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Restructuring the Textile and Clothing Industry Using Modern Business Models – A Slovenian Case Study

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Abstract
Restructuring an individual industrial branch is always a long-term process. This article presents a timeline of the restructuring of the Slovenian textile and clothing industry. The data show that the process has not yet been concluded, although the form and state support of the textile and clothing industry's restructuring process have changed. In the last few years, state incentives have been directed towards the accelerated implementation of modern business models.

Key words: *textile and clothing industry, Slovenia, restructuring, business models.*

Introduction

The textile and clothing industry is one of the biggest industrial branches in the world. In many countries it is the main industrial branch in terms of the number of employees as well as the domestic product and export share among the various industries. Its scope ranges from the most intensive branches in terms of capital (spinning, weaving, knitting and textile processing) to classical intensive work (the confectioning of clothes).

The uncertainty that has been present in the textile industry of the developed world – particularly in Europe – is a consequence of the continuous and rapid changes talking place in this field in the last few years. These changes have led to the restructuring and reorganisation, not only of production, but of the entire industrial branch. The result of these changes is a substantial reduction in staff numbers in the developed world, while presenting a way of industrialisation to countries whose economies are still developing [1, 2].

In the developed part of the world, the textile and clothing sector has been subjected to a series of radical changes due to a combination of technological changes, the growth of various production costs and the appearance of important international competitors. As a reaction to past competitive challenges, the textile and clothing industry of the developed world has started a lengthy restructuring and modernisation process by implementing technological development. Companies have improved their competitive advantage by substantial reductions, closing down mass production and eliminating the production of simpler fashion products, focusing instead on a broad spectrum of various products with high added value.

Similar to other companies, those in Slovenia are continually facing changes and calls to rapidly adapt to demands stemming from the environment. In the textile field, restructuring processes have been especially visible in Slovenia, including the cessation of mass production and its movement to countries with a cheaper labour force as well as a general reduction in personnel. The textile and clothing industry has therefore become more and more specialised in products with special applications and those intended for market niches.

Important political changes in Slovenia, which started in 1989, have dramatically influenced the Slovenian economic structure. Slovenia has lost the majority of the Yugoslavian market, while the Eastern-European markets have gone through substantial restructuring. At the beginning of the restructuring processes within the Slovenian economic structure, the textile and clothing industry held a very important place. In 1992, the textile industry comprised nearly 14% of all human resources employed in the industrial sector, which consisted of a 13% share of Slovene industrial production and represented a 10% share of industrial export. By 2006, the number of human personnel had dropped to 8.7%, the share of Slovenian industrial production to 4.2% and the export share to 3.5% [3].

At the beginning of the 1990's, the problems faced by the textile and clothing industry were both internal and external in nature [4]:

a.) External:
- Loss of Yugoslavian markets;
- Liberalisation of domestic trade;
- More demanding business operation conditions on the global market.

b.) Internal:
- Outdated products;
- High production costs;
- Sales bound to domestic markets.

The above problems have made the restructuring processes in the Slovenian textile industry difficult, which have not yet been concluded. On the basis of data

showing the growth and development of the Slovenian textile industry, this article wishes to demonstrate that:

- The restructuring process of the Slovenian textile industry has not yet been concluded;
- The State's role has been changing in the restructuring process so as to support the implementations of modern business models in textile and clothing companies.

This will be confirmed by comparing data related to the timeline of the growth and development of the textile and clothing industry and the processing industry in Slovenia. As can be observed in Slovenia, the processing industry has already turned the process of restructuring into positive growth. However, the Slovenian textile and clothing industry is still restructuring.

The Slovenian state has been playing an important role in the restructuring process of Slovenian industry. In the last five years, state incentives have been redirected from direct financial aid to encouraging new business models. This article presents two examples of new forms of inter-organisational cooperation within the textile industry using state support.

Timeline of growth and development in the processing, textile and clothing industries in Slovenia

Since 1991, production has been decreasing in the majority of companies within the textile and clothing industry in Slovenia. It seems logical that a dramatic decrease in production would bring about a reduction in human resources, however in most cases this did not happen. The number of human resources has been decreasing at a slower rate than production, which has brought about negative consequences in production efficiency and caused a long-term weakening in the global competitiveness of the Slovenian textile industry. In addition, the textile and clothing industry has undergone slower restructuring than other processing industries in Slovenia, as can be seen from the data below [5].

Sales revenues

The instability of the textile industrial branch can be seen in the fluctuation of revenues. Compared to the timeline of revenues created by the processing industry, which has seen constant growth, which managed to double between 1995 and 2006, the textile and clothing industry has seen dramatic fluctuations, with a falling tendency on index 120 (***Table 1***) [6].

Table 1. *Sales revenues of companies in the Slovene textile, clothing and processing industries.*

Year	The processing industry		The textile and clothing industry	
	Sales Revenues (in ECU up to 1999 and in EUR 1000)	Index	Sales Revenues (in ECU up to 1999 and in EUR 1000)	Index
1995	11,306,547	…	813,638	…
1996	11,607,382	102.66	790,987	97.22
1997	12,587,132	108.44	840,958	106.32
1998	13,822,019	109.81	953,659	113.40
1999	14,024,721	101.47	950,348	99.65
2000	15,465,462	110.27	1,213,917	127.73
2001	16,697,088	107.96	1,471,143	121.19
2002	17,642,492	105.66	1,385,199	94.16
2003	18,246,916	103.43	1,348,893	97.38
2004	19,808,065	108.56	1,388,887	102.96
2005	20,808,951	105.05	1,004,885	72.35
2006	23,081,698	110.92	977,758	97.30

Table 2. *Consolidated operating result in the Slovene textile, clothing and processing industries.*

Year	The processing industry		The textile and clothing industry	
	Profit or loss (in ECU up to 1999 and in EUR 1000)	Index	Profit or loss (in ECU up to 1999 and in EUR 1000)	Index
1995	-120,939		-16,289	…
1996	-187,297	54.87	-22,199	73.38
1997	98,118	390.90	-7,337	302.56
1998	227,114	231.47	-3,499	209.69
1999	389,131	171.34	-9,031	38.74
2000	418,801	107.62	-4,662	193.72
2001	369,826	88.31	-12,163	38.33
2002	526,371	142.33	-6,618	183.79
2003	592,394	112.54	-9,937	66.60
2004	722,119	121.90	-7,462	133.17
2005	765,788	106.05	-6,261	119.18

The next reason for the decrease in turnover in the textile and clothing industry is Slovene producers having fewer orders. In addition, the structure of the buyers has changed dramatically. The trend shifted from a smaller number of buyers ordering larger quantities of goods (mostly buyers from the former socialist countries) to a larger number of buyers ordering smaller quantities of goods.

Consolidated operating result

Similar trends can be seen in the consolidated operating result. While the processing industry recorded a strongly positive growth in the profit created, the textile and clothing industry steadily decreased its losses from 1995 onwards, yet still failed to conclude the fiscal year with a positive operating result (***Table 2***).

Personnel costs

Personnel costs in the processing industry moved at a substantially lower rate than the profits created. In addition, there was a noticeable decrease in the total number of personnel in the processing industry. This trend can be seen in increased work productivity. In the textile industry, there was a trend of further reduction in personnel costs which came as a result of decreasing the number of employees in this line of business (***Table 3***).

Number of employees

Number of employees is presented in ***Table 4.***

Export value

An important element of restructuring the Slovene textile industry was redirecting its sales to the global market.

This table shows that the processing industry tripled its export value in the decade studied and achieved a 70% share in sales revenues in 2006. On the other hand, the textile and clothing industry lagged behind in its export value and achieved a 58% share in sales revenues in 2006. The reason for this is the abandonment of finishing work, which has become uncompetitive due to growing labour costs in Slovenia (***Table 5***).

This is aided by the latest trends on the textile industry market, where adaptability is becoming ever more important, as well as fast response and shorter lead times. Larger series are replaced by smaller ones, and the quality of the product has become very important for customers.

Restructuring projects of the textile and clothing branch in Slovenia

When it comes to restructuring the Slovenian textile and clothing industry, the Slovenian State has played an active role throughout. Nevertheless, its role and form has changed significantly since the 1990's. The forms of state cooperation in restructuring the Slovenian textile and clothing industry can be divided into three periods.

The first period – from 1989 – sees *ad hoc* State intervention in the form of supporting individual companies that were in a difficult position due to changed macro factors. The aid was mostly in the form of a state warranty for obtaining loans and non-returnable funds, the aim being to preserve jobs.

The second period - from 1993 - was marked by a systematic approach to restructuring the textile branch, as well as by the Phare project in 1993. The main objective of the "Restructuring the Slovenian Textile Industry" project of 1993 was to create a strategic branch analysis. The main findings of this project are listed in the findings below [7, 8]:

- The analysis of the strengths and weaknesses of the Slovenian textile industry, as well as the comparison with the competition, show the good opportunities and prospects of the Slovenian textile industry, not only due to the provision of competitive labour costs but also solid technology and the skills of the workforce.

Table 3. *Personnel costs in the Slovene textile, clothing and processing industries.*

Year	The processing industry		The textile and clothing industry	
	Personnel costs (in ECU up to 1999 and in EUR 1000)	Index	Personnel costs (in ECU up to 1999 and in EUR 1000)	Index
1995	2,572,501	…	304,818	…
1996	2,516,503	97.82	276,003	90.55
1997	2,565,679	101.95	273,165	98.97
1998	2,773,895	108.12	285,592	104.55
1999	2,865,101	103.29	286,355	100.27
2000	3,000,555	104.73	281,680	98.37
2001	3,194,073	106.45	290,385	103.09
2002	3,407,809	106.69	289,299	99.63
2003	3,501,043	102.74	277,768	96.01
2004	3,700,792	105.71	272,838	98.23
2005	3,821,716	103.27	246,565	90.37

Table 4. *Number of employees in the Slovene textile, clothing and processing industries.*

Year	The processing industry		The textile and clothing industry	
	Number of employees	Index	Number of employees	Index
1995	242,785	…	37,994	…
1996	235,322	96.93	35,117	92.43
1997	231,266	98.28	34,586	98.49
1998	236,137	102.11	33,611	97.18
1999	233,578	98.92	32,713	97.33
2000	234,679	100.47	31,143	95.20
2001	235,274	100.25	29,765	95.58
2002	238,764	101.48	29,001	97.43
2003	232,664	97.45	26,083	89.94
2004	228,473	98.20	24,341	93.32
2005	222,502	97.39	21,085	86.62
2006	221,110	99.37	19,312	91.59

Table 5. *Export value in the Slovene textile, clothing and processing industry.*

Year	Processing activities		Textile and clothing industry	
	Export value (in ECU up to 1999 and in EUR 1000)	Index	Export value (in ECU up to 1999 and in EUR 1000)	Index
1991	1,173,644	…	69,992	…
1992	3,536,917	301.4	633,110	904.5
1993	3,116,229	88.1	670,517	105.9
1994	4,636,057	148.8	723,104	107.8
1995	5,954,781	128.4	690,625	95.5
1996	6,331,046	106.3	669,831	97.0
1997	7,058,014	111.5	679,798	101.5
1998	7,825,558	110.9	693,315	102.0
1999	7,947,308	101.6	638,823	92.1
2000	9,401,270	118.3	568,309	89.0
2001	10,210,684	108.6	703,492	123.8
2002	10,792,686	105.7	632,982	90.0
2003	11,065,531	102.5	567,124	89.6
2004	12,518,562	113.1	558,915	98.6
2005	14,003,796	111.9	580,210	103.8
2006	16,198,437	115.7	570,279	98.3

- The sensitive cost position of the Slovenian textile industry, the closing down of Western markets and cheap competition from Eastern Europe all dictate the direction of the Slovenian textile industry in the development of its own products, as well as in the improvement of service, product quality and marketing.

Based on the strategic analysis of the textile branch, state measures were formulated to encourage increasing competition in the form of financing new devel-

opmental projects for lowering costs, rationalisation of the number of employees and encouragement to enter the markets of developed countries.

When Slovenia approached the legal order of the EU, the forms and manners of state aid also changed within the restructuring process of the textile branch. When it comes to supporting restructuring processes, it is important to keep in mind that measures and financial incentives for companies need to be balanced with the legal order of the EU, as well as follow the goal of strengthening the competitive capability of companies within the EU market. This means that:

- Aid is not directed towards increasing production capacities;
- Aid is in accordance with the rules of allocating State aid for processing activities.

Restructuring the branch brings a further necessary decrease in work places within the branch. Solving the problem of redundant workers and social help for them is not a part of the programme for aiding companies.

The beginning of the third period can be placed at the end of the 1990's. At that time, the Government realised that the restructuring process is most problematic in work-intensive branches, which include the textile and clothing industries.

Based on the analysis, at the end of 1999 the Government of the Republic of Slovenia adopted a Programme entitled 'Adapting the Slovenian Textile and Clothing Industry to the Conditions of the Internal Market of the EU, 2000-2003'. Until 1993, The measures and programme of adaptation were based on the following objectives [9]:

- The scope of sectorial, i.e. vertical help will decrease over the next period, gradually becoming horizontal, i.e. branch measures for increasing the competitiveness of the economy;
- Increasing the capability of the industry in key problematic areas (marketing, technological renovation and human personnel development).

Based on the analysis, the Government of the Republic of Slovenia prepared measures for stopping the negative trends using accelerated investment in 4 key subprogrammes that were important for the process of restructuring [10]:

- The sub-programme of product and market redirection (encouraging the development of brands, strategic partnerships and the adaptation of companies to business operations in the unified EU market);
- The sub-programme for encouraging connections between companies and the development of a joint business infrastructure;
- The sub-programme of technological renovation (the development of human resources, the strengthening of developmental cores in companies and the encouragement of projects concerning technological development in companies);
- The sub-programme of developing human resources (the renovation of companies and the encouragement of work modernisation).

We will now present in detail the State's support of the restructuring processes of the Slovenian textile industry in the field of changing business organisation. We will show the implementation of two modern concepts of organisation in the textile industry in Slovenia - the implementation of clusters and technological platforms.

New models of business organisation for the textile and clothing industry in Slovenia

In the modern business environment, companies establish and maintain their competitive advantage not just by optimising their own potential, but above all with their capability of using foreign resources and by adopting an integrated business process (i.e. work process). The need for connecting companies and pooling resources stems from the requirement of the global market to achieve competitiveness in price, time and quality [11, 12]. The concept of the organisational restructuring of companies has become more and more popular since the 1990's and is based on the network approach. Particularly in the last decade have network forms gained new importance [13].

Due to mutual connections between the different companies, the so-called regional network connections have become prominent. Regional network connections unite small and medium-sized companies with the objective of connecting their resources in a particular field of operation. The most typical example of a regional network connection is the so-called cluster. The cluster - as a type of regional inter-organisational connection - has been implemented in the Slovenian environment as well.

The accelerated implementation of clusters started more than 20 years ago by connecting companies within an individual geographic area. The most typical regional network connections can be found in northern Italy (Emilia Romagna), southern France, Silicone Valley in the USA, etc. [14]. New impetus and development exceeding the regional form of connection was seen in clusters in the 1990's. In this period clusters became prominent in the fields of sectorial, multi-sectorial and regional connection.

The theoretical bases of chains of suppliers and clusters can be read in the works of the acclaimed management theoretician Michael Porter [15], which emphasise the level, development and encouragement of inter-entrepreneurial connections as an important element for individual countries to achieve a competitive advantage. Also, in his later works, Porter emphasises regional clusters as a form of non-formal connection between different groups, which connect, cooperate and compete with each other.

In Slovenia, clusters have become very popular [16], which was greatly encouraged by the State – the Ministry of Economy of the Republic of Slovenia – who saw the encouragement of companies as a measure for providing a long-term competitive advantage. Clusters are connections between companies in particular fields and?? suppliers, research institutions as well as local developmental organisations.

The Slovenian textile and clothing cluster

At the beginning of 2000, the Ministry of Economy of the Republic of Slovenia started implementing a project called "Encouraging Company Cooperation, Specialisation in Production Chains and the Joint Development of Cluster-modelled International Markets" [17]. In 2003, the first Slovenian textile cluster, SLOTIC, was established. To begin with, it connected 8 textile producers, two companies from a group of buyers, two laundries and three knowledge centres.

The main objective of linking textile companies into clusters is to increase their competitive abilities and create recognisability (particularly in the developed markets) to ensure an increased level of specialisation, unifying individual resources in the field of development. When organising the textile clusters, the State mostly aided them by financing the infrastructure for the operation of individual clusters. In Slovenia, the following textile clusters exist [18, 19]:

- The first Slovenian textile cluster, SLOTIC (since 2003), under the patronage of Svilanit Kamnik. It includes companies producing clothing products, companies producing furniture textiles, companies using textile products, laundry and both higher education textile departments.
- Textile companies from the Celje region combined to form the Cetex cluster in 2001.
- The Ljubljana ready-made fashion clothing cluster Oktober is based on connecting joint information and promotional platforms. The connecting company Oktober is known for developing and marketing a high-end clothing brand.
- The Design Klink cluster was established to connect modern technologies with experience as well as the knowledge and skills acquired. The main objective of this cluster is to become an information centre for integrating professional aid in the development of products and technologies.
- The Gornji trg cluster is a ready-made clothing sales cluster – including a younger generation of fashion designers – that has been facing the transition and disintegration of the Slovenian textile industry but has nevertheless managed to create its own strategy and developed a brand that is supported by a unique artisan concept for creating clothes and textiles.

Technological platform

Of course, clusters are not the only form of inter-organisational cooperation that has gained support within EU and Slovenian economic development incentives. Cooperation in the field of technological development – e.g. technological networks, technological platforms, centres of technological transfer, etc. – has become more increasingly prominent.

The difference between technological networks and clusters lies in the fact that "with networks there is the development of certain technologies and the use of these technologies in different branches and company products, while with clusters we are concerned with connecting different technologies in the production of a product [20].

Technological platforms are a mechanism of developmental politics that was established by the EU. They connect challenges within the different fields and determine strategic advantages and opportunities for individual technological sectors. They are recognised as increasingly important and beneficial for various fields in Slovenia as well. In the research and development field, they encourage target-directed investments and a more efficient approach to innovation, as well as the coordinated operation of European and national research programmes.

There is an economic initiative emphasised in the technological platforms. They have an open structure, which means that in order to be efficient, they have to include all key factors – from the economy to institutes, universities, public institutions and the State – so as to encourage partnerships with other sectors and, as such, present a basis for political dialogue [21].

The Ministry of Economy of the Republic of Slovenia has given an incentive for supporting the expansion of technological platforms and technological networks. In 2004, the 1st National Conference of Technological Networks was organised in Ljubljana (two conferences had been organised by 2006). Today, the technological networks in Slovenia connect over 70 companies and institutions of different sizes. The total number of employees in all the companies exceeds 80,000 [22].

The Slovenian textile technological platform

The Slovenian Textile Technological Platform was established in 2005, connecting 22 companies with research and educational institutions whose primary activity is related to the textile industry [23].

The STTP is an active member of the European Technological Platform for the future of the textile and clothing industry. By cooperating with the European Technological Platform for the Future of Textiles and Clothing, the STTP is contributing to the formation of an efficient network of professionals at the European level, as well as to the efficient implementation of the strategic research programme of the European Technological Platform and the development of conditions for research, development and innovations in the sector.

The vision of the STTP is based on the knowledge-based, sustainable and competitive advantage of the Slovenian textile industry. Therefore, successful textile companies include small and medium-sized companies without a sufficient critical mass of knowledge.

The Slovenian Textile Technological Platform therefore set the following objectives:

- The preparation and implementation of a strategic research agenda
- Connecting companies, technological centres and institutions into an efficient system, so as to perform research activities for the needs of the industry;
- The preparation and implementation of activities in the field of education and standardisation;
- New product development projects and products for new areas of use.

The research priorities of the STTP focus on research fields that have a long-term influence on the development of the textile and clothing industry, i.e.:

- Moving from the usual to more specialised products, based on highly technological processes along the entire chain of values of fibre textile / clothing;
- The implementation and expansion of textiles into numerous industrial sectors and new areas of textile use;
- Moving from mass production to customised production and the personalisation of products, along with intelligent production, logistics, distribution and new service concepts.

In the field of specialised products and highly technological processes, three research priorities have been identified:

- New technologies for the production and processing of functionalised textile materials;
- The development of textiles from renewable raw materials;
- Biotechnology in the production and processing of textiles.

With regard to the goal of using new, innovative textile materials – i.e. products – the following three important areas have been emphasised:

- New textile materials for personal protection (medicine, protection, sports, etc.)
- New textile materials for technical use (transport, construction, geotextiles, etc.)
- Smart textiles and clothes.

In the transition from mass production to customisation, the following key research areas have been determined:

- Tailor-made customisation;
- New designs and concepts for product development and technologies.

Conducting the research suggested will generate market innovation if the fields can connect in various joint projects, which will combine knowledge from the fields of materials, technologies, and market approaches, forming connections and cooperation in the chain of values.

Conclusions

More than twenty years ago, substantial restructuring processes started in individual industrial sectors in economically developed environments. The textile/clothing industry, which is one of the biggest industrial processing sectors in the world, was subject to extremely radical and all-encompassing restructuring processes in the majority of developed countries. Increased competition in a global business environment has contributed to the fact that the restructuring processes of the textile industry in the former socialist countries – Slovenia among them – have been so much more dramatic and radical. Since 1992, the Slovenian textile and clothing industry has lost the majority of the Yugoslavian market, while the Eastern-European markets have undergone substantial restructuring. This article presents data – i.e. the timeline – of the growth and development of the textile, clothing processing industries in Slovenia. As can be observed in Slovenia, the processing industry has already turned the restructuring process into positive growth. However, the Slovenian textile and clothing industry is still in the restructuring process.

When it comes to restructuring the Slovenian textile and clothing industry, the Slovenian State has played an active role all throughout. Nevertheless, its role has changed significantly since the 1990's. The form that state cooperation has taken in restructuring the Slovene textile and clothing industry has ranged from *ad hoc* direct financial aid for individual companies to the systematic encouragement of building competitive advantages in textile and clothing companies. This article presents two examples of the State's encouragement in the field of implementing modern business models in the Slovenian textile and clothing field, which will contribute to a more successful and efficient conclusion of the restructuring process.

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- *processing, modifying, and application of biopolymers,*
- *techniques and technologies of manufacturing, processing, and application of chemical fibres and other polymer materials and related products,*
- *techniques and technologies connected with manufacturing, processing and application of products of the pulp and paper industry and related branches*

***R&D activity** includes the following positions, among others:*

- *biopolymers – modifying and processing,*
- *functional, thermoplastic polymers,*
- *biodegradable polymers and products from recovered wastes,*
- *industrial biotechnology, e.g. bioprocesses for modifying and processing polymers and fibres, and biosyntheses of nano-biomaterial polymers,*
- *biomaterials for medicine, agriculture, and technique,*
- *nano-technologies, e.g. nano-fibres, polymer nano-coatings, nano-additives for fibres.*
- *processing of polymer materials into fibres, films, micro-, and nano- fibrous forms, and nonwovens,*
- *paper techniques, new raw material sources for manufacturing paper pulps,*
- *environmental protection,*

***The Institute is active** in inplementig its works in the textile industry, medicine, agriculture, plastic processing, filter and packing materials manufacturing, as well as in the cellulose and paper industries.*

***The Institute is equipped** with unique technological apparatuses and equipment. An outstanding example is the technological line for fibre spinning by the wet method which enables cellulose, chitosan, alginate, starch, and composite fibres to be spun.*

***The Institute is member** of domestic and international scientific organisations, the following, among others: EPNOE - European Network of Excellence, Polish Technological Platform of the Textile Industry, European Technological Platform of the Textile & Clothing Industries, 'Pro Humano Tex' Consortium, Centre of Advanced Textile Technologies Friendly for Human Beings, EN-VITECH-Net - 'Technologies of Environmental Protection' Int. Scientific Network, 'Biodegradable Polymers from Renewable Resources' - Int. Scientific Network. Polish Scientific Network for 'Nano-technologies in Textile Science and Praxis.*

***The Institute organises** educational courses and workshops in fields related to its activity.*

***The Institute's offer of specific services** is wide and differentiated, and includes:*

- *physical, chemical and biochemical investigations of biopolymers and synthetic polymers,*
- *physical, including mechanical investigation of fibres, threads, textiles, and medical products,*
- *tests of antibacterial and antifungal activity of fibres and textiles,*
- *investigation in biodegradation,*
- *investigation of morphological structures by SEM and ESEM,*
- *investigation and quality estimation of fibrous pulps, card boards, and paper products, including paper dedicated to contact with food, UE 94/62/EC tests, among others.*
- *Certification of paper products.*

***The Institute is active** in international cooperation with a number of corporation, associations, universities, research & development institutes and centres, and companies.*

***The Institute is publisher** of the scientific journal **'Fibres and Textiles in Eastern Europe'**; the journal is since 1999 on the 'Philadelphia List' of the Institute for Scientific Information.*

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