

Self-Assessment Textiles and Fashion Research Area

1. UNIT OF ASSESSMENT

1.1 Research area

At the University of Borås, textiles as education and research focused on three subjects: design, textile technology, and textile management. Textile and fashion are among the areas in which the University of Borås, through the Swedish School of Textiles, has national responsibility for both the development of the artistic perspective and the cross-disciplinary collaboration between art and science.

The University of Borås is nationally unique (Nordic unique also) by having a research and education environment for textiles all the way from textile fibre to final product. In this production chain, aspects of design, textile technology and textile management are covered. Our full-scale laboratory, workshops and technical facilities make us stand out from most European universities and schools. Moreover the Swedish School of Textiles is considered one of the top five schools in terms of educational and research environment in textiles. The main research areas within the design are Fashion Design, Textile Design and Textile Interaction design; textile management deals with sustainable supply chains and business models, marketing and consumption, circular economy and inter-organizational relationships and textile technology focuses on materials, process technology, resource efficiency, and functional and smart textiles. For that, the Swedish School of Textile is well-known worldwide and considered as Borås ambassador.

The research groups in Textile and Fashion have significant collaboration with several Swedish and European universities and industries, including TEKNO (Sveriges Textil och Modetextil). The research groups in Textile and Fashion have significant external research funding; the external research funds comprised with 80,7 MSEK in the last five years (19 Mkr in 2022), these values without taking into account the project which led by Science Park Borås, where a lot of research groups have highly involved in collaboration with them, and we are taking into account the limited external finance available for research on the artistic foundation from typically available funding bodies for research. For 2023, the internal research funds comprised 17,48 MSEK (of which SEK 13,2 million went to the research school), and part of this funding is directed to the artistic. Currently, 26 doctoral students are in the area, and around 40% of students' financing are external (project funded).

The total number of publications was 30 in 2022, based on the Web of Science. In addition, we need to consider the high artistic productivity of design that complements with curated exhibitions and artefacts and that we have high involvement in projects related to the industry where publishing the project results is difficult. (Prel. Figures for 2023 are account for below).

Our vision is to be one of the top international universities in textile and fashion in education and research with a high focus on sustainability and digitalization. And to strain our unique completeness environment consisting of design, textile technology and textile management with truly comprehensive full-scale laboratories and workshops.

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2. PROFILE OF THE UNIT OF ASSESSMENT

2.1 Description of the UoA recent (2023), history and organizational development, including present organizational structure.

The University of Borås is nationally unique (Nordic unique also) by having a research and education environment for textiles all the way From textile fibre to textile retailing through textile produce manufacturing and distribution. In this production chain, aspects of design, textile technology and textile management are covered, with our full-scale laboratory, workshops and technical facilities make us stand out from most European universities and schools and the Swedish School of Textiles is considered one of the top five schools in terms of educational and research environment in textiles. Also, the area has a special contribution and situation by gating permission to issue doctoral degrees on an artistic basis and general.

The development of doctoral education in the field of textile and fashion at the University of Borås (HB) started in 2003. Doctoral students placed at the School of Textiles (THS), were admitted to doctoral program at Chalmers University of Technology, Stockholm University, Gothenburg University and also in Engineering Science at Tampere University of Technology (TUT). Through a collaboration agreement, the main supervisor and examiner employed at HB, and placed at THS, THS could function as a home institution. The work continued to build up a research environment at HB / THS.

Since 2010 HB has received permission to issue doctoral education on both general and artistic domains. The doctoral program is very successful, with 43 doctoral students having so far defended their dissertations in the area of textile and fashion. There are 8 research groups in the textile and fashion area. The distribution of the research groups is represented in Figure 1.

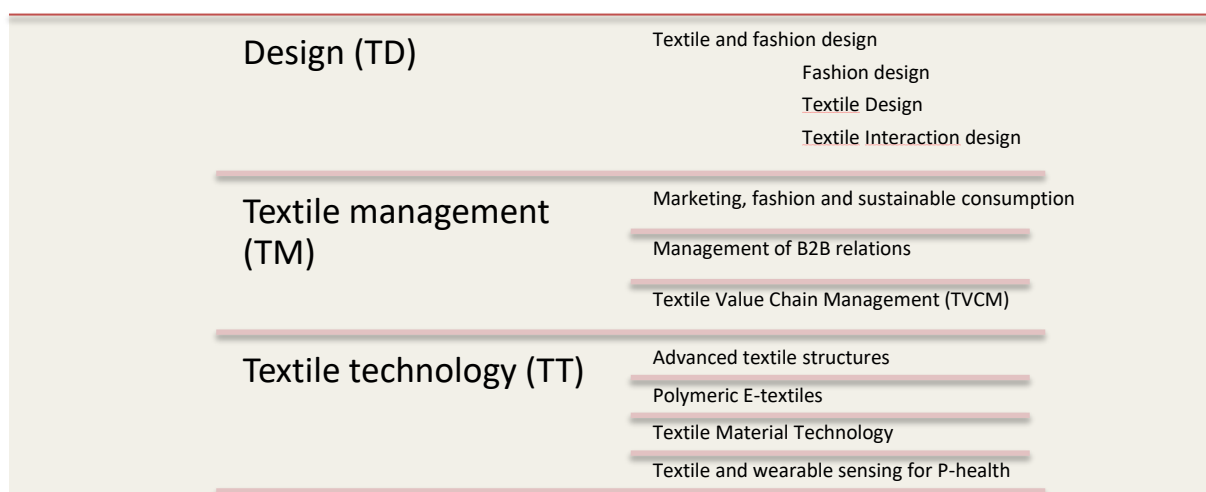


Figure 1: Research groups structures in the area of textile and fashion.

2.2 Special factors that should be noted when assessing the research within the UoA.

The textile and fashion area has a research and education environment for textiles all the way from textile fibre to final product. This production chain, aspects of design, textile technology and textile management are covered, which are considered unique in their comprehensive environment. Our full-scale laboratories, workshops and technical facilities make us stand out from most European universities and schools, and the Swedish School of Textiles is considered one of the top five schools in terms of educational and research environment in textiles. For that, the Swedish School of Textiles is well-known worldwide and considered as Borås ambassador. The area has an exceptional contribution and situation by gating permission to educate doctoral students on an artistic basis and in general.

The project with the city of Borås project ended in 2022, which had a high effect on the textile area, especially that for design (artistic) field there is very limited external finance available for research on the artistic foundation from typically available funding bodies for research in relation to other established research areas like for example technology, business, medicine etc. This condition increases the need for faculty finances to ensure a critical mass of research students and postdocs.

Most research groups in management and technology were created in 2018, where there is also a need for more investment in PhD and Postdoc to allow these research groups to develop in good condition. Similarly in design, with a strong focus on basic research, there is also a need for internal investment in PhD and Postdoc to allow the research groups to develop in good condition, considering the relative scares external funding for research in arts. We note that despite this short time, several research groups have done tremendous work in getting external funding, demonstrating the importance of more investment in the area. In addition, to sustain a high level of basic research and innovation in the full-scale laboratories, workshops and technical facilities and to keep standing out further investments in infrastructure is needed.

3. RESEARCH ENVIRONMENT

3.1 Description of the competences, opportunities to merit and skills development within the UoA

The Swedish School of Textile is an attractive environment for staff members and doctoral and master students. The area we focus on is the work condition of PhD students, especially the financial situation, where external funding (especially from the non-European industry) is highly investigated to validate their financing to avoid the exploitation of PhD students.

Opportunities for enhancing qualifications and fostering competence among researchers and doctoral students are facilitated through ongoing dialogues within research group activities, mentoring, and developmental discussions with managers. Currently, the ability to accrue merit is influenced by the accessibility of external funds. The demand for resources to support qualifications and recruitment is outlined in research group plans and is discussed with management.

Position	Design	Management	Technology
Professors	2 (100%) 1 (30%)	3 (100%)	3 (100%)
Visiting Professors/Researchers	1 (20%)	--	--
Associate professor /docents	1 (100%)	2 (100%)	4 (100%)
Researcher	1 (100%)	1 (100%)	6 (50-100%)
Post Doc	1 (80%)	1 (80%)	2 (80%)
Senior Lecturers/PhDs	12 (100%) 1 (80%)	11 (100%)	12 (100%)
Lecturers	4 (100%)		7 (100%)
PhD students	6 (100%) 3 (50%)	7 (100%)	6 (100%)

Figure 2. Accumulated Competences in Textiles and Fashion, 2023

Areas	Positions
Mix media: 3D, digital, crafts, tufting	6 technicians (100%)
Knitting (e.g., structural, elastomeric materials, 3D)	3 technicians (100%) 1 technician (90%)
Dyeing, preparation and printing (e.g., biocatalysts)	5 technicians (100%)
Assembly: (e.g., construction, joining etc)	2 technicians (100%)

Figure 3. Lab competences in Textiles and Fashion, 2023

Competence areas: The research in textile and fashion has been well-developed, with 8 research groups (one in design, three in management and four in technology):

– Textile and fashion design: The textile and fashion area is related to the methods and models that are of importance to the development and application of textiles and fashion in research, industry, and society at large. The area investigates the relationships between materials and design variables for function and expression in the development and production of textiles and fashion, as well as the connection between economic and design variables (resources) for function and expression in the production, distribution, and trading of textiles and fashion (research group leader Prof. Clemens Thornquist and Prof. Delia Dumitrescu)

– Marketing, fashion and sustainable consumption: The research group studies with cultural and social science perspectives how marketing and fashion are created, performed and interpreted by various actors in a consumer culture. The focus is on how marketing, consumption and fashion as an industry are created, reproduced and interpreted by various actors, including marketers, creators and consumers, through different practices and processes. Consumption is a central part and is also one of the main driving forces and purposes of fashion (research group leader is Prof. Karin M. Ekström).

– Management of B2B relations: The research group focus on inter-organizational relationships and how these are established, maintained and managed by involved stakeholders. These relationships shall be understood as both interaction and interdependencies between organizations in order to enable sustainability for individual actors as well society (research group leader is Prof. Daniel Ekwall).

– Textile Value Chain Management: Research in textile value chain management (TVCM) focuses primarily on the examination, understanding and development of intra- and inter-organizational structures, models and forms, and their underlying variables and antecedents that would enable sustainable value generation in textile and fashion enterprises, industry, and for the environment and society at large. Two important research areas within its scope are: I) circularity, and II) digitalization of supply chains & embedded business models (research group leader is Prof. Rudrajeet Pal).

– Advanced textile structures: The research group has an applied orientation based on advanced analysis methods combined with laboratory experiments. This research group aims at developing advanced innovative sustainable processes, materials and applications for the textile. The research group's scientific excellence, together with its relevance to the industrial field, puts important research efforts into more sustainable textile products. The research group is known for our research on transfer fibre to textile fibre, improvement of the spin ability of new sustainable fibre and the mechanical recycling of waste textiles (research group leader is Prof. Nawar Kadi).

– Polymeric E-textiles: The research group Polymeric E-textiles, where "E" indicates the involvement of electrical phenomena, works extensively with textiles as a central object of study, with the overall aim of merging physical, chemical and biological mechanisms with textiles and using textile material and processes a) as a mean of enhancing effects from these, other fields; and b) adopting these often "hard" mechanisms making completely new kinds of fibres and fabrics ("enriching the textile realm") (research group leader is Docent, Senior Lecturer Nils-Krister Persson).

– Textile Material Technology: Research in the research group Textile Material Technology focuses on the development of advanced functional and smart materials as well as novel, resource-effective processes to produce such materials in an effective and efficient way. Innovation is created in a unique research environment with a close connection to the textile industry. Apart from conventional technologies like coating, dyeing and finishing, examples of important novel technologies used in Textile Materials (research group leader is Prof. Vincent Nierstrasz).

– Textile and wearable sensing for P-health: The research group focuses on the production of textile sensors and sensorized garments that enable personalized healthcare applications. For that, both textile-electronic integration techniques and methodologies for functional characterization of smart textiles, in general, and textile sensors, in particular, are often used. The focus of the research activities extends beyond textile aspects and includes the evaluation of the biomedical measurement and monitoring functionality (research group leader is Prof. Fernando Seoane).

3.2 Description of the research facilities and infrastructure

The research in textile and fashion design has a well-developed infrastructure for experimental work, from experimental environments in weaving and tufting, knitting, sewing, printing, dyeing and finishing, mixed media (laser cutting, 3D printing, etc.) to full-scale workshops for weaving and knitting, which provides excellent conditions for experimentally oriented research and postgraduate education. The textile lab environment and workshops, known for highly qualified technicians, is essential for research and education development. A significant investment in developing the knitting laboratory and weaving labs, which are updated with new industrial machines had been done in the last three years. Investment in the employment of technical labs Technician (engineering technicians) is essential in the development of the area:

- In the knitting lab: it is necessary to keep a high level of knowledge, as some of the main technicians will be retired, and training new technicians will take time to maintain the cumulated expertise built in the school. A dedicated action to secure such knowledge while increasing the academic level in the lab is advised.
- In spinning and nonwoven labs: it is essential to facilitate researchers' access in the lab, where the last employment of 50% didn't meet the lab's needs.
- In the research lab, there is need for 1 engineering technician to assist research technologies.

Investment in the development of existing labs:

- Testing lab: the lab was created around four years ago based on buying the equipment for a commercial testing lab that had gone bankrupt; since its creation, the investment in the lab wasn't at all relevant for research and education. This investment was based on the labs' strategy to do a service for the companies. To make the lab useful for research, it is required to update the lab to allow performing automatic characterization tests.
- Research lab: The equipment in this lab is based on external funding; the investment of the university is so limited. This lab has no clear budget, even for co-funding small testing equipment and consumable materials. For that, a clear budget is needed urgently for the necessary materials to facilitate the work of the researchers.
- Spinning lab: This equipment and consumable material for this lab are based on external funding, with no investment from the school in any equipment. The development of this lab is essential for research and education.

Investment in creating a new lab:

- Creating a Textile Value Chain Innovation Co-Lab: Such an Innovation Co-lab should harness THS's existing physical labs/workshops and digital server as integrated infrastructure to transform our research results into innovations that are of high technology-, business- and market-readiness for impacting the target users in the industry and society.
- Digital and virtual reality lab: where the movement in this direction is part of the area and University of Borås's strategy.

Research centers connected to the UoA. Please list those centers, where researchers within the UoA has an active engagement.

Creation of Fibre Centre:

The fibre centre will have the objective to complete the production chain (from raw material to fibres to end-product) in the same area, whether it is a woven, knitted or nonwoven fabric, to improve the research quality in collaboration with the industry and facilitate the development and prototyping for the innovative textile processes. The complete chain will be the base for developing the research and the application of digitization of the textile process. The goal is to have sufficient equipment related to fibre testing systems, small-scale fibre spinning systems, yarn spinning systems, recycling and sorting equipment, nonwoven systems and digitalization tools. And this centre will allow the university to take a step further, to strengthen its position and become one of the best environments for education and research in the textile area.

3.3 Description of research seminars

Research seminars are conducted at departmental level for each subject within Textile and Fashion. In design, for example, higher seminars are given every week. The seminars consist of presentations with invited guests, doctoral students and senior researchers about current research and development in the artistic field for critical discussion with a special focus on practice-based design research. Here, the doctoral student continuously reports the progression of his research task and the work is revised and developed based on the criticism and the points of view highlighted at the seminars. Every two weeks, the seminar is internal for PhD students, master's students and the college in textile and fashion design. Every other week, these seminars are open to everyone, including the public. The program with lecturers both from the environment, academia and from the profession is on the website. These seminars are weighted for in-depth discussions of ongoing research projects. Regardless of the week, seniors and doctoral students present their ongoing research work, but also guest researchers and collaborative partners in research projects. The seminar series is part of compulsory research and master courses.

The senior seminar brings together seniors and doctoral students in textile and fashion design every week. The higher seminar in design together with the studio activities is a key activity for both the postgraduate education and the educational environment and brings together doctoral students in design, the design college and advanced level design students every week during term time. Here, each doctoral student also presents his research at least once a year.

3.4 Description of the UoA's academic network and co-operation.

The research groups in Textile and Fashion collaborate significantly with several Swedish, European and Global universities and industries. As part of a textile ecosystem, Textile Fashion Center, the profile is a central part of the transformation of the textile industry, changing from being a textile supplier to becoming a positive force in social development. Both within textile design and technological development as well as fashion, new, creative solutions, business ideas and collaborations for sustainability are created.

The collaboration with the science park strengthens the position of the area, where several research groups (not all) have been involved in several research and industrial projects with them; this collaboration improves the relationship between the research groups and the industry. The area is known for its high partnership with industry, where the majority of its external funding is based on industrial collaboration. The collaboration with the communication department has been significantly improved, with several meetings and discussions. The area collaborates with all top universities in the textile field, especially the European textile. And it is part of several European and International platforms, e.g.:

Organisations

- AIC (International Colour Association; <https://aic-color.org>)
- ArcInTex (coordinated by the Design Department at UB; www.arcintex.se)
- AUTEX (Association of Universities for Textiles), it creates a worldwide network of textile universities and was founded in 1994; <https://www.autex.org/>
- CUMULUS Association(<https://cumulusassociation.org>)
- ELIA (The European League of Institutes of the Arts; <http://www.elia-artschools.org>)
- ETP (The European Technology Platform for the Future of Textiles and Clothing), <https://textile-platform.eu/>
- FASHION BIG DATA (FBD) Foundation (<https://www.fbfdfoundation.org/>). TVCM Group at UB is a founding member.
- EIHA (European Industrial Hemp Association) www.eiha.org
- IFFTI (Network of International Fashion and Textile Institutes, <https://site.iffiti.org>)
- IEEE Engineering in Medicine and Biology. Technical Committee on Wearable Biomedical Sensors and Systems

- International Trade Center (expert role)
- International Labour Organization
- Nordic Circular Hotspot
- NETFAS
- TEKO (Sveriges Textil och Modeföretag)
- UNECE's Sustainability Pledge
- United Nations Economic Commission for Europe, Switzerland

Institutes (examples of main collaborators)

- Aalto University, FI
- Chalmers University of Technology, SE
- Designskolen Kolding, DK
- Edinburgh College of Art, UK
- Eindhoven University of Technology, NL
- ENSAD, FR
- ENSAIT, France
- Indian Institute of Technology, Delhi, India
- Karolinska Institutet, SE
- Nottingham Trent University, UK
- Politecnico di Milano, Italy
- RMIT University AU
- The Royal Danish Academy of Fine Arts, DK
- Turku University of Applied Sciences, Finland
- Umeå University, SE
- University of Art and Design, Linz
- Universität der Künste Berlin, DE
- University of Manchester, UK

Moreover, we are involved in the European master program WE-TEAM (it is a two-year Erasmus Mundus Joint Master Degree (EMJMD) Programme to educate the next generation of textile engineers); <https://we-team.education/>. We are also involved in double degree doctoral education in design, with Aalto University and in technology, with Lotz University.

3.5 Description on how the UoA promotes equality and sustainability.

The area follows the University of Borås' guidelines for equality and sustainable development and thereby contributes to the university's goals "The attractive university" and "Complete academic environments 2.0". The University of Borås works to actively promote equality and diversity under the concept of "equal conditions". Equal conditions are defined as equal rights and opportunities regardless of gender, gender identity or expression, ethnic affiliation, religion or other belief, disability, sexual orientation or age. At the University of Borås, zero tolerance applies regarding discrimination, harassment and sexual harassment in accordance with the applicable law or regulation. Every single individual, both employee and student, has a responsibility to treat each other with respect and to prevent any form of discrimination and harassment. The University of Borås must also contribute to sustainable development locally and in the world and reduce negative impacts from its own operations. The university's sustainability policy states, among other things, that the university's research into sustainable development is prioritized. Research on sustainable development is characterized by problems that require a multidisciplinary approach, innovative thinking and collaboration with the surrounding society. By supporting cross-border cooperation, the diversity of ideas and different perspectives is promoted.

To ensure that these aspects are brought into the research environment, the university offers a series of training sessions both for supervisors and doctoral students where these issues can be problematized and discussed. Newest among these courses is Equality integration in practice – basic

knowledge and guidance for equal education, which is an example of a concrete measure given the action plan decided for 2017-2019. This course provides basic knowledge about equality and gender as well as concrete examples of and methods for equal education. The course is aimed at all staff within the university. Thus, the course is relevant both for supervisors and doctoral students, of which in the latter case in the capacity of the teaching role the doctoral student has within the framework of his teaching. In order to increase awareness of gender equality among doctoral students, the gender equality perspective has been included as part of the supervisor training To supervise doctoral students given by PUF. The supervisor training has as a course objective to critically discuss the doctoral education, its organization, cultures as well as norms and values that can affect supervision and the conditions of the doctoral students. This course is also a requirement for associate professorship.

4. PRODUCTIVITY AND IMPACT

The research groups in Textile and Fashion have significant external research funding; the external research funds comprised with 80,7 Mkr in the last five years (19 Mkr in 2022), these values without taking into account the project which led by the science park, where a lot of research groups have highly involved in collaboration with them, and we take into account the limited external finance available for research on the artistic foundation from typically available funding bodies for research.

The doctoral program is very successful, with 43 doctoral students having so far defended their dissertations in the textile and fashion area. There are currently 26 doctoral students in the Textile and Fashion area, and they are the central part of the research activities. Around 40% of PhD students' financing are external (project funded).

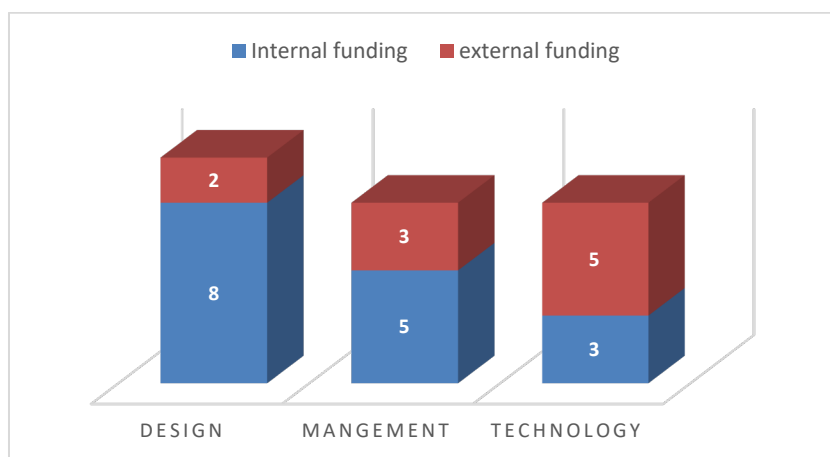


Figure 4: Distribution of PhD students in the area

Figure 5, demonstrates the majority of the projects' funders in the last five years, where the higher value is commencing from Borås Stad; this funding was stopped in 2022, and the EU funding with several programs, including Erasmus+. And we note an augmentation of the projects' financings from KK in the last two years. For 2023, the internal research funds comprised 17,48 Mkr (of which SEK 13,2 million went to the research school), and part of this funding is directed to the artistic.

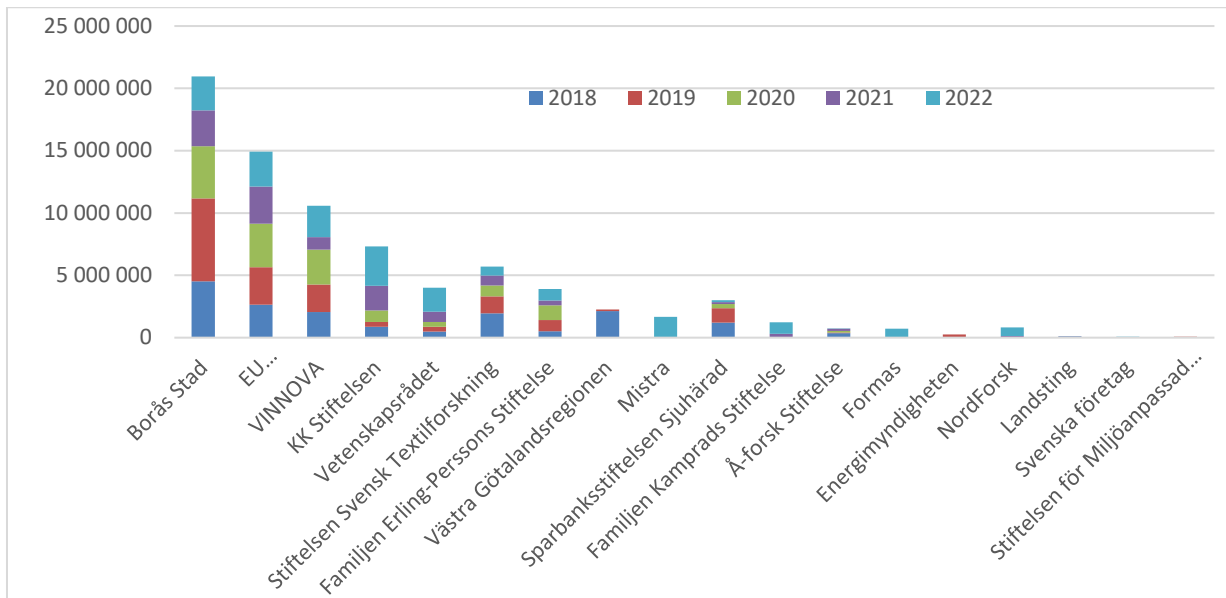


Figure 5: Research funds comprised.

The total number of publications was 30 in 2022 (figure 7), based on the Web of Science. If we include all the conferences and other research papers will be 78 (from DIVA, figure 6). The preliminary figure (DIVA) for refereed publications in 2023 is 63 in all three areas, however this figure will most likely increase before finalized in early 2024. However, we also need to consider the high artistic productivity of design that complements with curated exhibitions and artefacts and that we have high involvement in projects related to the industry where publishing the project results is difficult. The researchers in the area also present their research in social media, TV, radio, and popular press etc.

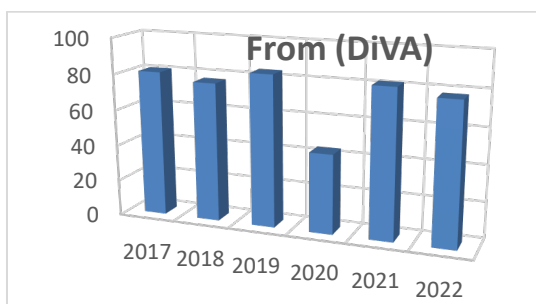


Figure 6: Number of publications per year based on DIVA.

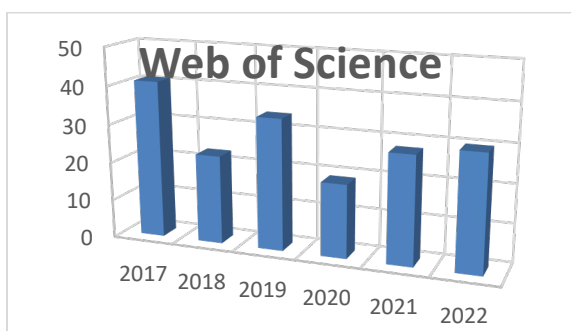


Figure 7: Number of publications per year based on the Web of Science.

The total number of the researcher in the area is 89, and the majority are not active in research where the necessity for more motivation for researchers, especially for the senior lectures to be more involved in researchers and PhD supervision, where the necessity to involve them with 50% of their time in research. Below follows example of citations for management and technology.

Name	Citations	h-index	i-index	Nr. of Publ.
Rudrajeet Pal	2408	22	35	137
Vijay Kumar	951	14	21	51
Kanchana Dissanayake	811	14	17	43

Figure 8. Citations (Google Scholar 2024-01-02). Management (selected)

Name	Citations	h-index	i-index	Nr. of Publ.
Nawar Kadi	465	8	7	50
Fernado Seoane Martinez	2851	32	73	176
Vincent Nierstrasz	3153	34		110

Figure 9. Citations (Google Scholar 2024-01-01). Technology (selected)

For design, as well as to certain degrees for management and technology, the visibility of research impact comes in many different forms, and is less considered in terms of citations, but also varies between areas. Given that artistic research focuses on the development of artistic practice, education on master and doctoral levels are together with the development of research environments two key such impact indicators:

- national and international recognition of education and research environments development,
- national and international research grants,
- national and international exhibitions and prizes in student competitions,
- national and international recognition of specific research results, especially results of a programmatic nature that guides the development of practice.

Research projects and collaborations

Year	Project	Funder
21-23	Designing with Living organisms	Vetenskapsrådet
22-25	Sonic Fashion	Vetenskapsrådet
21-24	Beyond E-textiles	Nordforsk
18-23	Textile and Fashion 2030	Swedish Government
21-25	Holding Surplus House	Formas
21-23	Active Wear	Vinnova
23-26	RESORTEX	Formas
22-26	SCArCITY	Formas
22-25	Circular Logistics	Formas
21-24	Sustainable Clothing Futures	Formas
21-24	CLOSeD	Ikea Family Research Foundation
24-26	ReLoRe	Hakon Swenson Stiftelse
23-26	Strengthening women's representation in senior textile positions	Erasmus+
23-26	Hope	KK stiftelsen
22-26	Softwear	Horizon Europe
21-24	Development of a reusable urinary incontinence pad	MISTRA
21-24	Bio-based residual streams with potential in the technical textile industry	
22-25	ADDTEX	ERASMUS+
23-27	Locality	Horizon Europe
23-24	Microplastics	Swedish Environmental Protection Agency

Figure 10. Selection of research projects significant for the area (management)

5. COLLABORATION

Internally, the multidisciplinary research environment at is based on common roots in the understanding of, and development of, textiles and fashion as materials and techniques and as design, use and craftsmanship. The most basic form of collaboration within a multidisciplinary field such as textiles and fashion is the in-field application; a form of interaction, which drives development through more or less strong bonds, through applications that generate feedback. It is not a question of systematic collaboration but rather a question of the everyday putty that in practice defines a multidisciplinary field as a field. The most typical form of a "strong" interaction between sub-areas involves the development of techniques/materials/methodology/processes in one area that is relevant also for the development in another area. Examples of this are new textile materials and techniques used to develop design methodology and design techniques through design experiments. The experiments "review" materials and techniques and thus provide feedback. At the same time, the design experiments open up possibilities, which can be applied to develop methodology and systems for production and trade. Similarly new textile processes connect to design methodology and design techniques through design value chains. At the same time, the design examples open up possibilities, which have consequences and opportunities in develop process and business models for production and trade.

Looking externally, the research group has developed a strong international presence within textile and fashion research where researchers in design, management and technology have an extensive international network (e.g. through the projects in figure 10.) which is the basis for international collaboration in research and exchange programs.

6. CONNECTION BETWEEN EDUCATION AND RESEARCH

The area is related to several education programs at bachelor's, master's and PhD level, see Table 11. In addition to this are educations designed specifically for lifelong learning, see Table 12.

Name	Level	Credits	Area
Fashion Design	BA	180 hp	Design
Textile Design	BA	180 hp	Design
Master Programme in Textile and Fashion Design	MA	120 hp	Design
Research School in Textile and Fashion Design	PhD	240 hp	Design
Textile Management, specialization in Fashion and Retail	BSc	180 hp	Management
Textile Economics	BSc	180 hp	Management
Master Programme in Textile Management	MSc	60 hp	Management
Master Programme in Textile Value Chain Management	MSc	120 hp	Management
Master Programme in Fashion Marketing & Management	MSc	120 hp	Management
Research School in Textile Management	PhD	240 hp	Management
Textile engineering	BA	180 hp	Technology
Textile Product Development & Entrepreneurship	BA	180 hp	Technology
Master Programme in Textile Engineering	MA	120 hp	Technology
Master Programme in Technical Textile Innovation	MA	120 hp	Technology
Research School in Textile Technology	PhD	240 hp	Technology

Figure 11. Education programs at the University of Borås related to Textile and Fashion

Courses (selection)	Credits	Area
Artistic research and practice-based design research (PhD)	7,5Hp	Design
AI and Textile Design (1 st cycle)	15Hp	Design

Fashion Design and Sustainability (1 st cycle)	7,5Hp	Design
Sensory Design: Designing experience through wearing (1 st cycle)	7.5Hp	Design
Theoretical perspectives on the role of logistics in the strategy of the firm (PhD level)	7,5Hp	Management
Foundations on the role of industrial value chain management towards sustainability (PhD level)	7,5Hp	Management
Scalability of fashion-tech value chains: Addressing future sustainable development challenges (Master level)	7.5Hp	Management
Textile Material Science	7.5 Hp	Technology
Textile Regulations	3 Hp	Technology
Advanced Processes for functional, smart textile materials I	7,5Hp	Technology
Advanced Processes for functional, smart textile materials I	7,5Hp	Technology

Figure 12. Elective courses and courses in lifelong learning

As can be seen from the tables above, postgraduate courses, undergraduate courses and independent courses are directly related to research areas and research groups.

7. DEVELOPMENT AND STRATEGY

7.1 Research environment

- Develop the research axes in the research groups to be adapted to EU Textile Strategy for sustainable and circular textiles.
- Improving and clarifying the scientific contribution needed to promote researchers.
- Promote career development for existing researchers and adopt that all senior researchers must be involved with 50% research and 50% education of their time.
- Promote collaboration and not individualization in the research work.
- Promote recruitment of postdocs and senior lecturers with a high scientific background.
- Encourage the visiting of guest researchers to contribute to the research environment.
- Improve communication with textile labs
- Improve the number of publications in high-quality scientific journals.
- Promote patenting and commercialization of research results
- Investment in research equipment and infrastructure wish had been mentioned in the chapter 3.1.

7.2 Doctoral education

- Develop collaboration with other universities for joint supervision or a double degree.
- Organize Textile and Fashion seminars/activities/poster days.
- Develop PhD-courses.
- Research groups leader need to support/give input to the Research Education Board in the ongoing quality work with the PhD programs.
- Encourage Co-supervisors between the research groups. (for exchange and broader input/knowledge).
- Ensure the minimum critical number of PhD students, especially for design (artistic).
- More acceptance of externally funded PhD students (with continuing the high investigation of the validated industrial financing for non-European companies to avoid exploiting PhD students).

7.3 Communication

- Continue the discussion and collaboration
- Encourage the researcher to use social media to communicate their research work.
- Continue the communication of our activity with the industry.
- Re-establish the Nordic-textile journal to be more international and a top textile journal cross-interdisciplinary.

7.4 Collaborations

- improve and extend the collaboration with the Science Park Borås.
- Improve and extend collaboration with resource recovery.
- Improve our international collaboration with other universities.
- Promote patenting and commercialization of research results.

7.5 External funding

- More involvement of new researchers in the writing of projects.
- More collaboration between the research groups for funding applications.
- Open discussion with Borås Stad for the possibility of funding the area.
- Check possible external funding for research equipment and infrastructure.

8. DISCUSSION AND CONCLUSIVE EVALUATION

A number of strengths and weaknesses that the area exhibits are discussed below.

8.1. Strengths

- HB/THS is located within a textile industrial cluster in Sweden with strong support and interest locally and nationally and there is a large network with both companies and other organizations.
- There is a strong interest from national and international research environments to collaborate in all areas of textile research at HB/THS – design, management, and technology.
- Cooperation with international research environments is high. The area has many research projects with international participants.
- Textile and Fashion Research is a prioritized area at HB
- There is strongly committed collegial research culture to develop the area, both in depth in each area of design, technology and management, as well as a culture for interdisciplinary research.
- Research focus has both strong connection with industry and society as well as a solid foundation in basic research.
- HB/THS attracts strong students to MA-programms that both contributes directly to research, but also provides a dynamic and highly skilled based for the research school and future research careers at HB/THS.

8.2. Weaknesses

- The limitation of internal funding will affect the number of PhD students, especially for the design part, which is critical.
- More seniors could more actively participate in research groups but are challenged to do so by the teaching commitment.
- The number of joint research projects between the areas subjects are relatively few but growing.
- Differences in research funding opportunities especially between design (art) and technology and management (science) provide challenges for more joint research projects.
- A consequence of a long tradition of experimental research and education in textile and fashion design is a relatively high pressure on studios and workshops due to the exploratory nature of the work.
- Research seminars in the different subjects are well organized, but more cross disciplinary participation in each other's seminar would be beneficial.
- Differences in research funding opportunities especially between design (art) and technology and management (science) provide challenges for more joint research projects.