashion Enterprises.

The current project is expected to conclude the contribution of continued globalization on international competitiveness and growth performance necessary to understand the industrial dynamics and a strategic fit of the firm’s value chain with the globalized environment.

The principle research questions intended to be discussed in this area:

- What are the economic effects of the relocation of production and other activities on the European fashion and textile enterprises?
- What are the major affected areas, regions and countries?
- What are the possible reasons for failure of the firms in the process of globalization?
- How can the effects of increasing globalization on international competitiveness, growth performance and employment perspectives be measured or forecasted?
- What are the impacts of emerging dynamic growth regions, European integration and EU enlargement on the textile sector?

How is it undertaken by the Research Centre and the Project?

- Identify the attributes of globalization with their impact and measurement
- Analyze different factors like growth of economic, monetary, political and many such inter-related activities like market deregulation, trade political rules, foreign exchange markets, integration & partnership etc. as driving forces
- According to the research frame work of the project, it is pivotal to determine and analyze the effects of the qualitative factors apart from the quantitative economic perspective.

9.2. Competition

The main factors that a company can control to achieve competitive advantages in global business are related to innovation, responsiveness, collaboration and resilience. Thus the ability to produce innovative, high quality, highly value-added products and services and bring them quickly and effectively to the market is instrumental for textile & fashion enterprises.

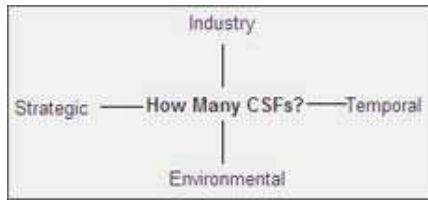
The need lies somewhere among the concepts and implementation of several propositions like - **Agility, Leanness, Partnership, Integration & Collaboration, Network Value Advocacy, Risk Management** etc. These are further step-downed into innumerable practical application factors like lead time reduction, reduction in TTM and TTC, customer creation and retention (CCR), New Product Development (NPD), EDI etc.



- Manufacturing on demand has become the primary weapon in the competition of a market already bombarded with products...
- Reducing wastes and inventory according to the Lean concept has become predominant for success of manufacturers and vendors...
- Higher degree of flexibility and customer service according to the Agile concept are ways of consolidating market shares...
- Pressure for Lead time reduction has also become an integral part of winning strategies...
- One of the requirements to stay ahead in the competition is to constantly work on improving efficiency...

All these makes it essential to determine the critical success factors for European business, with a focus on Sweden, Finland and the United Kingdom as the project work demands.

Market Intelligence



The project aims to identify key factors for generation of Market Intelligence (MI). The focus is on the impact of collaboration, in defining perceived consumer value, designing innovative products, enhancing supply chain agility and mitigating risks.

How does the Centre and the Project do?

- Identify the critical factors responsible for success or failure of a textile or fashion firm in the targeted economies (Sweden, UK, and Finland) in the globalized setting.
- Identify major elements of Market Intelligence (MI).
- How to disseminate MI across the entire supply chain for better business performance?
- How to generate 3-dimensional concurrent engineering (3DCE) for the overall perspective. Why is it necessary?
- Determine the future impact of globalization on different competitive factors (in terms of supply chain attributes like responsiveness, flexibility, supply chain risks, customer focus etc.) of the firms.

9.3. Innovation

Innovation comes from the understanding of 3 essential natural questions:

- What is desirable?
- What is viable?
- What is possible?

The term **innovation** means a new way of doing something for betterment. In the present context, from management perspectives the changes must increase value, customer value, or producer value.

Pertaining to the research work, innovation in the value network aims to focus on understanding the concurrent designing and development of products, processes and supply chain from the origination of an idea to its transformation into something useful, to its implementation; and on the system within which the process of innovation unfolds.

Since innovation is also considered a major driver of the economy, especially when it leads to increasing effectiveness, the factors that lead to innovation are also considered to be critical and pioneering.

How does the Centre do?

- How should innovative, value-adding products be defined and developed?
- How do we innovative or restructure processes or supply chains according to the demand and reconfigure for good?
- How do we design, develop and manage responsive and integrated demand chains with the design function as an integral starting point?

9.4. Customer Focus

Listen to the voice of the Customer - The customer is the King!

What is innovative and value adding is decided by the consumer. Designing and managing the supply chain to deliver just what the customer wants is a key to business success. Customer Requirements can be turned into goals that unify the entire supply chain across its functional boundaries. Hence “perceived consumer value” is the key to design and development – of products, processes and in a holistic way the entire supply chain. How consumer value is identified and defined in the consumer insight process and how products and services are quickly brought to the market are timely research topics.

The principle questions intended to be investigated under the scopes of the current project work would be:

- How to understand the feedback – Responsiveness to the customers?
- How to understand perceived consumer value?
- How is the consumer insight process performed and integrated in the design and development of products?

3.1.3.3. Textile Advisory Board

The Advisory Board is managed by the Manager of Centre. The Manager has an Associate Manager. Advisory Board composed of public and private sector representatives such as; CEO Swedish Fashion Council, Nudie Jeans, Swerea/IVF, Johan Huldt, professor and Furniture Designer, University of Borås, Eva-Karin Anderman, SVID, the National Swedish Handicraft Council, Design Manager H&M, Teko, The Textile Museum

3.1.3.4. The Swedish School of Textiles, Textile Innovation and Competence Centre



All over the world people come into daily contact with textiles primarily in clothing and textiles for furnishings. In recent years textiles have also become increasingly important in technical applications in fields such as construction, automotive industry, soil protection, plant protection, filters and medical applications. However, there is more to textiles than mere functionality. Through one's way of dressing and choice of furnishings, textiles and fashion is one of the strongest means available for expressing feelings, personality and social and cultural identity. In other words the textile field displays great width when it comes to form and functionality.

The textile industry also carries great economical importance as it is one of the largest industries globally. In 2003 the EU textile and fashion industry employed 2,5 million and generated a turnover of €187 million, making it one of the largest industries in Europe. The far-reaching structural transformation the textile industry is presently undergoing, partly as a consequence of expansion of the EU and abolishment of the production quota system for textiles and ready-made clothing products, has resulted in increased interest in the textile field at the EU level. In an effort to strengthen the competitiveness of the textile industry the European Commission has appointed a High Level Group. This group recommends large-scale investments in textile education and textile research and also proposes that textiles become a priority field within the Seventh Framework Programme. The group also points out the potential gains of increased cooperation between the textile industry, universities and research institutions.

Compared to other European countries, Sweden possesses a competitive advantage in the structural transformation that began in the 1960's as a consequence of the gradual abolishment of customs duties on domestic production and trade. Over the last few decades the Swedish textile and fashion industry has developed from a traditional manufacturing industry into a complex and knowledge-intense business focussed on design, logistics, advanced product and process development and trade and marketing. This far-reaching structural transformation has been successful in several respects and many Swedish companies have become prominent members of the global market. This development has led to the textile industry playing an important role in present-day Swedish national economy. In 2003 the turnover generated by trade and consumption in the textile and fashion sector amounted to SEK 60 billion (€6 billion). Over a number of years, the export of textile products has increased and in 2003 amounted to SEK 15 billion (€1,5 billion).

The export success of the Swedish textile and fashion industry is to be attributed to a strong tradition of textile industry and trade. In addition to the fact that many recognize the importance and potential of the Swedish textile industry, the industry's geographical

concentration has given the textile and fashion industry a strong position in the region of Västra Götaland and especially in the Borås area.

The Swedish School of Textiles, the University College of Borås – national center of Textiles and Design

The University College of Borås (UCB) is nationally leading in the textile {research} field and plays an important part in the development of the textile industry, e.g. by supplying the vocational field with skilled manpower and knowledge development. Using this unique position as a starting point the UCB strives to become one of Europe's leading seats of learning in textile education and research. To attain this goal a great deal of investments has gone into education and research in the textile field in addition to acquiring a unique set of machinery.

Historically, the textile center of the UCB has been the Swedish School of Textiles. As the character of the textile field is in itself interdisciplinary, research at the UCB is naturally carried out across the boundaries of related subjects and disciplines. As a result, close cooperation has been established with other research teams at the UCB, e.g. the School of Engineering and the School of Business and Informatics, in fields such as polymeric materials, logistics, signal processing, management, trade and marketing. All in all, 20 professors and senior researchers at the UCB operate in the textile field at the UCB, as well as 50 teachers, postgraduate students and technicians.

An industry in rapid development generate increasingly higher demands for competence in integrating a scientific approach with advanced application competence. To meet these demands, the UCB has developed higher textile education to prepare students for qualified vocational exercise in different textile professions. The education programmes cover the competence demands of the textile industry all the way from shorter programmes mainly focussed on professional and handicraft skills to longer and strongly profiled programmes. What the above says is that the textile field at the UCB is characterized by a great number of competences and an interdisciplinary and multidisciplinary approach. In reality this means that theoretical and subject specific knowledge is combined with a strong tradition of handicraft, artistic development and extensive experience in the trade.

Textiles and design at the Vocational University

Basic education

In the years to come, development of the basic textile education will focus on vocationally directed and profiled Master's {Degree} Programmes. Through further development of firmly established and internationally recruiting Master's {Degree} Programmes the Vocational University of Borås will gain a position as an important international actor in textile education. The international perspective is central in preparing the students for an increasingly globalized labour-market. This development will be founded in the collective competence in the textile field of the entire UCB.

Within the framework of the Vocational University the vocational orientation and multidisciplinary foundation that characterize today's education will be additionally reinforced. Further development will take place by e.g. strengthening the {educational} programmes' vocational items and initiating projects and courses that bring together students from different programmes. The latter will lead the individual student to a deeper understanding for the specific competences of other student categories, an insight that is imperative in a future career since cooperation between different professions is characteristic of the textile industry. Thus, focus will be on pedagogical development and creation of an educational environment that emphasizes proficiencies, competences and characteristics that are central to the students' coming professional and social life. Prominent features of the education will be e.g. introductory textile courses, projects executed entirely by students and national and international development projects in cooperation with business and trade organisations. Our ambition is that each student will receive a thorough introduction to the profession the programme is aimed at.

TIC – a center for competence in the textile field

Within the framework of the Vocational University the Swedish School of Textiles together with a number of actors {in the textile field} have created a center for competence in the textile field. The purpose of the competence center is to support the development of the textile field through research, competence development and product and business development.

The {competence} center is to constitute an arena for cooperation that in a structured and equal way creates the opportunities for a continuous exchange of knowledge and competence between the Vocational University and the participants. Behind the establishment of the center are the business community, research institutes and the Vocational University. The center will be headed by a board of representatives from the textile field.

The textile industry has come through a far-reaching structural transformation that among other things resulted in a large portion of the manufacture of clothing and textiles being moved to so-called low-wage countries, a tendency that has affected almost every branch of Western manufacturing industry. As textile production is moved out of the country, competence connected to knowledge-intense parts of the production line is in danger of being lost. In the light of structural transformation and in order to strengthen the competitiveness and to maintain knowledge-intense activities in Sweden, a central task for the cooperation center will be to support e.g. product development, design, trademark development, marketing, business development, logistics and entrepreneurship.

A competence center makes possible different forms of cooperation with the business community and other external actors, e.g. by sharing advanced equipment and through joint research and development ventures. An already existing example of this kind of cooperation is a development laboratory containing special equipment for the dyeing, preparation and covering of textiles, built by the UCB using financial means donated by the trade organization

Tekindustrierna. The equipment is used not only for education and research at the UCB but also for product development and testing by branch organizations. The intent behind the laboratory is to coordinate valuable resources that independent actors on their own cannot afford or do not possess the competence to run. Beside intensified contacts between academy and business community sharing the laboratory has provided the business community with "neutral ground" { a place to meet other members of the trade and exchange ideas}. Common issues may be identified and problemized together with scientists and students of the UCB.

Arenas for cooperation as the one outlined above may pose as a model for other branches where outsourcing and a diminishing national industrial basis has become reality.

Vocationally oriented research in the textile field

Research is a key factor in the further development and strengthening of the Swedish textile industry in the intensifying competition for the international market. In the textile field, the UCB has developed a research and development environment that in many respects already has come close to the Vocational University's orientation and methods as described above. In its widest definition, textile research is about exploring {the potentials of} textile materials, textile technology, textile application and textile products in all forms. The field may be divided into four subordinate areas which correspond to education and research found at the UCB. Textile technology – analysis and development of textile materials, i.e. fibers, non-woven, woven and knitted materials and also materials and chemicals {adapted} for lasting and environmentally sustainable preparation, dyeing and printing. Also, analysis and development of textile techniques such as weaving, knitting, spinning and preparation are included in this area.

- ❖ Design – analytical and experimental design research directed toward the textile field – textile design, fashion design, interactional design and material design.
- ❖ Trade and management – analysis and development of methods and techniques for textile trading, entrepreneurship, logistics and management of the textile design process, textile production and the product's way along the entire market chain.
- ❖ Textile handicraft – analysis and development of textile handicrafts. Reconstructions of historical textiles are included here. The area is a good example of how researching materials, technology, design and cultural science allows knowledge to interweave and develop.

Thus, the textile research field includes engineering science, handicraft, design research based on practical experience and vocationally oriented management and trade research specialized in the textile field. The threads that bind these very different areas together are the textile materials, the textile techniques and the textile product.

The textile research field will be a prominent research profile at the Vocational University of Borås. The strength of the profile comes from: Width, with highly developed communications between the different fields

Integration of design, material technology, production technology handicraft, culture and management and trade, based in modern design studios and state-of-the-art workshops and laboratories for preparation, knitwear, weaving, polymer-technical material development and characterization.

- Direct connections between education and research
- Strong regional and national support from the textile industry
- A well developed national and international network of actors in the {textile} field

Taken together with the collective competence profile of {the UCB} researchers, teachers and technicians, the vocational profile is unique and a great promise to join the {exclusive} group of Europe's leading textile research environments in the near future.

3.1.7.5. The Textile World

The Swedish School of Textiles has a close cooperation with a large number of actors that in various ways are connected to the school. Companies, organizations and other schools are represented.



University of Borås
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3.1.4. Overview of Textile Clusters in United States of America

There is significant innovative activity within South Carolina's Textile Cluster. Textiles is not a dying industry, but a changing one. Two studies on the South Carolina textile industry commissioned by New Carolina - one from Clemson University and one from North Carolina State University - show there are still over 900 company locations and 35,000 employees working in the industry. Textiles in South Carolina have a \$21.9 billion economic impact.⁷

- ❖ 16 major textile industry headquarters in SC
- ❖ 80 other industry sectors affected by textiles
- ❖ 46 out of 46 counties in SC with at least one textile related business
- ❖ 664 US patents generated by Milliken Research in the past 10 years
- ❖ 2,200 US patents generated by Milliken Research since they opened in 1955
- ❖ #1 in US patents by a privately held US company over the last 20 years: Milliken Research
- ❖ 63,000 jobs in the Textile and Apparel Industries
- ❖ 113,258 jobs from the Textile and Apparel Clusters and complementary businesses
- ❖ 912 company location/branches throughout the state

The Textile and Apparel Cluster is defined by a group of industries that include: the traditional textile and apparel sectors, direct supporting supply chain industries that provide key raw material suppliers and equipment, Cotton Farms, Cotton Gins, Noncellulosic Organic Fiber Manufacturing, Cellulosic Organic Fiber Manufacturing, Inorganic Dye and Pigment Manufacturing, Synthetic, Organic Dye and Pigment Manufacturing, and Textile Machinery. Related wholesaling margin activities Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers, Home Furnishings Merchant Wholesalers, Men's and Boys' Clothing and Furnishings Merchant Wholesalers, and Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers), and two emerging producers of textile/fiber products Surgical Appliances and Supplies Manufacturing and Motor Vehicle Seating and Interior Manufacturing⁸.

The Apparel Cluster has viable companies manufacturing apparel for a worldwide market. Though smaller than textiles, it is focusing on bringing emerging niche companies together with existing apparel companies. The Cluster has formed linkages with the National Association for the Sewn Products Industry, to link its member apparel companies with cluster activities. New Carolina also engaged Clemson University and *North Carolina State University* to incorporate the apparel industry into two textile industry studies. Linking the apparel and textile industries is one of the cluster's main goals.

⁷ <http://www.newcarolina.org/clusters/textiles.aspx>

⁸ The Contribution of the Textile and Apparel Cluster to the South Carolina Economy, UCED Research Report, 2007

3.1.4.1. North Carolina State University, College of Textiles, the Nonwovens Institute, Nonwovens Cooperative Research Centre

The Nonwovens Cooperative Research Centre (NCRC) was established as a State/Industry-University Cooperative Research Centre in 1991 as a result of a grant from the National Science Foundation. The NCRC serves the nonwovens industry through *research, training, education and economic development*.

NCRC Strives to be the global leader in nonwovens education and research. To achieve this vision and fulfil the mission for serving the nonwovens and allied industries, centre has established unique capabilities to address the diverse needs of this dynamic industry. The Centre houses unique and state-of-the-art facilities for product development, analytical services and materials testing, analysis and evaluation. These facilities are available for serving industry needs.

The Nonwoven Research Centre (NCRC) serves the nonwovens industry through fundamental and applied research in the technologies of the industry and an active program of technology transfer. The Centre has developed core research, non-core research, and product development activities.

The oversight committee for the research Centre is an Industrial Advisory Board (IAB). Each Member Company is represented on the IAB. The Board meets at least twice a year and offers advice and guidance on the nature of the core research programs carried out in the Center. Research proposals are developed by the faculty in consultation with member companies based on their perceptions of the needs of the nonwoven industry. The IAB helps prioritize these proposals for the funding decision. Progress reports of the research are presented to the IAB members and their technical representatives twice a year. The Board discusses the importance and quality of the results and recommends the Centre's path forward. The Board also monitors operational aspects of the Centre. It plays an important role in the recruitment of new members.

NCRC offers services to its industrial in the form of core and noncore research undertaken for the benefit of its membership.

Areas of Interest and Research

Core Research

Core research programs are developed jointly by the Center faculty/staff and the NCRC member companies. Core research programs focus on areas such as;

- ❖ the development of new materials
- ❖ the modification of existing materials
- ❖ basic studies that lead to a better understanding of technologies
- ❖ applied research directed at process material - property relationships
- ❖ the development of instrumentation and test methods for nonwoven fabrics

Core research programs are supported by funds from the State of North Carolina and fees from NCRC member companies. The results of the research are proprietary to the NCRC and to all member companies of the Centre. This information is placed in the public domain, through presentations and publications, poster presentations, software, and patent disclosures, only after the approval of the Industrial Advisory Board of NCRC. The policies governing the ownership of intellectual property are discussed under the policy section.

NCRC offers various levels of membership. The level is determined by the annual gross income of the company. One may question the benefit of membership in an organization such as NCRC. There are many direct and indirect benefits that can be derived from membership in NCRC. Below, we summarize our top ten reasons to join NCRC.

Non-Core Research

A **non-core** research program focuses on one or more of the above objectives but is carried out for an individual company. The single company sponsored programs can be proprietary and are made public only if the sponsoring company agrees. Non-core projects of special interest can also be developed for a group of NCRC member or affiliate companies. The results of such research are made public only if the sponsoring companies agree.

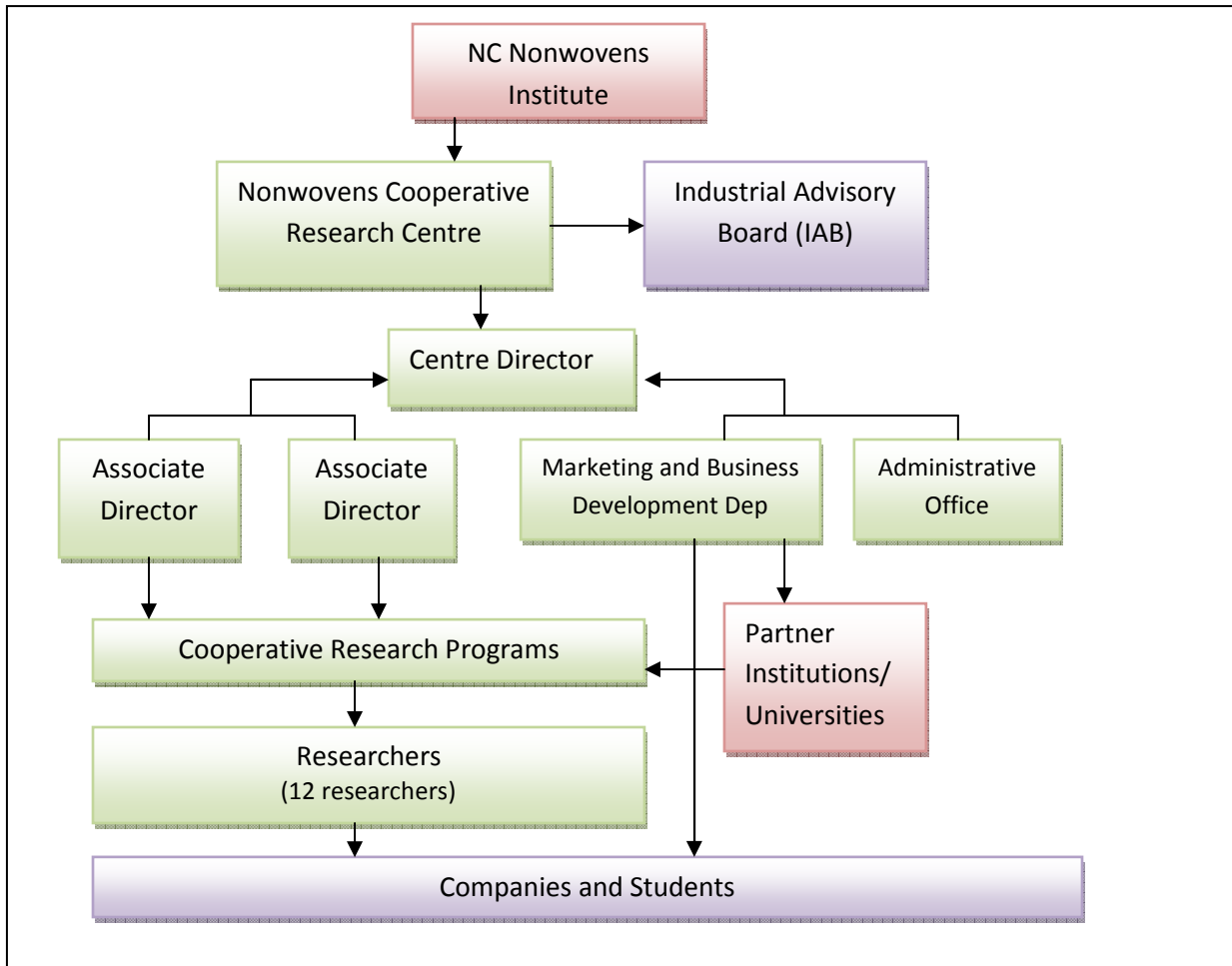
Technology Transfer

The Centre carries out an active program of **technology transfer** supported by funds from the **State of North Carolina** and **industrial members**. This program seeks to disseminate technology developed by the Centre along with existing knowledge of the management of materials and processes. Such programs are provided in the form of:

- ❖ training and assistance in the implementation of Centre developed technology
- ❖ courses taught at plant sites
- ❖ workshops at the Centre · industrial internships
- ❖ focused seminars, symposia, and conferences
- ❖ one-on-one consulting.

To carry out its research mission, NCRC seeks out talent at North Carolina State University as well as other universities such as Georgia Institute of Technology, Clemson University, University of Georgia, Loughborough University, University of Tennessee and others. Such **cooperative research programs** are undertaken by the faculty, staff, and students of these universities with the approval of the IAB.

Organisation Scheme



3.2. Best Practices in Turkey

To keep up with competitors from other countries (EU and third countries), the companies are stimulated to change their strategy from low-cost producers to diversity and quality producers of textile products. High investments are needed to build up R&D departments, to train employees and to reorganize. Most companies (SMEs) don't have the financial assets to invest, and could therefore start to lag behind.

3.2.1. TEKAUM, Aegean University Textile and Apparel Research and Application Centre



Aegean University Textile and Apparel Research and Application Centre was established in 1988. It is the first centre at its working area among Turkish Universities.

The purpose of establishment was to make practical research and development works in textile and apparel and to train staff in these fields. In 1994 the centre was departed from Engineering Faculty and connected to Rectorate. The centre is sharing the same facilities with Textile Engineering Department.

The services performed by the Centre are:

- ❖ to follow the newest technologies and to adapt them to Turkey and to give educations about them,
- ❖ to increase the efficiency and quality of Turkish Textile and Apparel Industry, to decrease the energy and material wastes, to show the routes,
- ❖ to make the necessary research and development works over production of the native, inexpensive, but qualified textile machinery and textile auxiliary agents
- ❖ to make trials in pilot plants in order to develop new products.
- ❖ to give objective service for quality and expertise.
- ❖ to arrange conferences, symposiums, seminars and courses about the developments in Textile and Apparel industry in order to contribute Turkish Economy. Theoretical or practical seminars and courses are organized for the technical staff which are working at textile industry and for the other employees which don't have any textile education and working at different departments (such as sales, marketing and exportation departments).
- ❖ to give training and consultancy services in the areas of textile industry needs, consultancy services are given in the areas such as export, business development etc.
- ❖ Feasibility reports are prepared.

Fiber, yarn, fabric, textile finishing and apparel, and also in specific fields like; oeko-textiles, waste water, energy and washing are made. Bachelor's degree, graduate degree and PhD thesis works in every field of textiles such as, Research Fund Accountancy, DPT and TUBITAK projects are also performed in corporation with Ege University Textile Engineering Department. *Consultancy services of many subjects, which are required by textile industry, are performed.*

Facilities and Plants

Ege University Textile Research and Application Center is sharing the same facilities with Textile Engineering Department. "Textile Pilot Plant" was operated by Engineering Faculty Textile Engineering Department first, and then connected to Textile Research and Application Center. Textile Pilot Plant is consisted of 7 Units:

- * Cotton Spinning
- * Wool Spinning
- * Weaving Preparation and Weaving
- * Knitting
- * Non-Woven
- * Textile Finishing
- * Apparel

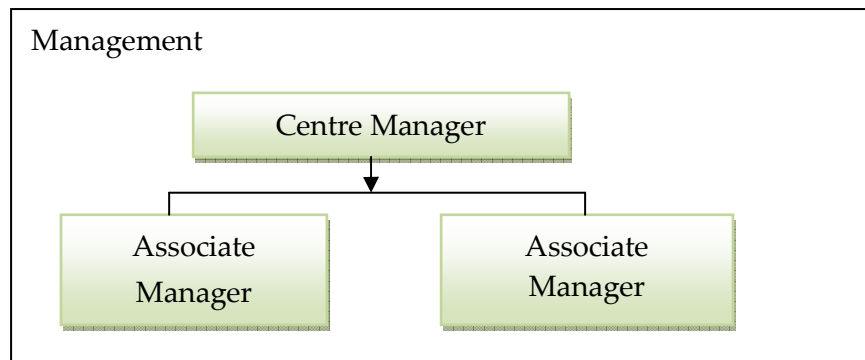
The Center also has Physical and Chemical Textile Testing Laboratories.

Academic Staff

The academic staff that works in Center is the personnel of Textile Engineering Department and Emel Akin Vocational School.

Management and Administrative Structure

Ege University Textile Research and Application Center has 32 personnel including 5 engineers, 2 chemists, 6 officers, 2 accountants, 12 technical staff, 2 secretaries and 3 workers.



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www.tekaum.ege.edu.tr*

3.2.2. Mediterranean University Entrepreneurship and Business Development Research and Application Centre (AKGİM)

The Centre has been established to contribute regional and national economy and employment. The centre aims to be the leading institution firstly in Mediterranean region and secondly in Turkey through coordinating relations between private sector and university.

Within the scope of this vision following services are provided to private sector and students; Human Recourses Services, Training and Advisory Services, Entrepreneurship Development Services and Scientific Research Project Management.

AKGİM is a unique example of a University Research and Application Centre with the sound success of bringing private sector and university together. It plays vital role bridging the need of sector with knowledge of the university. Through its online platform www.hemenis.com the centre is the first and only human resource centre working under the umbrella of a university. The centre is also working as ISKUR Private Employment Office.

The centre has been awarded by ANSIAD (Antalya Industry and Businessmen Association) with “Year’s Entrepreneur Prize” in 2006.

The Centre provides below services;

1. Human Resources

- ❖ Establishing business relations in order to meet the employer needs of the companies,
- ❖ Providing students, graduates and candidates who are looking for job with the services of finding appropriate jobs,
- ❖ Defining the employment needs of the institutions and companies,
- ❖ Gathering and assessing the demands of the institutions,
- ❖ Evaluating the candidates and selecting the appropriate people for the required positions,
- ❖ Acting as a meeting point for the candidates and the companies,
- ❖ Monitoring the satisfaction of the candidate and the company started working together,
- ❖ Supporting graduates to be employed and achieve career goals,
- ❖ Trainings and consultancy services to increase personal development, entrepreneurship, innovation culture

2. Career Advisory Services for Individuals

- ❖ Organisation of events to support students, companies and people looking for job finding the right organisation and the job they are looking for,
- ❖ Supporting students and people looking for job with advisory services to prepare efficient CVs,
- ❖ Providing information and advisory services on successful job interview techniques,
- ❖ Organising one-to-one meetings to better understand and the meet the human resources needs of the companies as well as the expectations of the candidates.

3. Personal Development Events

- ❖ Organising introductory events bringing companies and candidates together,
- ❖ Organising exhibitions to provide environment for direct contacts among candidates and the companies,
- ❖ Preparing seminars delivered by leaders and businessmen to enlighten students

4. Training and Advisory Services

- ❖ Analysing companies and diagnostic study on company needs,
- ❖ Evaluation of trainer application requests from the academicians,
- ❖ Evaluation of the consultancy requests from the academicians,
- ❖ Meeting academicians and representatives of the organisations in order to meet the training needs of the companies,
- ❖ Meeting academicians and representatives of the organisations in order to meet the consultancy needs of the companies,
- ❖ Providing information about certificate programs, language schools, etc.
- ❖ Organisation of on-site trainings for the engineering students in collaboration with the manufacturing companies,

5. Entrepreneurship Development Services

Centre aims to contribute entrepreneurship development therefore provides set of services including;

- ❖ Organising seminars and dissemination events and increasing the level of entrepreneurship culture,

- ❖ Following trends and dissemination related information,
- ❖ Implementing Projects in order to support entrepreneurs,
- ❖ Organising entrepreneurship trainings,
- ❖ Organising events to support women entrepreneurs,
- ❖ Providing advisory services for micro start-up businesses

6. Scientific Research Projects Management

The Centre undertakes studies to standardize project management and provide advisory services to academic environment and private sector.

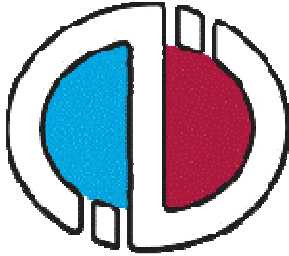
Through gathering projects and studies of academicians and students, the Centre established a pool of expertise to meet needs and demands of industry, companies. The Centre serves “Solution Packages” applies and monitors the results. Centre aims to achieve collective success in the region.

Figure 6: AKGİM Organisational Structure



AKGİM www.hemenis.com
AKDENİZ University Rectorate
Contact Person: Eda Şahal
+90 242 227 53 10

3.2.3. Anadolu University Tourism Research and Application Centre



The Centre has been established in order to play a bridging role between the university academic studies and implementers. In this regard the Centre provides research studies, trainings, conferences and publications to achieve the objectives. The Centre as a unit gives priority to inter-sectoral and interdisciplinary aspects of tourism.

The Centre is operating through the studies and monitoring of the faculty members of Anadolu University Tourism and Hotel Department.

1. Objectives

With the support of the related university units undertaking research activities and applications, delivering trainings and consultancy services in Turkey and abroad.

2. Activities of the Centre

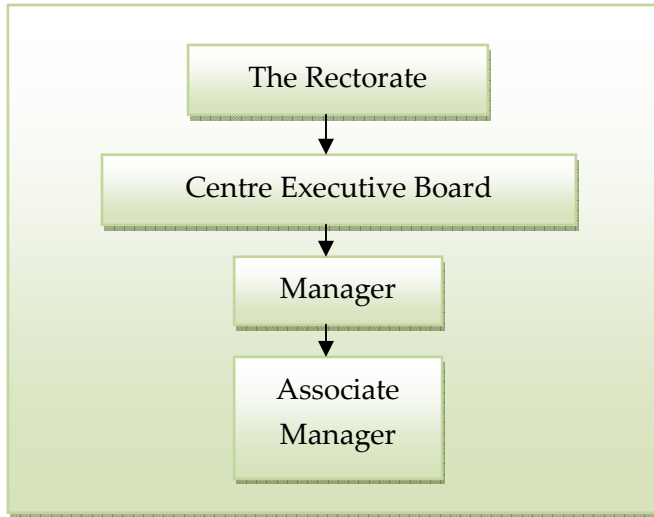
- ❖ Undertaking studies in every area related to tourism and made the results to public and contribute raising awareness,
- ❖ Establishing linkages, collaborations and partnerships with the related private and non-for-profit institutions in Turkey and abroad in the areas related to the Centre. Preparing joint projects, creating resources and monitoring the applications,
- ❖ Organizing trainings, seminars in the public related areas, running awareness raising events introducing different cultures,
- ❖ Establishing a library and archive serving the needs of the researchers, establishing national and international electronic communication network, preparing publications,
- ❖ Promoting academicians who are undertaking post graduate programs to involve tourism and culture related areas,
- ❖ In line with the objectives of the Centre, delivering training and advisory services

3. Management

The managerial bodies are;

1. The Manager
2. The Associate Manager
3. The Executive Board

Figure 7: Organization Chart of the Centre



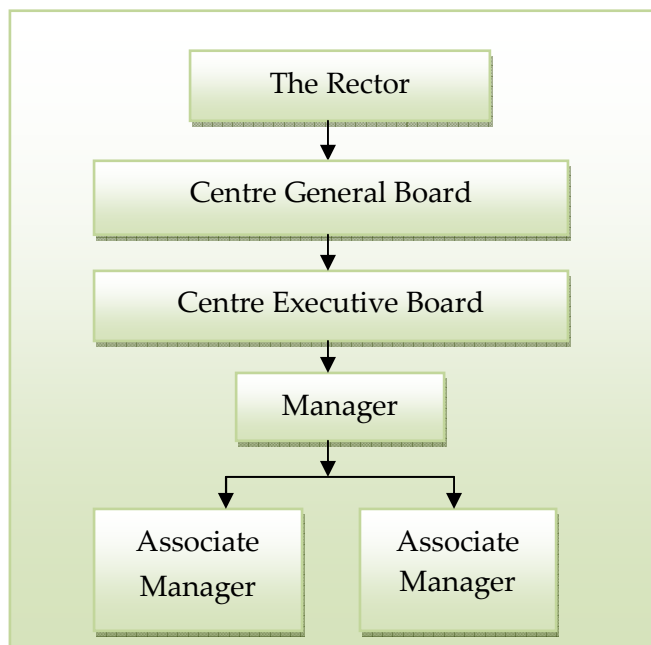
*Anadolu University, Tourism
Research and Application Unit
<http://tab.anadolu.edu.tr/>
0 222 335 05 80 / 1689*

Supportive Information

Beside above mentioned Centres, as a successful example of implementation Harran University Solar Energy Research and Application Centre has also been reviewed and interviewed. The Centre completed important renewable energy projects in the region and starting a macro scale Project called "GAP Renewable Energy" funded by the SPO.



Management structure of the Centre is same as the reviewed centres:



Section 4 –The Model

4.1. Why to Establish a University Research and Application Centre?

The Joint Program aims to establish enterprise development and research centre providing *advisory support* for the textile and apparel sector, in subjects such as *corporate social responsibility, environmental and social conduct* as well as carrying out innovative research in many technical fields.

In line with above statement, mission of this report was specifically defined as “the analysis study to be conducted in five university research centres in the world and three in Turkey with the priority given to ones refer to *environment, social responsibility, institutionalization structuring in supply chain and sustainability* of mentioned areas.”

Therefore preparation phase of this report put substantial effort supported with strong desk research study and interviews to outline the working principles of the Research Centres which are *not working on solely technical needs of textile and apparel enterprises but also giving special emphasis to sustainable development areas comprising the aforementioned specific topics*. When the analysis and expectations are considered -in terms of the structure- we are not anymore talking about establishment of a technical innovation and research centre but rather an institution or unit focusing social subjects that textile and apparel enterprises should handle in order to successfully transform their business.

In the light of the findings, this report strongly recommends establishment of a centre which will follow the establishment rules and procedures of a “*university research and application centre (URAC)*” and serve as university unit providing wide range of information, counselling and innovative consultancy services to students, graduates and textile enterprises in the areas including business development, environment, corporate social responsibility, supply chain management.

Main reasons why this report strongly advice establishment of an URAC:

- ❖ As examined it has been examined in Section-2, establishment of macro scale research centre requires comprehensive technical feasibility study and substantial infrastructure investment which is a subject of multi phase planning, preparation and budgeting, separate and macro scale project should be on stage. The Joint Programme has its limitations of time and budget for such scale project.
- ❖ Establishment of URAC is relatively fast and structure is flexible to work both on technical research areas as well as the complementary enterprise development areas.

Very importantly as the continuation of the Project, URAC can also provide long term services such as research studies on best potential technical areas, establish national and international networks and partnerships, prepare project proposal for the establishment of a macro scale technical research and development centre which could be further funded by the SPO.

There is also another vital issue which requires attention at maximum level; the *coherence between the name and the objectives of the centre*. The Higher Education Council is highly sensitive on this specific issue beside their expectation on the content/rationale of university dossier. Therefore the name, vision and the activities of the centre should be crafted reasonably connected in accordance.

Design of the centre should also ensure that there are not overlaps in the services with existing faculty, departments and/or units. Differentiation with the areas and services is an asset and more it is a must to establish such centre in the universities already hosting related departments. Centres should support faculties and/or departments with the complementary activities and services where in-house production could not be achieved within the university. The justification for the establishment of the centre should be reality based, pointing out solid requirements and contributively serving academic environment and the industry.

4.2. Establishment & Working Principles of University Research and Application Centre

4.2.1. Context

Research and Application Centers are established in order to undertake activities which cannot be undertaken under the existing structure of the universities. URACs can be established under rectorate or faculties, institutes or Vocational Schools.

- Centers working under the rectorate, Centre Establishment Proposal needs to be first approved by the university senate, then accepted by the Council of Higher Education and published in the Official Gazette to start its activities. *Different from the opens operating under rectorate, centers which are going to be established under faculties, institutes or vocational schools are evaluated by the Executive Board of the University.*
- Centers can be aimed and established either to do only research activities or just applications. Relevant law does not differentiate these objectives and accepts all kind as “research and application centre” Therefore; even over the course of the establishment the centers should be called as “research and application” they can use either of these following the official establishment.

4.2.2. Evaluation Phase of the Applications

Research and Application Centre Establishment Proposals are evaluated by the Research and Application Coordination and Evaluation Committee which is formed by the university Senate. Research and Application Centers are established by the Senate for four years in the framework of the Committee’s Report. Application is then made to Rectorate following the views of related unites invited. Application to Rectorate consists following points and the other issues founder members will include.

One third of the founder members should be among the faculty member and the number should be at least three. Founder members should select an Interim President among themselves and President undertakes the establishment operations. The Centre Proposals should be prepared in line with the indicators and criteria defined by the Higher Education Council. The Proposal should be prepared in detail clarifying the below mentioned items;

- a. Rationale and the objectives of establishment,
- b. Existing departments, graduate and undergraduate programs in the university related with the planned centre
- c. Academic benefits and support o f the centre’s activities to programs and research already being undertaken by the university departments,
- d. Supportive contributions of the centre to meet the aims of the programs already being undertaken by the university departments,
- e. Contribution of the Centre Activities in terms of the applications run by the existing programs,
- f. In which ways and how the Centre Applications will be differentiate from the existing programs and applications of the departments,
- g. Contribution of the specific to the university and society in general,
- h. Explanation on the required building, location, laboratory and availability, if not available foreseen plan to meet these requirements. Planning should include below topics;
 - Goals aimed to achieved in four years,
 - Existing and foreseen infrastructure needs,
 - Existing and foreseen needs of support,
 - Financial resources and budget planning for the current year
- i. Organization bodies, roles and responsibilities,
- j. The Unit Centre going to be operate under,
- k. List and CVs of the faculty members going to take part in Centre General Council
- l. Draft version of the Centre Regulations

4.2.3. Organizational Structure

Parts of the Research and Application Centre are; Manager, Centre General Committee, Centre Management Committee and Centre Advisory Committee.

1. Centre General Committee is composed of the members stated in the application. Acceptance of these members are upon the submission of the person and approval of the Centre General Committee
2. Centre Manager is assigned by the Rector upon the proposal of Centre General Committee among the university full time faculty members for three years. Same manager can be proposed in the following turn.
3. Centre Manager can select maximum two Associate Managers among the members of the Centre General Committee.
4. Centre Executive Committee is selected by the Centre General Committee among the members of Centre General Committee. Manager and Associate Managers are the members of Centre Executive Committee naturally.

4.2.4. Evaluation of Annual Activities

Research centers present Annual Activity Report to the Committee. The content of the activity report and criteria set by the Committee. Following criteria are important in evaluation of the reports;

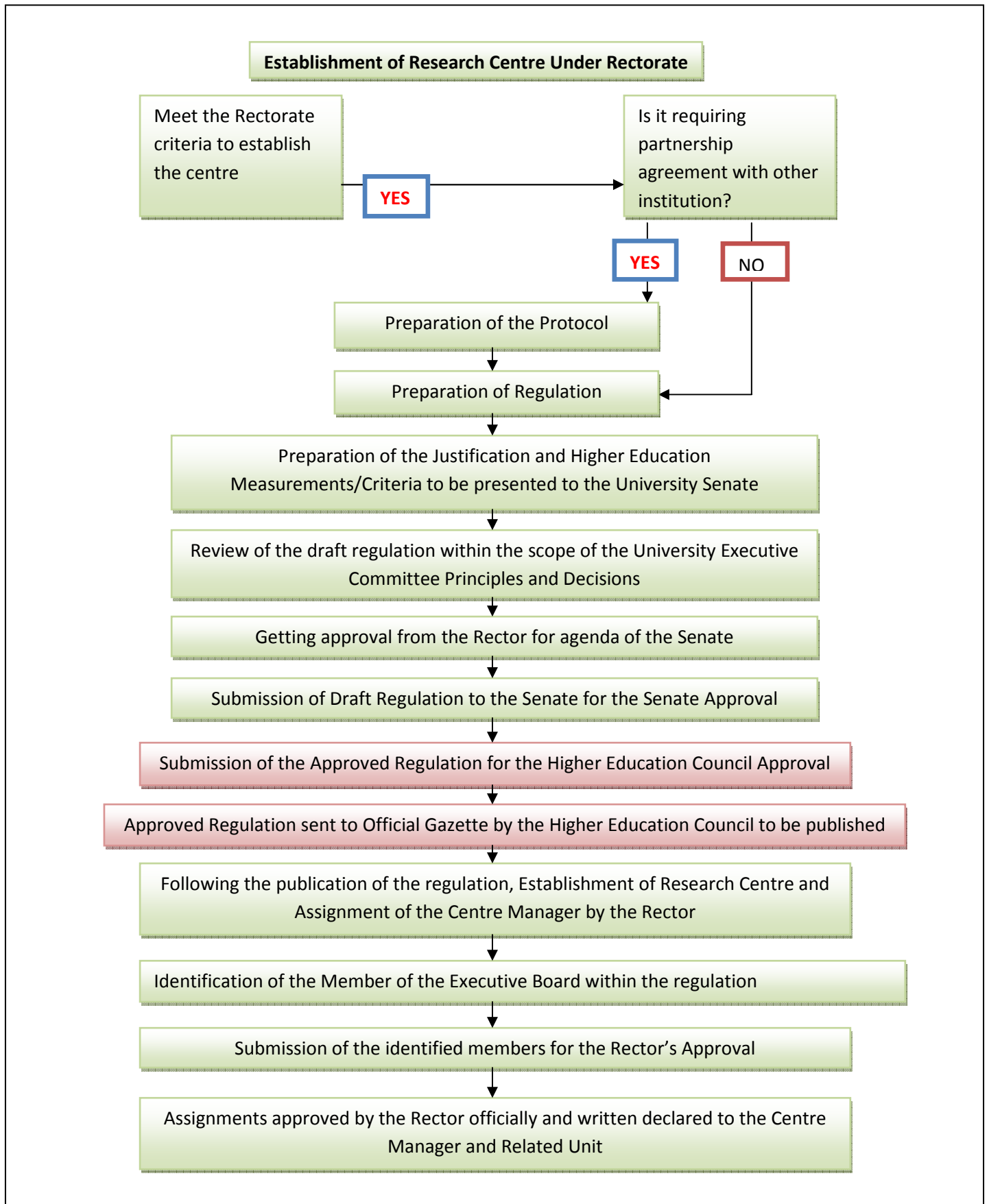
1. Executed activities should be in line with the Centre objectives,
2. How far the centre could release the foreseen objectives,
3. Level of contribution to the university academic environment

The evaluation results are sent to the centers. Commission notices the centers if two years of the criteria could have not been met. Senate decides continuation of Centers upon the performance. The first evaluation for the centers starts the following year of the establishment.

4.2.5. Budget

Research and Application Centers may request budget from the university. Research Centre is the authorized body to use the Circulating Capital (Doner Sermaye) unit portion as the result of its activities. For the newly established centers source request procedure starts with the following year.

Figure 8: Establishment Process of Research Centre under Rectorate



4.3. The Council of the Higher Education (CHE)

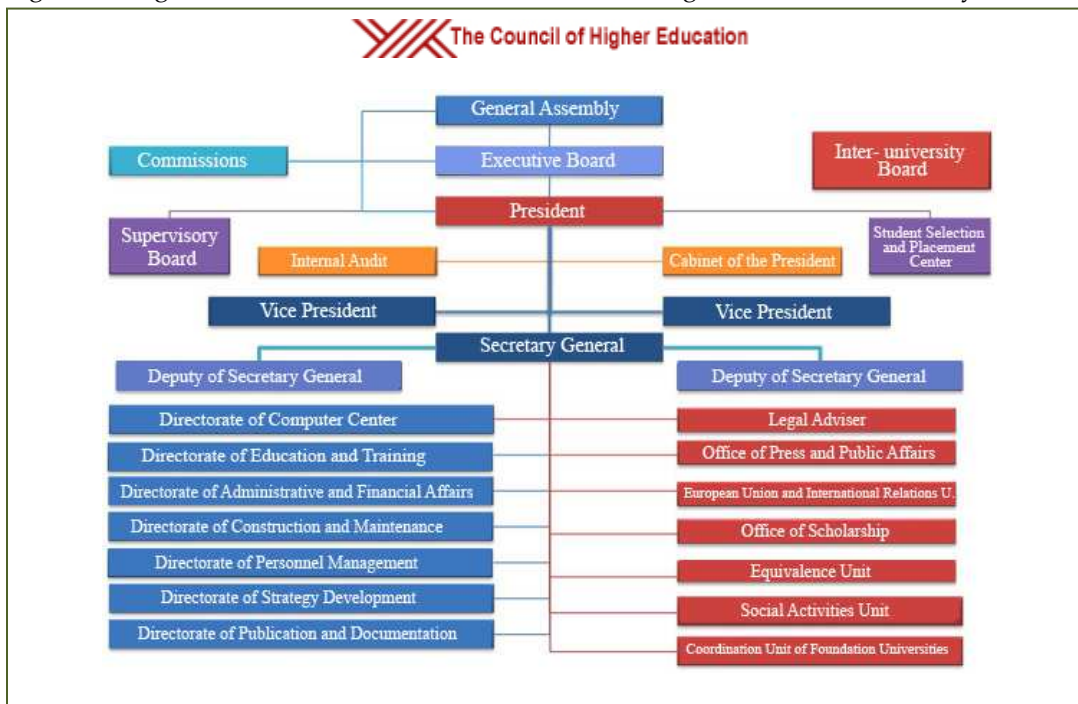
4.3.1. Expectations of the (CHE)

Establishment of University Research and Application Centre, is being coordinated by the Directorate of Education and Training. An interview with Ms. Şule Yılmaz from the Department was held on 17.02.2011 at 11:00 am. The interview was held on the phone and below information received from the Department:

- ❖ Proposals for establishing Research and Application Centre is coordinated by Education and Training Directorate of the Higher Education Council,
- ❖ Proposals are evaluated by the Council,
- ❖ Proposals should provide the name, objectives and activities of the centre in detail,
- ❖ Council is paying high amount of attention into coherence of between the name of the centre and stated activities,
- ❖ It is highly important to provide examples of similar centres from Turkey and Europe,
- ❖ If there is not any similar example from other universities, Higher Education Council expects solid and very strong evidence and justification for the centre
- ❖ If all documentation, justification and annexes meet the expectation, approval procedure takes approximately one and a half month.

Interview with Ms. Şule Yılmaz
The Council of Higher Education
Directorate of Education and Training
+90 312 298 78 12/14/29
www.yok.gov.tr/content/view/21/57

Figure 9: Organisational Structure of the Council of Higher Education, Turkey



Important Notice: Any unit called “Research Centre” accepted by the university senate but not operate under rectorate and not submitted to Higher Education Centre *will not be accepted* by the Council of the Higher Education and may have operational and administrative problems in the future. This information has been taken from the Council of the Higher Education and additionally confirmed from METU, Research Centres Coordination Office⁹.

Thereby this report strongly recommends establishment of an URAC operating under the rectorate and submitted to Council of the Higher Education.

4.3.2. Higher Education Council Regulation

Principles of Establishing Research and Application Centre

Establishment of Research and Application Centre

Law Enforcement Council Decision

Session Date: 22/02/2000

Session Nr: 11

Decision Nr: 2000.11.500

It has been decided below issues are appropriate and will be use therefore should be explained in detail in the University Research and Application Centre Establishment Proposals.

1. Existing departments, graduate and undergraduate programs in the university related with the planned centre and academic benefits and support of the centre’s activities to programs and research already being undertaken by the university departments,
2. Supportive contributions of the centre to meet the aims of the programs already being undertaken by the university departments,
3. Contribution of the Centre Activities in terms of the applications run by the existing programs,
4. In which ways and how the Centre Applications will be differentiate from the existing programs and applications of the departments,
5. Contribution of the specific to the university and society in general,
6. Explanation on the required building, location, laboratory and availability, if not available foreseen plan to meet these requirements.
7. List and CVs of the faculty members¹⁰ going to take part in Centre General Council
8. Draft version of the Centre Guidelines
9. Establishment of Research and Application Centre -Summary Application Form Annex¹¹

⁹ Interview held with Mr. Serkan Alkan, Director of METU Research Centres Coordination Office, Date of the Interview 23.02.2011 Contact Nr: +90 312 210 41 34

¹⁰ Annex 4 – Sample CV for CHE Proposal

¹¹ Annex 5 – Submission Form Summary for CHE Proposal

Figure 10 – Annex of the Regulation-Summary Application Form

**Annex-1: ESTABLISHMENT of RESEARCH and APPLICATION CENTRE
(Summary Application Form)**

Name of the University :

Proposed Centre

Name :

Rationale :

Examples in Turkey :

International Examples :

Physical Infrastructure :

**Information on the staff currently working for the University and will take role in the
Centre**

Area of Graduate:

<u>Title-Name & Surname</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>Doctorate</u>
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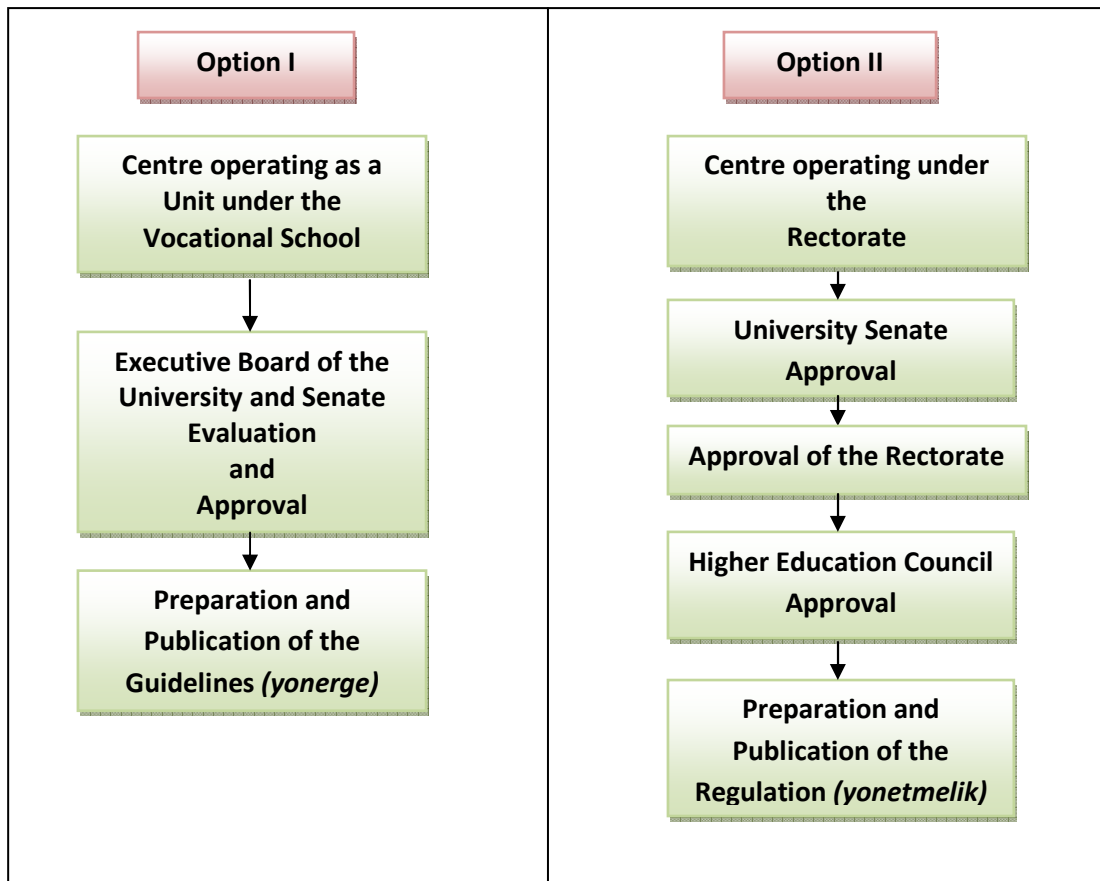
4.4. Recommendations

4.4.1. Options for Textile and Apparel Research Centre Establishment

The Centre in the university either can operate under Rectorate or initially starts operating under Yakinca Textile Vocational School. This decision should be given in consultation with the University representatives taking part in the Project upon the results of the Need Assessment Studies undertaken.

Recommendation 01: As it has been stated earlier this report *strongly recommends Option II*, Establishment of a Centre operating under rectorate, submitted to the Council of the Higher Education.

Figure 11 - Options for Textile and Apparel Research Centre Establishment



Recommendation 02: In the light of the findings, as an alternative for the centre, the report provides following name for readers' future examinations; Inonu University Textile and Apparel Enterprise Development and Collaboration Research and Application Centre

4.4.2. Organisation and Administrative Structure

Administrative and operational issues should be identified by the “Centre Regulation”¹² Over the course of the establishment process; the utmost importance should be paid to the *regulation (yonetmelik) of the centre*. Almost all decisions relevant to administration and operation are identified and should be clearly declared in this document. Therefore before the protocol with the university and before the submission to CHE, detailed and comprehensive consultation and preparation should be undertaken together with all involved parties.

What can be defined with the “Centre Regulation”?

Upon the circumstances and the needs, below issues can be defined and set in the Regulation;

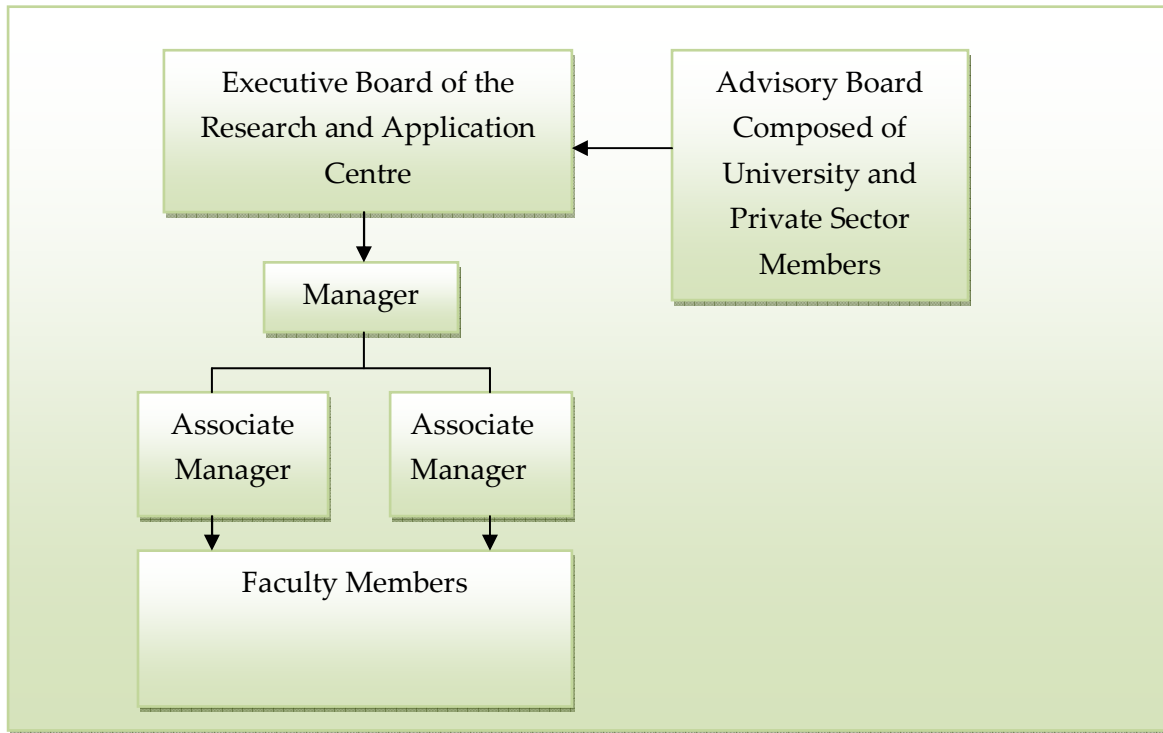
- ❖ The objectives,
- ❖ Areas of Research and Interest,
- ❖ Organisation and Management,
 - The President
 - Executive Board
 - Advisory Board (optional)
 - Centre Departments (optional)
 - Project Groups (optional)
- ❖ President,
- ❖ Responsibilities of the President,
- ❖ Executive Board,
- ❖ Responsibilities of the Executive Board,
- ❖ Advisory Board,
- ❖ Departments of the Centre and Responsibilities,
- ❖ Date of Start
- ❖ Execution

Recommendation 03: Activities will be defined and stated in the regulation. Issues such as advisory services, purchase of consultancy services, members and roles of Advisory Committee will be defined in the Regulation. *Formation of an Advisory Committee* representing both university and textile/apparel industry and presence of related *consultancy services within the Regulation* are strongly recommended.

Recommendation 04: Below management structure is recommended for the Centre.

¹² Sample Regulations can be found at Annex 6,7,8 of this report.

Figure 12: Management Structure Recommendation



4.4.3. Roles and Responsibilities

Executive Board: The Board is selected by the Rector from the academic units of the university. Including the Manager it is composed of seven members. The President of the Executive Board is the Manager.

Duration of the Executive Board is three years. Members can be selected again following the end of their execution period. Board meets once a month or more upon the decision of the Manager. The Board reviews the studies of the Centre and takes decisions in line with the requirements. *Responsibilities of the Board should be specifically stated in the Regulation.*

Advisory Board

Advisory Board is established upon the request of Executive Board among the representatives and experts of the public and private organisations. The members are assigned by the Rector for three years.

Advisory Board meets upon invitation of the Manager. Responsibility of the Board is to provide technical advise and views on the required issues.

Recommendation 05: The protocol and the business plan (or preparations) should consider the membership of ITKIB in the Advisory Board.

The Manager

The Manager is assigned by the Rector from the faculty members for two years. The same Manager can be selected for the following years. If the manager leaves the job for six month, new manager would be assigned.

Responsibilities of the Manager:

- ❖ Representing the Centre,
- ❖ Leading the Executive Board,
- ❖ Executing the decisions of the Executive Board,
- ❖ Preparing annual budget and presenting to Executive Board,
- ❖ Undertaking the administrative issues of the Centre, ensuring coordination, monitoring and correspondences,
- ❖ Preparation of the annual activity plans, preparing work plans for the following year and presenting them to the Rector for approval ,
- ❖ Further responsibilities specific to the Centre such as coordinating and ensuring administrative issues for the advisory services, projects and etc.

Associate Managers and Responsibilities

Assisting manager in his works and representing him when his absence. Associate managers are selected upon the request of the Manager from the faculty members and assigned by the rector. Duration of the assignment is two years and their responsibility end together with the Manager.

Supportive Staff

Need for technical, administrative or supportive staff assigns by the Rector upon the CHE Regulation 2547, item number 13.

4.4.4. The Model Recommendation Highlights

1. Name

Inonu University Textile and Apparel Enterprise Development and Collaboration Research and Application Centre

2. Areas of Interest and Research¹³:

Providing research studies, applications, training and advisory services to the university, textile and apparel sector and specifically to the enterprises in subjects such as CSR, sustainable development and institutionalisation of textile supply chain as well as carrying out innovative research in many technical fields.

3. Objectives

The main objective of the Centre is increasing institutional capacity of textile and apparel enterprises and increasing level of collaboration between university and industry. The Centre aims to contribute scientific and social development of the university and industry through creating and running collaborative projects, defining research areas, providing information on required areas, applying results as counselling and advisory services on defined areas including sustainable development and corporate social responsibility (environmental and social conduct) and institutionalisation of textile supply chain.

4. Activities

Within the scope of the Centre below activities can be undertaken;

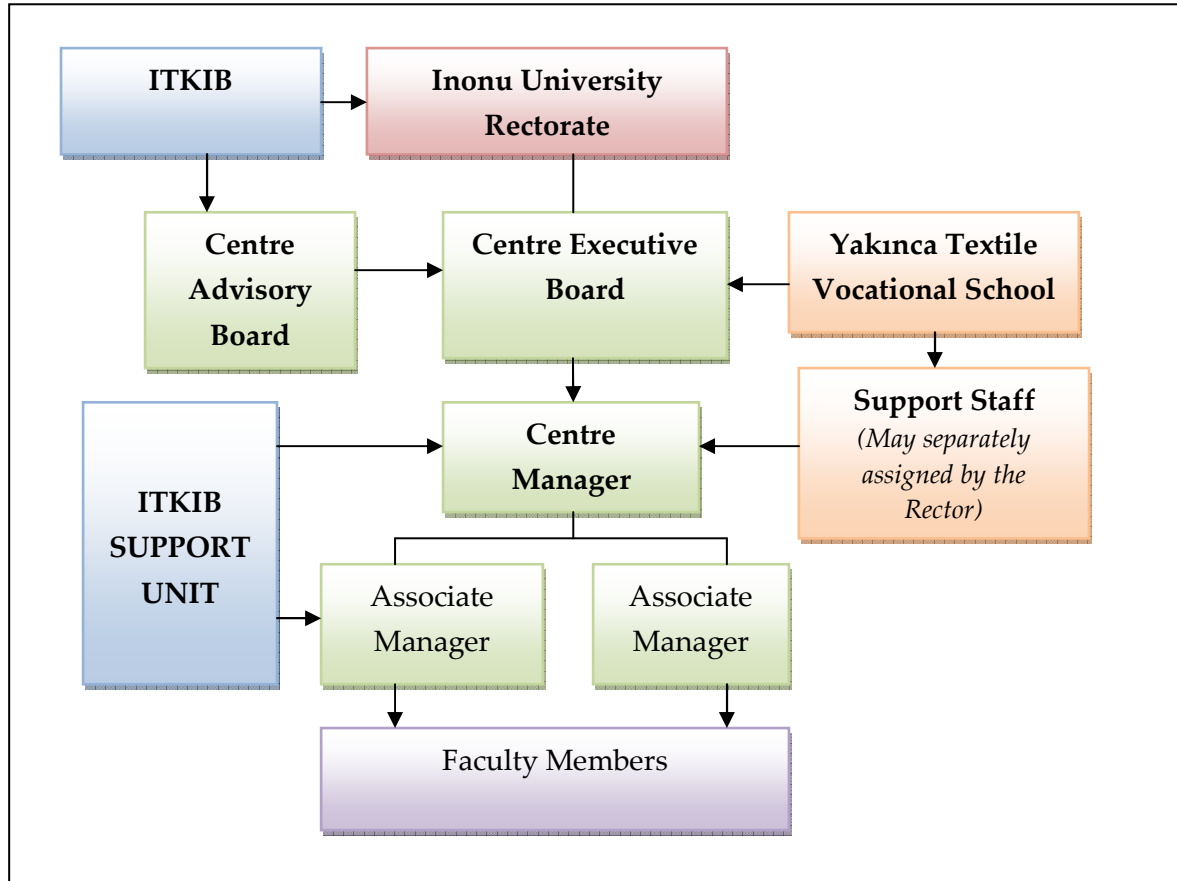
- ❖ Identification and research studies on the specific areas related to textile and apparel industry within the scope of the Centre Objectives,
- ❖ Providing national and international database of experts to the faculty members and enterprises on the specific areas,
- ❖ Providing trainings, advisory and consultancy services to the textile industry in the required areas including; exports, market research, business development, social responsibility, environmental and social conduct, supply chain management,
- ❖ Organising awareness raising events, seminars, conferences and supportive events to increase awareness and competences of the involved parties,
- ❖ Preparing collaborative projects and applying these projects through university and industry collaboration
- ❖ Provide advisory support on value chain analysis and guide industry on how to use supply chain management tools and databases.
- ❖ Prepare feasibility study, partnership and projects to submit for the establishment of Advanced Thematic Research Centre fund of SPO.

¹³ For further information see Section 5- Research and Interest Areas, at pg XX of this report.

Important Notice: Please note that above mentioned activity lines are overall activities and should be based on solid results of needs analysis conducted in the regions. The above items are given to underline the importance of collaboration and collaborative activities for the sake of the continuation of Joint Programme Outputs.

4.4.5. Management and Administrative Organisation Chart

Figure 13: Recommended Organisation Structure



Recommendation 06: Regarding the sustainability the Centre can get income from the services given to industry. The income should proceed through the “Doner Sermaye Office” of the university. This is one of the most important decisions to be taken at the planning phase and included to the Centre Regulation.

Section 5 – Research and Application Areas

In this section of the report, the CSR concept is based on the management and response of textile and apparel enterprises to, social, environmental, broader economic and ethical issues – and the extent to which businesses are responsive to stakeholder expectations on these issues.

The concept of a business/company working only with the motive of earning profit is gradually becoming outdated. Awareness about the social responsibility of business organizations is rapidly on the rise and firms are also accepting this concept. The textile industry is no exception. Textile producing and trading firms are also realizing their responsibility towards the society and the environment. The report in this part is briefly touching the social responsibility and the common ways in which textile firms can fulfil it through support of the Research and Advisory Centres going to be established in the regions.

5.1. Corporate Social Responsibility (CSR)

CSR has become such an important and popular concept along with the rise of the importance of sustainable development in the world. It has become clear to the business world that sustainable development is no longer only concern of governments and related NGOs, they should also immediately start concerning about the sustainability of resources and human development along with their financial sustainability. CSR and sustainable development could no longer be thought as two separate concepts anymore; it has become apparent that the latter could not be achieved without a proper CSR approach from the private sector.

The EU has been defined CSR as; *“A concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.”*¹⁴

The above EU definition of CSR highlights the important aspects of the concept:

- ❖ In spite of the English term corporate social responsibility, CSR covers social and environmental issues.
- ❖ CSR is not or should not be separate from business strategy and operations: it is about integrating social and environmental concerns into business strategy and operations;
- ❖ CSR is a voluntary concept;
- ❖ Another important aspect is how enterprises interact with their internal and external stakeholders; employees, customers, neighbours, non-governmental organisations, public authorities, etc.

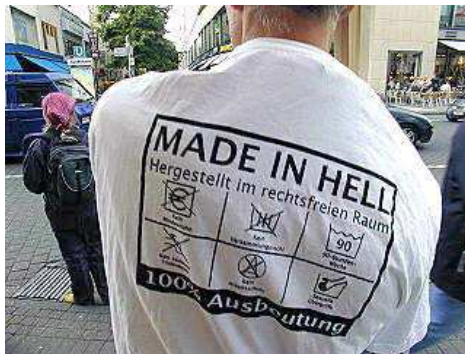
¹⁴ Commission Green Paper 2001 “Promoting a European Framework for Corporate Social Responsibility”

5.1.1. Social Responsibility in the Textile Industry

Corporate Social Responsibility (CSR) is a worldwide-accepted development on how companies can manage their business processes to produce an overall positive impact on society and environment. CSR represents care for social and environmental issues with a profitable business perspective: the so called 'People – Planet – Profit' philosophy.

The concept of social responsibility is applicable to individuals and governments as well as organizations. The social responsibility of an organization is referred to as 'corporate social responsibility'. Corporate Social Responsibility is "an organization's obligation to maximize its positive impact and minimize its negative impact on the society". In other words, it is "the concept that businesses should be actively concerned with the welfare of the society at large".

Social responsibility can be broadly divided into two parts: *human responsibility* and *environmental responsibility*.



Human responsibility refers to the responsibility of the organization towards the various parties associated with it, which are known as 'stakeholders' in business environment. These parties include employees, shareholders, the government, customers, investors, suppliers, competitors and the society at large.

Environmental responsibility refers to the organization's responsibility towards environment protection.

Textile companies lacking behind in the CSR process often have a reactive and short-term management perspective. A reactive response on daily business concerns and pressure can lead to violations to social and environmental performances, often caused by factors like¹⁵:

- ❖ Short lead times to keep up with fast moving trends and fashions,
- ❖ Last minute changes in specifications of fabrics or color and delayed sample approval,
- ❖ Unreliable delivery of materials and accessories,
- ❖ Inefficiencies in production,
- ❖ Low skilled workers, leading to high rates of re-working,
- ❖ Seasonality leading to excessive hours in some months and lack of work in others,
- ❖ Little commercial incentive to reduce hours if overtime premiums are not paid,
- ❖ Low costs for discharge of emissions, solid waste and wastewater.

¹⁵ International Textile Overview, Corporate Social Responsibility in Textile Industry, IVAM, Amsterdam 2006

5.1.2. CSR in the Textile Supply Chain

Retailers and brand companies take some responsibility for the labour conditions in their supply chains, at least on paper. Many have developed codes of conduct on labour standards to be implemented in their overseas workplaces. The reality in these workplaces however, is often still quite grim. Wages are low to live on, long hour workweeks are common, and the health and safety of the workers, the majority of whom are women, is constantly being undermined. Workers have no security of employment; women are discriminated against and harassed. In many countries there is also evidence of bonded or child labour. Workers are often not allowed to form trade unions, because the right to organize or collective bargaining is not recognized in the country where they work. Generally, the most frequently found problems in the textile supply chain are in the field of working conditions and labour standards.

For supply chains for example, a major driver of CSR practices tends to be the big buyers who are keen to protect brands and reputations. CSR is about building relationships with customers. Another driver can be risk management as there are a range of issues that can threaten the value and future health of the company. These range from the publicity around human rights abuses in the supply chain and to environmental incidents such as pollution incidents or explosions leading to regulatory measures, fines and damage to brand reputation. CSR focuses on managing risk and assuring reputation. CSR enables companies to implement a pro-active social and environmental strategy, which reduce pollution in the production processes by means of preventive measures and increase workers productivity and liability. It's a structural business strategy that increases the efficiency and the gross returns (profit).

Generally stated, CSR leads to a more beneficial situation in terms of cost saving through improved working conditions, higher loyalty and productivity by workers, saved costs by energy efficiency and cleaner production and better opportunities for international trade and attracting foreign clients and financiers.

5.2. Institutionalisation of Textile Supply Chain¹⁶

In recent years, supply chain management (SCM) has been developed as essential management philosophy and practice for all business operations. As with other business management principles, SCM also applies to the textile and apparel industries.

Entering the new millennium, organizations must consider the issues of increased competition, rising customer expectations and the demand for increased product variety. Organizations will simultaneously be forced to decrease profit margins and cope with changing governmental regulations, such as taxes and tariffs to remain competitive (Rockhold et al., 1998). To handle

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This part of the Report has benefited substantially from the Research Study "Supply Chain Management Practice and Competitive Advantage in Textile and Apparel Industries", Institute of Textiles and Clothing, The Hong Kong Polytechnic University.

these pressures, organizations are forced to consider the impact of operational decisions on not only their own company but also all members of their supply chain. No longer will firms compete against each other individually but rather they will compete with their respective supply chains (Schorr, 1998). Thus, developing close, long-term relationships with both customers and suppliers can take significant wastes out of the supply chain, and is a potentially valuable way of securing competitive advantage (Porter, 1985; Spekman et al., 1998). *Understanding and practicing supply chain management (SCM) have become an essential prerequisite to staying in the competitive global race and to growing profitably* (Garwood, 1999). As with other business management principles, SCM also applies to textile and apparel industries.

Stone (1994) pointed out, "The same general principles that apply to all businesses apply to the textile and apparel industries, but they are magnified when the product is fashion" (p.35) because of the nature of fashion product. Fashion products are unique, dynamic, emotional and cyclical, which makes the rate of change in the apparel industry much faster than in other businesses (Stone, 1994). Because of the synergy SCM can generate, it has been given much attention by both scholars and practitioners in textile and apparel industries.

Theoretically, the goal of SCM is to coordinate the activities of each tier, as well as the transition between tiers, to facilitate the smooth and efficient flow of products down the value-added chain at the lowest cost, and at the same time, to match the supply with market demand (Tan et al., 2000). Supply chain members should cooperate with its downstream customers and upstream suppliers to achieve supply chain goal.

Lamber and Cooper (2000) propose a SCM framework that consists of three closely interrelated elements: *the supply chain network structure, the supply chain business processes and supply chain management.*

The supply chain structure element tells who the members of a particular supply chain are, how many tiers are involved in the chain and how many members are in each tier. A supply chain looks rather more like an uprooted tree than a pipeline, which suggests that supply chains are very complicated to manage. Within such complex network structure, the key to successful SCM is to identify the key processes, which need the coordination of all the tiers in one supply chain, and manage these processes in an integrated fashion. Even though different researchers give different categories of the processes involved in a supply chain, these processes are somewhat functionally independent and quite similar in that sense.

Strader et al. (1999) referred to the underlying business processes as mechanisms and included these processes in a complete supply chain: (1) forecasting demand based on information such as market research, (2) placing and receiving customer orders, (3) purchasing between supply chain partners, (4) processing orders internally, (5) identifying new sources for capacity and/or inventory when needed, (6) managing inventory, (7) planning production, (8) managing

distribution (shipping), (9) communicating between supply chain partners and (10) supporting customer service.

Lancioni et al. (2000) defined seven substantive supply chain decision areas, which include purchasing/procurement, inventory management, transportation, order processing, customer service, production scheduling and relations with vendors. These seven areas do not include any process that relates to demand forecasting while joint forecasting or demand management is one of the processes that are critical for a successful supply chain to be able to compete in the market.

It is recognized that a basic enabler for SCM is *information sharing*. Many researchers have emphasized the importance of information sharing in SCM practice. Lalonde (1998) considers sharing of information as one of five building blocks that characterize solid supply chain relationship. According to Stein and Sweat (1998), supply chain partners that exchange the information on a regular basis are able to work as a single entity. Together, they have a greater understanding of the end consumers and are better able to respond to change in the marketplace. Moreover, Yu et al. (2001) point out that the negative impact of the bullwhip effect on a supply chain can be reduced or eliminated by sharing information with trading partners. Tompkins and Ang (1999) suggest that the key competitive and distinguishing factor for the 20th century is the proficient use of relevant and timely information by all functional elements within the supply chain to meet organizational objectives.

However, there is the reluctance on part of organizations in the supply chain to share information with each other. Information is generally viewed as providing an advantage over competitors, and organizations resist sharing with their partners (Vokurka and Lummus, 2000). This hesitancy was due to a variety of factors, including the perceived threat of giving away competitive advantage to other organizations, the sharing of sensitive information such as inventory levels and production schedules with other channel members, and the potential of losing customers to other competitors (Lancioni et al., 2000; Ballou et al., 2000; Croom et al., 2000).

5.3. Research and Interest Areas of the URAC

Under the auspices of the Joint Program, the Research Centre (URAC) which will work to contribute development of Turkey's Textile Industry can facilitate sustainable value growth of the textile industry by promoting Corporate Social Responsibility, by way of enabling textile-producing enterprises to adopt good management, labor and environmental practices.

Textile industry is experiencing a rapid transformation of labor market as it moves from a system of traditional structure to a more open and competitive global environment. This transformation has thrown up many challenges including an evident need to build local capacity within local enterprises, and develop solutions to meet changing circumstances. As one of the most traditional industries in Turkey, the textile industry could experience substantial

pressure to address these challenges and specifically how to incorporate labor-related and environmental standards into core business operations.

The Centre can undertake several studies and projects comprising; comprehensive training and advisory support services for managers and workers in selected enterprises, verifying the validity of the approach through action research. The results of the studies can be replicable in other centers planned to be established in Adiyaman, Maras and Antep.

5.3.1. Research and Application Areas of the Centre

The Centre can support the creation of a viable industry-wide framework for high quality business management (in labor-management cooperation, productivity and quality up-grading, environment, human resources management, working conditions and occupational safety and health) for a sustainable development of the textile industry. Beside CRS in textile industry the Centre can provide wide range of trainings and information on institutionalization of textile supply chain.

5.3.1.1. CSR and SCM Areas

Like the firms in other industries, textiles firms are also realizing their responsibility towards the various parties associated with them and the environment. The Centre can provide information and advisory services focusing on below specific CRS topics:

Social (people)

- ❖ Better working conditions and increased workers motivation
- ❖ Decreased overtime and decreased reworking
- ❖ Increased productivity and increased wages
- ❖ Improved health & safety, less illness and accidents
- ❖ Improved (company) image
- ❖ Increased ability to attract and retain quality employees

Environmental (planet)

- ❖ Reduced raw materials and energy inputs
- ❖ Eliminated toxic materials use
- ❖ Reduced quantity and toxicity of emissions and waste (water) outputs

Economical (profit)

- ❖ Reduced costs on input materials and energy
- ❖ Reduced (wastewater) treatment costs
- ❖ Increased production revenues
- ❖ Better product quality
- ❖ Enhanced reputation and brand value
- ❖ Increased efficiency and productivity
- ❖ Increased total income
- ❖ Increased sales and customer loyalty
- ❖ Attracting and retaining quality investors and business partners

5.3.1.2. Specific Activities

- ❖ Through establishing mechanisms for joint problem solving, the Centre can help enterprises identify areas of improvement and formulate action plans.
- ❖ The Centre Undertake studies for promoting good labor and environmental standards and practices, meanwhile, building the capacities and capabilities of the university to deliver comprehensive and integrated training/advisory and information services to enterprises that wish to voluntarily implement labor and environmental application programs.
- ❖ The Centre can serve small and medium sized enterprises from the textile sector and provide information/seminars, one-to-one counseling and advisory service in below areas:
 - ❖ Quality and productivity - improvement of quality and productivity which aims to benefit enterprises economic development;
 - ❖ Environmental management - introducing environmental techniques and cleaner production methods and promoting establishment of environmental management system;
 - ❖ Workplace protection - health and safety issues - how to identify and minimize risks to workers and factories; and
 - ❖ Human resources management - how to strengthen workplace relations between workers and management and how to establish sustainable improvement mechanism.
- ❖ Research and analysis understanding supply chain network structure, the supply chain business processes
- ❖ Working with companies to understand weak points in supply chain and propose set of actions for supply chain management
- ❖ Providing information and advisory services on;
 - forecasting demand based on information such as market research,
 - placing and receiving customer orders,
 - purchasing between supply chain partners,
 - processing orders internally,
 - identifying new sources for capacity and/or inventory when needed,
 - managing inventory,
 - planning production,
 - managing distribution (shipping),
 - communicating between supply chain partners and
 - supporting customer service.

APPENDICES
