

نماذج من دعم الابتكار والتصميم و التطوير للصناعات الصغيرة والمتوسطة
- دراسات ميدانية من جامعة نوتنجهام ترنت

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مقدمة

تعتبر الصناعات الصغيرة والمتوسطة شريان الحياة لاقتصادية في المملكة المتحدة ،فهي يقوم بتوظيف أعداد أكبر مما يساهم به القطاع العام والشركات الكبيرة و هي أيضا تقوم بمساهمة كبيرة في الإقتصاد القومي. جامعة نوتنجهام ترنت (Nottingham Trent University) تدعم المؤسسات الصغيرة والمتوسطة من خلال رسالتها التعليمية والبحثية. جامعة نوتنجهام ترنت هي واحدة من أعلى الجامعات في المملكة المتحدة لمعدل توظيف الخريجين. أكثر من 97 ٪ من الخريجين يحصلون على وظائف أو يتابعون دراستهم العليا في غضون ستة أشهر من التخرج. جامعة نوتنجهام ترنت تهدف إلى أن تكون الاختيار الأول للشركات الصناعية للتعاون في مجال البحوث والتدريب والخدمات الاستشارية وتوظيف الخريجين. الجامعة أيضا تدعم إنشاء شركات جديدة فضلا عن تعزيز وتوفير التعليم وروح المبادرة اللازمة لإدارة هذه الشركات و الأعمال في المناهج الدراسية وفي جميع أقسام الجامعة.

جامعة نوتنجهام ترنت ملتزمة من خلال أنشطتها لتحسين الإبداع والابتكار في الصناعات الصغيرة والمتوسطة من خلال التدريس والبحث العلمي. هذه الورقة تقدم أمثلة عن الأنشطة التي يتم تنفيذها في جامعة نوتنجهام ترنت لدعم الابتكار و الإبداع للصناعات الصغيرة والمتوسطة وإنشاء الشركات التجارية. تتضمن هذه الورقة أيضا بعض الدراسات الميدانية التي تقوم بتسليط الضوء على بعض هذه الأمثلة و النشاطات في قسم تصميم المنتجات (Product Design) .

**Supporting Design, Innovation and Business Improvements for SMEs -
Case studies from Nottingham Trent University**

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Abstract

Small and Medium sized Enterprises (SMEs) are the lifeblood of the UK economy, employing more people and generating a greater share of national wealth than the public sector and larger companies. Nottingham Trent University supports SMEs in several means within its mission of delivering education and research that shape lives and society. Nottingham Trent University is one of the top universities in the UK for its graduate employment rate. Over 97% of graduates with first degrees from full-time study are employed or go on to postgraduate study within six months of graduation. NTU aims to be the university of choice for corporate clients and industrial collaborators who want a professional approach and concrete results from research, training and consultancy services and from the graduates they employ. The University also supports the creation of new businesses as well as fostering the delivery of entrepreneurship education into the curriculum across the University.

This paper outlines examples of activities that are performed at NTU for supporting design, innovation and business creation. The paper also includes some case studies to highlight some of these examples from the Product Design subject area where the author is currently working.

1. Introduction

Nottingham Trent University is committed through its activities to improving creativity and innovation of SMEs through teaching, research and entrepreneurship activities. Nottingham Trent University is also ranked 1st amongst universities in the 2009 Green League for its environmental commitment. It has 24,000 students and is investing £130 million across its three campuses to create an inspiring learning environment. NTU's close links with employers and strength in employability have established the University as a national and international player- recruiting students from over 90 countries. Nottingham Trent university goal is to be the university of choice for students who want to engage in all aspects of university life to gain the skills, knowledge and self-confidence to succeed in their chosen profession, making a positive impact on the people they meet and the societies in which they live.

NTU provides a full range of educational programmes to meet the needs of both young people keen to enter their chosen career and practising professionals who either wish to change career direction or accelerate their promotion prospects.

This paper presents, using case studies from Product Design subject area, how Nottingham Trent University helps SMEs in supporting design, innovation and business improvements. This paper presents activities within business creation through enterprise development centre (The Hive), Business Innovation & Creation Unit, industrial placement activities, research projects, the integration of teaching and learning with industry and examples consultancy activities.

2. Business Creation Through Enterprise Development Centre- The Hive

The Hive is Nottingham Trent University's purpose-built enterprise development centre. It supports the creation of new businesses as well as fostering the delivery of entrepreneurship education into the curriculum across the University. The Hive gives entrepreneurs the skills and business training to make their ideas a commercial reality. Although primarily for students and graduates of NTU, the Hive offers help to anyone with a viable business idea, or staff who need help embedding enterprise into their curriculum. At the Hive, business experts will help to evaluate business ideas and equip future business people with the essential knowledge that will be needed to develop that idea into a successful business venture. The Hive began in 2001, to date the Hive has helped more than 100 businesses ideas become a reality. Statistics show that up to 60% of start-ups are likely to fail within their first three years. However, with structured support some 80% are likely to remain in operation after the same period. The Hive statistics show the support for more than 100 new business ideas to date, 90% of which are still operational at the present time. This speaks for itself.

The centre provides help and support in the following areas:

- Expert help, mentoring and in-house training
- First class business support and excellent facilities
- Access to the invaluable expertise, both external and University based.

The Hive also delivers in-curricula accredited courses and one off workshops on entrepreneurship, as well as extra curricula activities for undergraduate and

postgraduate students across the whole University. Our students and businesses have won many awards and competitions. The programmes will help new entrepreneurs in many aspects including:

- Understanding the principles of running a business
- Helping to identify and evaluate business opportunities
- Preparing business plans
- Supporting entrepreneurs through the crucial early stages of business development and beyond.

3. Business, Innovation and Creation

The Business Innovation Team provides businesses with a route into the expertise and resources of Nottingham Trent University. The team works with colleagues from all nine academic schools to ensure that businesses and external organisations can access the knowledge, skills and specialist facilities that are available within NTU. The team is always seeking new ways of working with external partners. To enable businesses and external organisations to learn how organisations can benefit from the team's activities, the team regularly hosts business breakfasts, specialist workshops and networking events.

Close working with business and the professions is vital to NTU's research and teaching. NTU has a number of Knowledge Transfer programmes that are beneficial to many SMEs. Some of the programmes are supported by external funding, so external organisations may even be able to get them at a reduced cost.

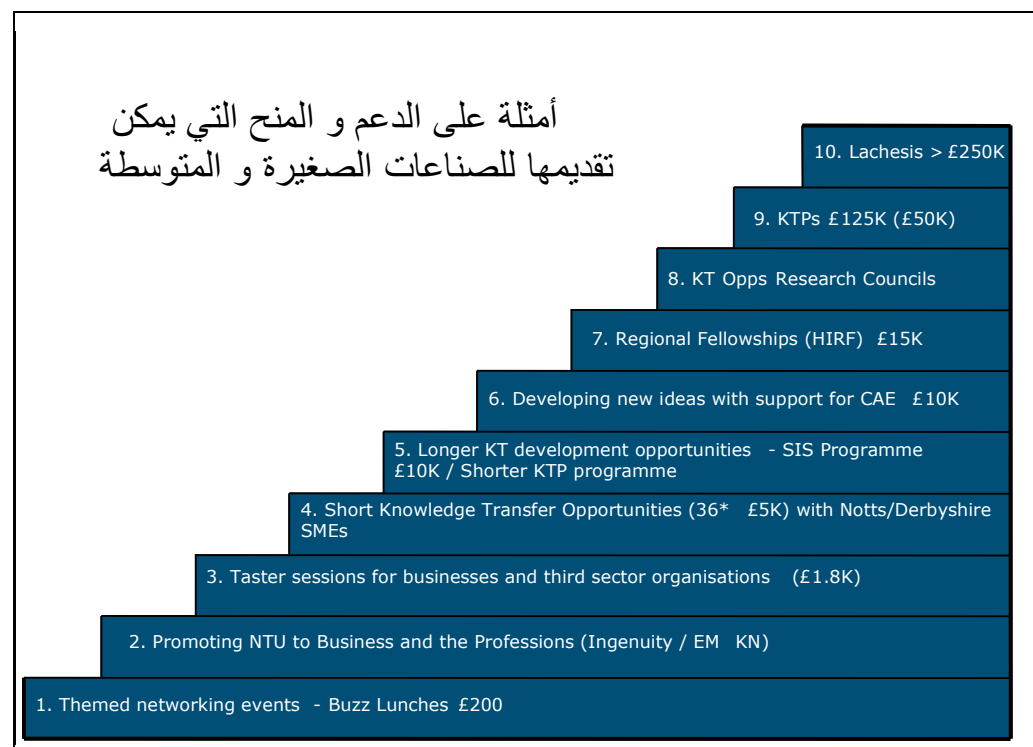


Figure 1: Examples of the funding opportunities for supporting SMEs and business innovation and creation at NTU.

One of the schemes available for supporting SMEs is Knowledge Transfer Partnership (KTP). Knowledge Transfer Partnerships are for companies seeking to achieve speedier growth, realise an important breakthrough, fill a key skills gap and

make a change in direction. For the funding application, the Knowledge Transfer Team will help identify a specialist to help draw up the project proposal. If the proposal is approved, the team helps recruiting a high calibre graduate associate to work within the company, supported by the University. The company, University and graduate (associate) work in partnership to develop a three-way project. Companies who have previously worked in partnership with the Nottingham Trent University are expected to significantly increase their annual sales turnover. In addition, the company will have the opportunity to:

- improve profitability
- develop new products
- increase sales and establishing new markets
- reduce costs
- compete more effectively
- gain a high calibre graduate at low cost with the option to employ them following the project
- recruit and train staff
- access University specialists.

In addition to KTP, NTU professional consultancy services offer companies access to a wealth of experience, specialist expertise and research centres to enable them to find the solutions to the challenges they are facing. Many of NTU academic staff act as specialist consultants to businesses, the professions and public sector bodies both in the UK and internationally. They engage on special projects, including:

- assisting with problem solving
- providing new insights
- facilitating projects, systems, new product development or service delivery.

4. Industrial Placement Activities

NTU is in the top three universities in England and Wales for its graduate employment rate (HESA performance figures, 2006-2007). Over 97% of NTU graduates with first degrees from full-time study are employed or engaged in further study six months after leaving. This is due to the fact that NTU courses are informed by businesses and industry. As an example, Product Design graduates thrive in the jobs market because of the subject's high commitment to educational quality, multi-disciplinary course portfolio and powerful links with businesses and industry. The University also boasts the third highest number of students in Great Britain working on year-long work placements (HESA Student Records 2006-2007). NTU is committed to providing its students with the experience and know-how necessary to succeed in their chosen profession. The authors work within the Product Design team and the Product Design courses at NTU are designed to meet the needs of the graduate employment market. Product Design courses are rich in terms of technical and interpersonal skills. This helps students to recognise their transferable skills and their application to many companies and careers. The Placement students benefit from this experience and also helps in providing SMEs with new talents and expertise. The process also aims at developing strong relationships between SMEs and the University.



Figure 2: Students on placement activities in industry.

There are many benefits to students from doing a placement year. The advantages could be summarised as:

- Students experience at an early stage how academic studies and industrial practice relate.
- The placement experience reads well on students' CV when they are looking for their first career appointment and improves chances for better employability on graduation.
- The opportunity to have an industrial referee as well as an academic referee
- The placement process is similar to seeking graduate employment.
- Some placements develop into offers of career appointments after graduation.
- Improve student's technical and interpersonal skills.
- Students become more mature and develop much better professional skills and time management.

Placement activities also benefit companies, particularly SMEs. One employer stated "For me it is the second experience with students from NTU. For our R&D organisation it's absolutely great to have those young dynamic talents here for a year". Another employer expressed his experience as "We've been lucky enough to have enjoyed students who have been enthusiastic and up for the challenge of working in a top creative outfit."

The Placement activities are also integrated with teaching and learning activities. Students are required to submit CVs and covering letters for job opportunities by the deadline given by the employers. Students are guided through the application procedure and are required to see applications through to interview stage and accept offers for jobs. Students on placement will have the opportunity to attend a Call Back day to inform other students about their experience and the benefits they gained. The Call Back day also allows students to discuss progress, and receive early feedback, see Figure 3.



Figure 3: Call-back day for placement students studying Product Design. Students go back to the University to present their work to their colleagues and members of staff.

5. Teaching, learning and Networking Week

Companies are frequently invited to give professional lectures to students on specialised subjects and improve students' understanding of industry. In addition, a week-long conference, namely The Networking week, is organised on yearly basis where companies, professional institutions, career services and other organisations participate in the event to give lectures to students, see Figure 4.



Figure 4: Companies and professional institutions are invited frequently to give lectures to students and strengthen the relationship between NTU and industry.

6. Teaching Through Live Industrial Projects to Support SMEs

Students at NTU work closely with companies on research projects and teaching and learning activities. For example, students on the Product Design course have enjoyed for the last 2 years working closely with Ocean Navitas Ltd in developing portable wave energy generation ideas and products, see Figure 5.

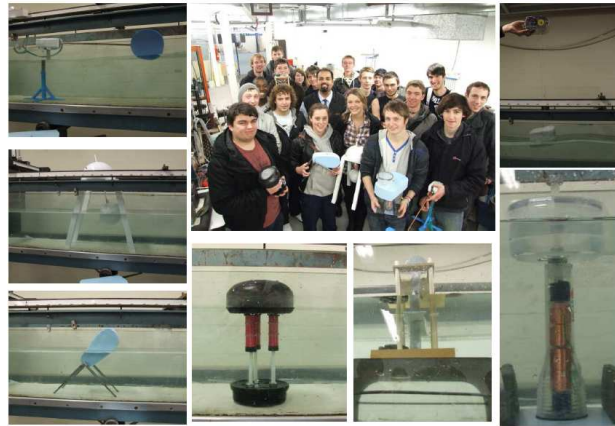


Figure 5: Product design students and their wave energy designs that have been tested.

This collaboration gives Product Design students an invaluable professional experience in working on real-life projects and meeting industrial deadlines and requirements. The experience the students are having, has been extremely beneficial in terms of product design as well as customers requirements. The experience has also been very beneficial to students to be aware of the energy-market and the diversity of products available to customers and the opportunities available to product designers in this area.

7. Research Activities to Support SMEs

Nottingham Trent University and Ocean Navitas Ltd have been collaborating together on the development of sustainable energy generation systems. Ocean Navitas is developing a system to generate electricity from wave power. The first stage of collaboration was the development of the gearing system for the wave energy converter as SIS project (Stimulating Innovation for Success). Following the success of the project, Ocean Navitas has been interested in developing further collaboration by the means of a consultancy and research work in order to develop a commercial product within a short time scale. Ocean Navitas Ltd has designed and manufactured a direct drive Wave Energy Converter (WEC), which utilises a geared system connected to a Permanent Magnet Alternator (PMA) as shown in Figure 6.

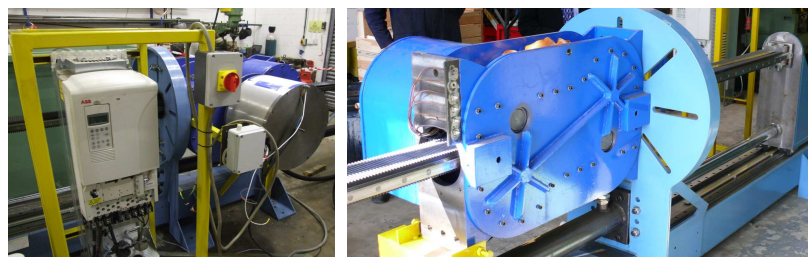


Figure 6: The wave energy components and simulator system developed in collaboration between Nottingham Trent University and Ocean Navitas Ltd.

In relation to SMEs in the medical sector, Nottingham Trent University has been working closely with Olberon Ltd on placement and research activities in developing many medical products. For example, recently as part of a SPARK project an Otorhinoscope, see Figure 7, has been developed.

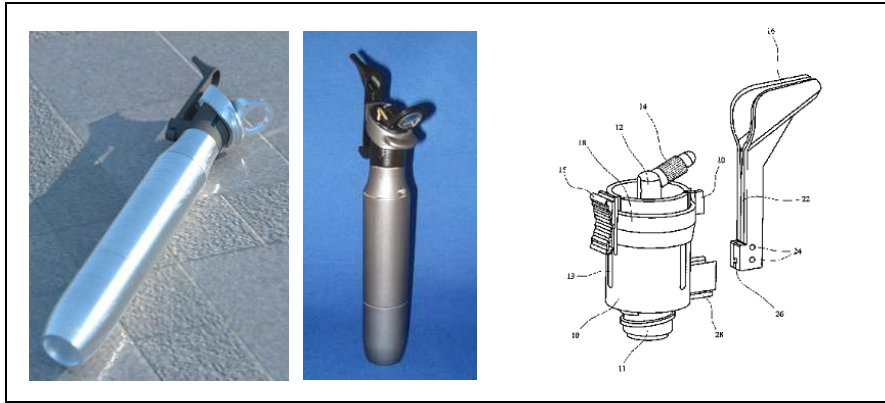


Figure 7: The complete and final design of the medical device that was developed as collaboration between Nottingham Trent University and Olberon Ltd

An Otoscope (also known as an Auriscope) is a medical device that is used to look into the ears. A rhinoscope is a medical device that is used to look into the nasal passages. Olberon Ltd have proposed a dual purpose handheld device, an otorhinoscope, that could use a disposable speculum that can be used for both ear and nose and will allow the hand held device to be used similar to an operating scope for the ear. This will empower doctors of Accident and Emergency departments, primary care practitioners as well as other doctors not specialised in the field of ENT to have access to a novel, robust and versatile diagnostic device for the examination of ear and the nose. The design of the handheld otorhinoscope with its disposable speculum also removes the chance of cross infection or the need for sterilisation of metal nasal specula. This work has been developed as a collaboration on research, teaching and placement activities between Nottingham Trent University and Olberon Ltd.

Conclusion

Small and Medium sized Enterprises (SMEs) are important for the UK economy. Nottingham Trent University supports SMEs in several means within its mission of delivering education and research that shape lives and society. The University supports SMEs in the creation of new businesses as well as fostering the delivery of entrepreneurship education into the curriculum across the University. The University integrates its research and teaching activities with local and international industries. This paper outlined examples of activities that are performed at NTU for supporting design, innovation and business creation. The paper also included some case studies to highlight some of these examples within Product Design subject area.