

## OPEN ACCESS

# Ghent University Technology Park: from a Local Initiative towards an Essential Component of the Ghent Knowledge Innovation Ecosystem<sup>†</sup>

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**Abstract :** Using the case of the Ghent University and its Technology Park, we will illustrate how changing policies and practices at the level of the university concerning research valorization have an impact on our science park. We will also demonstrate how the evolving nature of our science park has a clear impact on the university, as the science park becomes more and more an integral part of the university knowledge eco-system. We will also highlight the involvement of Ghent University in the Korea Songdo Global University Campus Project.

**Keywords:** Knowledge innovation ecosystem, Valorization, Entrepreneurship and creativity

## 1. THE GHENT KNOWLEDGE ECOSYSTEM, A DENSE NETWORK OF ACTORS

### 1.1 Education and academic research

Ghent is a medium sized city in Flanders, Belgium (250,000 inhabitants). Ghent University is a reasonable large university, with more than 36,000 students and 4,500 researchers (about 1,000 tenured track professors) in all kinds of fields, ranging from human sciences to science and engineering. As such, the impact of the University on the City and the region is quite large.

Ghent also has 3 university colleges. Ghent houses the largest student population of Belgium with about 70,000 higher education students including more than 3,000 PhD students.

The city hosts a large University Hospital and about 20 research organizations (see <Fig. 1>), the most important ones being 3 strategic Flemish research institutes:

- Flemish Institute for Biotechnology (VIB)
- IMinds, the Interdisciplinary Institute for Broadband Technology
- IMEC, focusing on microelectronics and nanotechnologies.

In 2012, they together employed more than 6,000 researchers and realized an R&D investment of more than 300 million euros, of which more than 30% was financed by industry, indicating the strong collaboration with companies worldwide.

### 1.2. Ghent, an important economical actor

The Ghent region is also an important economic hub within one hour drive from the capital of the European Union:

- It is home to a diversity of commercial and industrial activities thanks partly to the proximity of the Port of Ghent (waterborne transshipment volume of 48 million tons, 70,000 jobs and an annual wealth creation of no less than seven billion Euro).
- Established businesses like steel mills, paper mills, car assembly, chemical plants and biofuel processing are mostly situated around the Port, in the northern part of Ghent.
- High-tech companies in the fields of biotech, navigation software, speech technologies, graphical preprocessing software and numerous other innovative technologies are mostly established in the southern part of Ghent, near the

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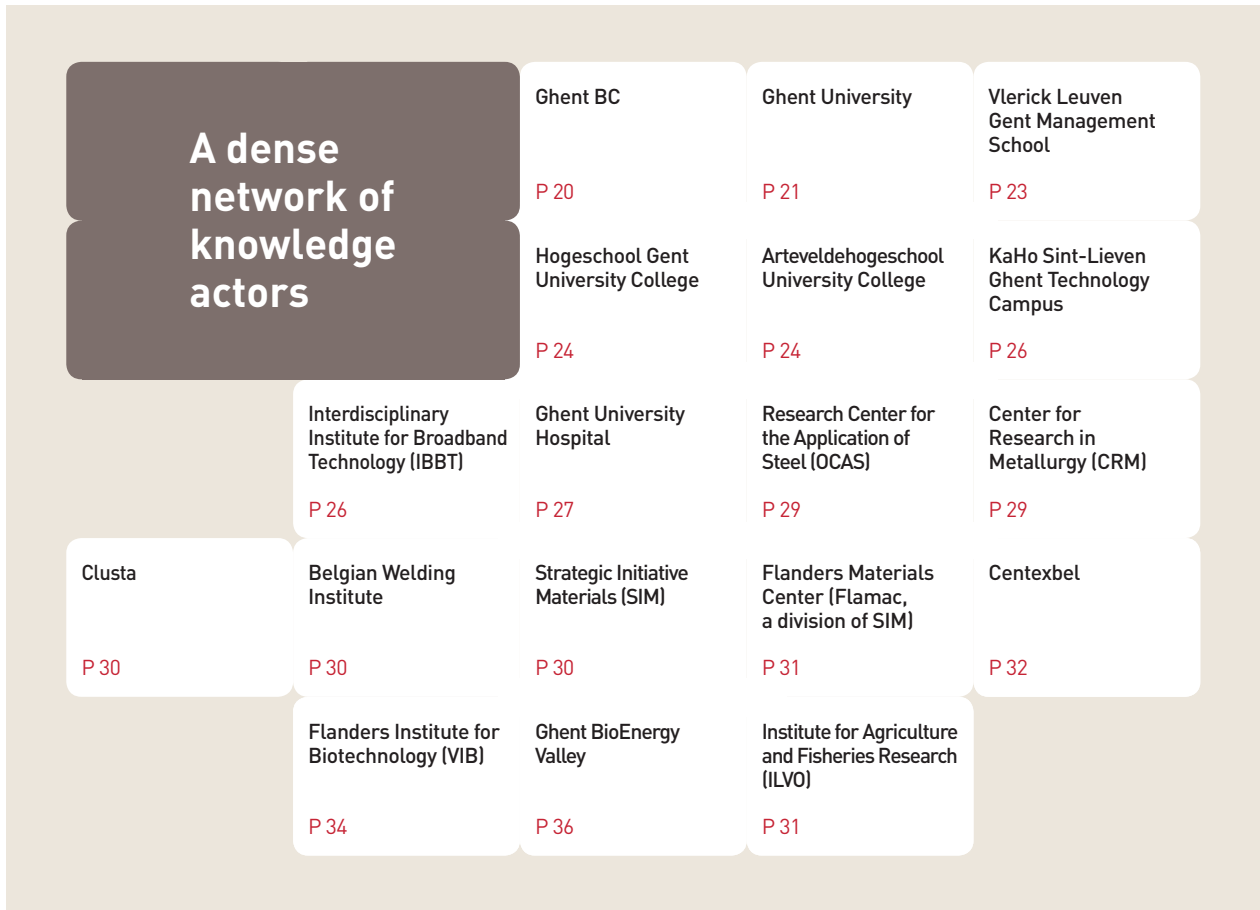


Fig. 1. The Ghent network of knowledge actors

university or other research organizations. Several applied research centers and semi-industrial pilot plants, created as joint-ventures between industry and academia, stimulate innovation in areas such as biofuels, new steel applications, innovative textiles, and materials.

- The urban part of Ghent is characterized by a dense network of creative service companies, new media software start-ups and cultural organizations. More than 3,000 people are employed in more than 500 companies belonging to this creative sector (1) together with 3,700 self-employed creative professionals. In 2009, they produced a total turnover of 170 million EUR, with a yearly growth of more than 30% (average over the period of 2004 to 2009). Ghent forms the second largest creative cluster in Belgium (after Antwerp).

## 2. GHENT UNIVERSITY : TOWARDS MORE PRO-ACTIVE UNIVERSITY-INDUSTRY RELATIONS

To support valorization of research results, many universities have established specific ways of working and structures such as central technology transfer offices, seed capital funds, incubators and science parks.

However, there is a general feeling that the classical model of knowledge transfer based on patenting, licensing and spin-offs is no longer sufficient for a university desiring to play an important role in the regional innovation systems in these turbulent times of globalization and scarcity of resources. (see i.a. Jacobsson et al. 2013).

During the last years, Ghent University initiated several ini-

tiatives in order to make better use of the publicly funded R&D results generated by our large potential of talented academics and the ideas of our creative students.

## 2.1 Re-organization of the Technology Transfer Office: towards a proactive valorization of research results

Ghent University used to have a classical central Technology Transfer office, with a staff involved in the usual 3 technology transfer activities (patenting, licensing and contract research, spin-off support)

As Ghent University is a broad university with 11 faculties covering all different kinds of fields, it was very difficult for the central technology transfer unit:

- To provide professional support towards all these fields. A telecom license negotiation is somewhat different from licensing out a molecule.
- To build a trust relationship with all professors, a necessary condition for dealing with larger projects with industry

- Pro-actively identify interesting patentable research results.

That's why Ghent University created in 2006 a dual 'valorization' structure <Fig. 2>: A decentralized industrial liaison network of 22 business development centers grouping complementary research departments by application area or domain of expertise. Each center is responsible for technology transfer within its area of competence. Each center has one business development manager who acts as a direct point of contact for companies setting up durable industrial partnerships, and also for researchers willing to commercialize research results.

The business development manager is becoming an expert in valorization in his/her specific field, being it aquaculture, composites or photonics solutions. The central technology transfer office acting as a central point of contact and also as a back-office for the business developers looking for specialist expertise. In this way, the technology transfer office is becoming

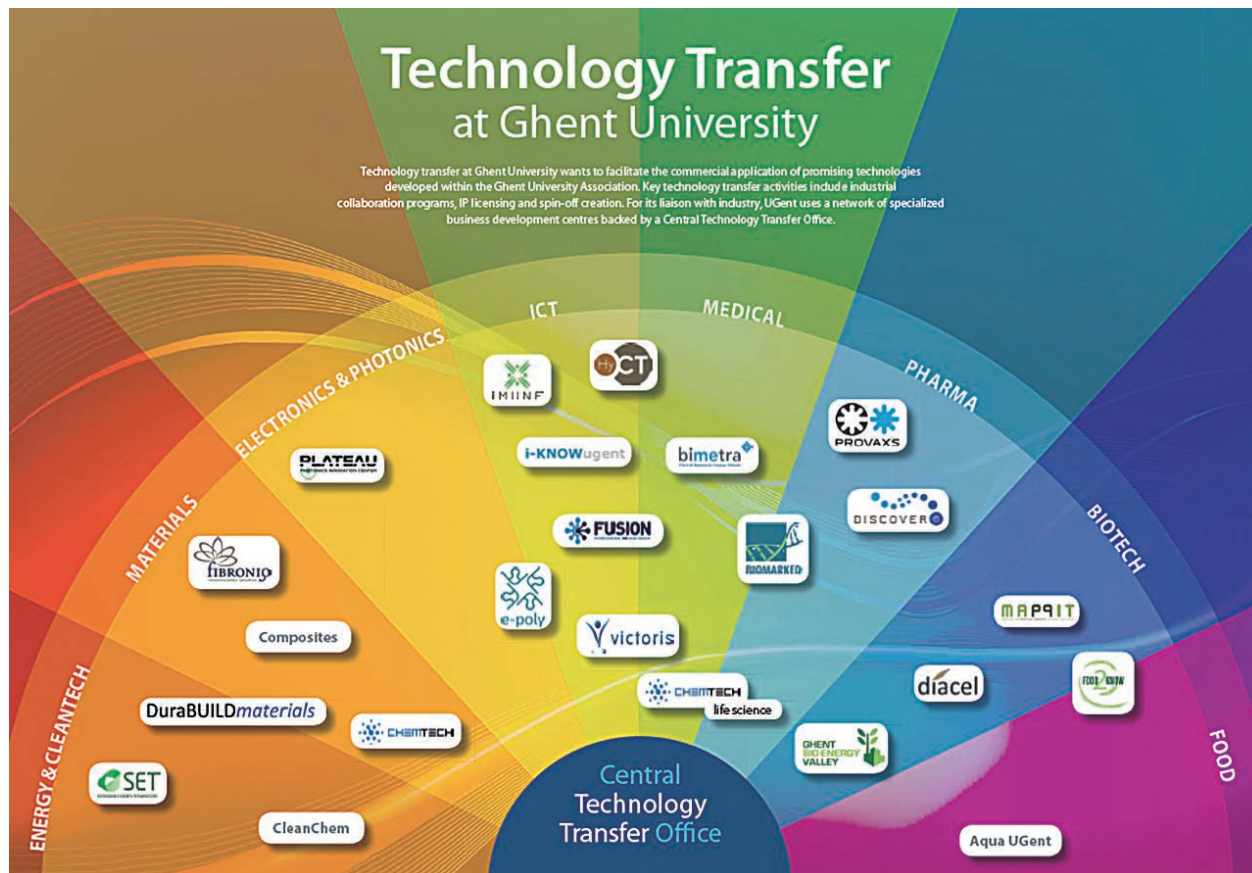


Fig. 2. The dual valorization structure of Ghent University, combining a central tech transfer office with a network of business developers.

ing a center of specialist expertise in the fields of patenting, legal matters, valuation and business planning. The central technology transfer office is also taking up the longer term strategic business development projects, stimulating :

- long term collaboration agreements with companies (instead of collaborating on a project basis)
- financing the creation and use of shared R&D infrastructure

## 2.2 Impact

An impact study (TToflanders 2012) analyzing the period of 2006–2010 indicated that this dual structure already has created a considerable impact increasing the commercialization of research results:

- A 4-fold increase in income from contract research over a period over 4 years (2006–2010) from, on average, 36.6k€ EUR/professor per year towards 137.8 k€/professor per year;
- Research groups supported by a business developer create 8 times more spin off companies than research groups not supported by a business developer;

The pervasive de-central network of 22 business developers also clearly contributes to:

- i) The changed culture within the university towards an entrepreneurial and valorization oriented university with a majority of academics clearly engaged towards research for the benefit of society.
- ii) The creation of specific innovation “communities” generating local spill-overs: based on the domain specific knowledge, the business developers act as catalyst in creating targeted innovation “communities” bringing a group of companies together with a group of university research groups; although most collaboration projects remain bilateral, a lot of local spill overs are created, where knowledge generated in one specific project with one company is of use for other companies (for other applications) (Feldman and Florida 1994).

## 3. THE GHENT UNIVERSITY TECHNOLOGY PARK: TOWARDS A SUSTAINABLE GROWTH

Ghent University manages two sciences parks. The largest one is situated on the Ghent University Technology Park located in Zwijnaarde, a suburban area of about 10 minutes driv-

ing from the center of Ghent, located at the junction of 2 major European highways, the E40 (connecting Calais with Aachen/Köln through Brussels) motorway with the E 17 (connecting the Lille and Paris area with the Amsterdam/Rotterdam area through Antwerp).

The Technology park covers an area of 52 hectares owned by Ghent University itself. The development started very modestly in 1982, dividing the area in two separate areas:

- A 30 ha campus area, aimed for the establishment of university laboratories and publicly funded research institutes related to the faculties of engineering and of sciences.
- A 22 ha science park, exclusively reserved for the establishment for R&D intensive companies collaborating with the university.

Areas defined as science parks can receive extra subsidies from de Flemish government if the university strictly restricts company access to R&D intensive locations that collaborate with the University through R&D collaboration, licensing or as a spin-off.

During its growth, the Technology Park went to several stages of development. As documented in numerous publications (USPA 2003), also the Technology Park went in 3 phases of development.

### 3.1 1986 until 1997: Planning and incubation

In the first phase of planning and incubation, the Technology Park slowly developed. This first period was characterized by:

- Large involvement of public authorities and regional development agencies in developing and financing projects, because of lack of private interest but also lack of interest from within the university. The first tenant was, typically, not a R&D company, but a governmental research institute. The daily Park management was delegated to a committee consisting of officials nominated by the University, City council and the regional development agency.
- An (unrealistic?) focus on the potential of university spin-off companies.

An incubator facility was created in 1991 largely financed by public means. The regional development agency, together with the University, believed that the provision of incubation facilities would, on its own, lead to the creation of academic spin-offs. This was remarkable, since the University had, at that time, a limited track record on spin offs and no formal structure such as a Technology

Transfer Office stimulating and supporting the creation of spin offs.

This hope was probably nurtured by the one big success story at that time, the company Plant Genetic Systems, founded in 1982 by the Ghent University biotech pioneers Marc Van Montagu and Jeff Schell who were among the first to assemble a practical system for genetic engineering of plants.

In 1990, Plant Genetic Systems employed more than 100 people and was located at university buildings in the center of Ghent.

– Limited interaction with university research lab's

As the incubator—created as a for-profit company—and park management could no longer wait for spin offs (nor Plant Genetic Systems) to come, they started to accept companies without collaboration with the University, as long as they had some R&D activity. This increased the alienation between the University community and the activities happening on the Science Park. There was not much collaboration between the companies on the science park and the academic community.

### 3.2 1998 – 2008 : Growth

This all changed in 1998, with:

- The decision of a fast growing pharmaceutical diagnostics company, Innogenetics, closely collaborating with Ghent University, to build modern lab facilities on the Science Park
- The creation of two biotech spin-offs companies Devgen and Cropdesign, growing fast and both renting space at the incubator facility. Suddenly there was scientific activity at the Science Park, mostly focused on biotech.

Since the biotech industry needs special facilities such as clean rooms, incubator rooms and air-conditioned laboratories, conforming to certain bio-safety regulations, the Flemish Institute for Biotechnology (VIB), a strategic research organization created in 1996 by the Flemish government together with all Flemish universities, decided to create an incubator facility on the Science Park dedicated to biotech. In 2003, the new university research facility, located at the University campus on the Technology Park, just next to the Science Park, opened its doors.

The creation of the biotechnology incubator together with the opening of the biotech academic research building created an important clustering effect, attracting other biotech companies from other regions.

Concluding, this second phase is characterized by:

- The continued involvement of the public sector  
The construction of the biotech incubator or the biotech research facility was not possible without public funding.
- Internationalization  
The advent of two successful biotech spin-offs (with international investors as shareholders) together with Innogenetics, a midsize pharmaceutical company but active in international markets, and residing in a modern state-of-the-art building, changed the image of the science park from a local activity to a science park with an international ambition.
- A growing industry cluster approach  
The development of the science park, in the first phase mostly driven by the university, became more and more driven by the VIB (the Flemish Institute of Biotechnology), and the group of biotech companies and biotech investors, promoting the science park as a biotech cluster. The collaboration with the University is growing, but to a large extent limited to co-operation with the academic research groups active in life sciences.

### 3.3 2008 – 2013 : maturity phase

Since 2008, the development of the science park accelerated because of:

- The growing international success of the biotech cluster of companies and R&D organizations, in itself attracting new companies.
- The changed university policy towards pro-active valorization of academic knowledge and collaboration with industry, as explained in the former paragraph, started to create more spin-offs and lead to more companies wanting to settle an R&D lab on the Science Park, also in ICT and materials.

In 2008, the company Ablynx, a biotech spin-off from the Brussels University VUB, but up till now located at the bio-incubator, announced that it wanted to expand rapidly and was looking for real estate partners willing to invest in the construction of its own 6,000m<sup>2</sup> laboratory. Several private real estate companies responded positively and were even willing to invest in laboratory and office facilities for multiple tenants on the Science Park. The activities on the university campus part of the Technology Park have also further evolved.

Renown Ghent University research groups in the domains of applied materials and mechanics have been expanding their research facilities. A long standing co-operation between these groups with companies like Arcelor Mittal and the applied re-

search centers OCAS (steel, partly owned by Arcelor) ended up in the creation of a new research center, pooling all heaving research apparatus, testing equipment and skilled technicians. This new building was created on the Technology Park campus area and was, to a large extend, financed by the private sector.

Ghent University is also building now a modern 13,000m<sup>2</sup> ICT research building, pooling excellent research groups (in total 500 researchers) and infrastructure in the fields of electronics design, telecommunication, embedded systems and

broadband applications.

This has attracted the attention of the IT industry. A major TV company, TPVision (a joint venture between TPV and Philips) wanted to centralize all its R&D activities in a new innovation lab. As they are already co-operating with a lot of Ghent University research lab's, they proposed to come to the Science park. A real estate company has proposed to build an ICT accelerator building, just next to the ICT research building. This new building will not only provide space to the 300 researchers and product developers of TPVision, but also to other R&D intensive companies.

Because of the increasing demand from ICT spin-offs and student startups, IMinds took the initiative to rent two floors in the new ICT accelerator, providing an extra 2,000m<sup>2</sup> incubator.

Concluding, this third phase is characterized by:

- The growing interest of existing companies like Arcelor Mital or Ablynx to establish R&D facilities (see <Fig. 3>) on the science Park and close to university research buildings and also SME's renting offices at the incubators. The growth of the science park is not only triggered by university spin-offs generated with support from the university but is now also stimulated by an interest from the "outside" companies.



Fig. 3. Ghent University Technology Park : some research buildings

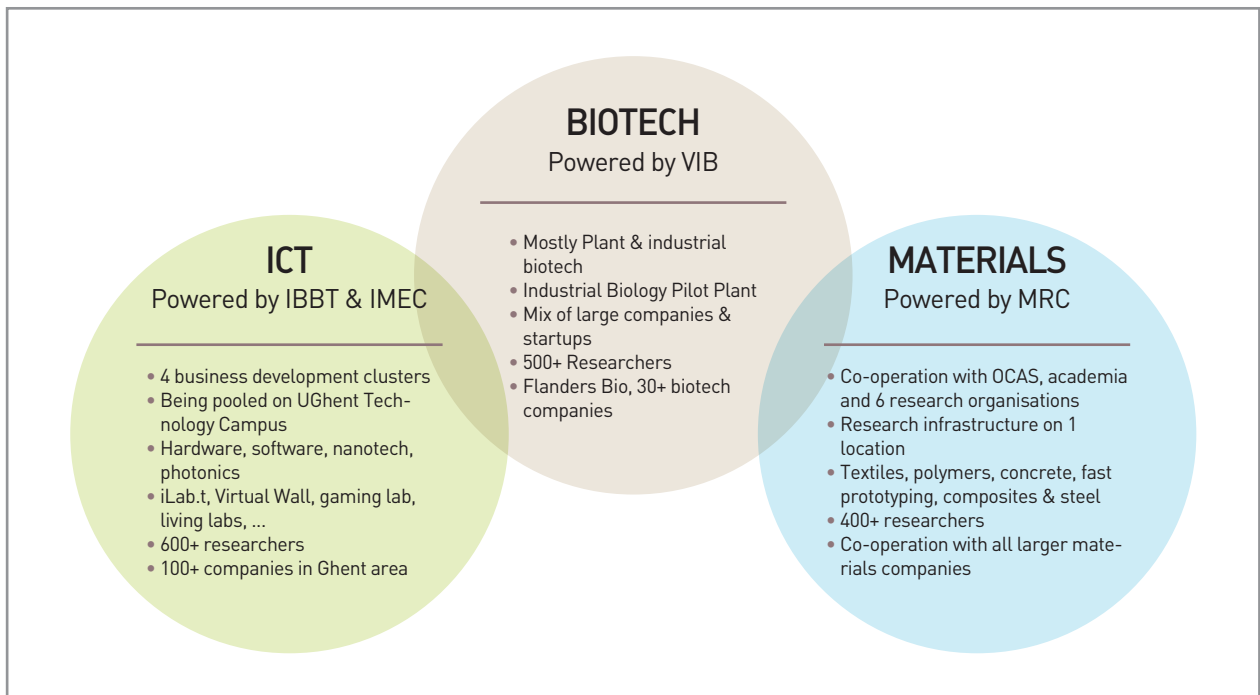


Fig. 4. The Ghent University Technology Park, evolving towards a cluster of clusters

- The science park becoming a profitable business for real estate investors, as they are willing to invest in incubator, accelerator and other multi tenant R&D facilities without public support.
- Broadening the sectorial focus of the science park: evolution from a biotech focus towards a cluster of 3 clusters in the fields of biotech, ICT and Materials.
- Cluster of clusters: the evolution from science park mainly focused on biotech towards a science park expanding towards also materials and ICT, two other successful Ghent University research area's.

## 4. THE STIMULATION OF STUDENT ENTREPRENEURSHIP AND CREATIVITY

With its 70,000 students, Ghent has the largest concentration of students in Belgium. The large influx of students not only has an important rejuvenating effect on the demographic pyramid of the City, it also ensures that the knowledge pool is constantly supplied with fresh talent, creative ideas and young entrepreneurship.

Within the region, and also within the university, a lot of initiatives have been taken to try to use this entrepreneurial and creative spirit towards more economic growth and creation of more S&T based startups.

### 4.1 Towards a more entrepreneurial university

Not only the quality and usefulness of the research results but also the level of academic engagement and entrepreneurship determines the intensity of co-operation with industry.

It has been a longstanding objective of the university and, in particular, the Technology Transfer office, to stimulate entrepreneurship within faculty and staff. Also other organizations such as the Chamber of Commerce, the regional development agency and city council, started a lot of initiatives towards university faculty, without a lot of success. As documented by Clarysse et al. (2011), the personal background and social environment play a more influential role than the Technology Transfer Office in driving academics to start new ventures.

In 2011, some academics within the Faculty of Engineering teaching software courses noticed that their students were very ambitious in elaborating their course assignments towards fully working pieces of software, although not required

to get the course credits. They were also interested in commercializing the applications by putting them on-line and marketing them. Most of the applications were mobile app's, developed using the free available IOS/Apple and Android software development programming environments.

One of the involved software professors took the initiative to support students who, during their studies, want to start up a business. This was the beginning of the "Dare to Venture" initiative, stimulating student-entrepreneurship within all faculties of the University:

- Students wanting to start up a business can receive, once they have passed successfully their first year of study, the special status of "student entrepreneur" providing them organizational flexibility regarding participation in practical courses and exams.
- In order to receive this status, they must submit a small business plan to prove their engagement. All types of business activities with a sustainable growth perspective are accepted. There is no need to have a link with university research or practical assignments (although about half of them have a link)
- The special status entitles them to receive practical coaching and advice from the Technology Transfer Office and external professional coaching services.
- The special status also gives them free access to facilities, services and training provided by our incubators (office space, meeting rooms...), usually not accessible for students.

Since last academic year, the university also initiated a set of 4 courses accessible for all Master's students:

- The first two courses are teaching courses (how to identify opportunities, how to write and defend a business plan,....)
- In the third course, interdisciplinary teams are created and develop a business plan around a self-defined business idea.
- In the fourth course, intended for last year Master's students, the business plan must be validated through negotiations with real stakeholders like possible clients, suppliers and financing partners, with the intention of incorporating the company at the end of the course.

Each year, about 50 students receive the special statute, covering all university faculties (most of them coming from engineering or economy faculty, see <Fig. 5>).

We have a feeling that there is more entrepreneurship with

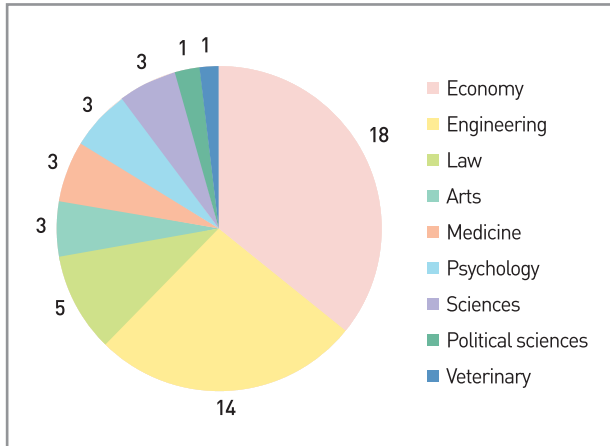


Fig. 5. Distribution of student entrepreneurs across the Ghent University faculties

graduate students than with faculty or staff. A recent study in the United States analyzing National Science Foundation data following the career paths of graduated scientists and engineers (Åsterbro et al. 2012), indicated that the number of start-ups by recently graduated students is at least a magnitude higher than the spin-offs from faculty. This is not only the volume effect since there are more graduates than faculty: a recent graduate is twice as likely to start up a business within 3 years of graduation. Moreover, the graduates' start-ups are not of low quality and can, in terms of generated added value, be compared with academic spin offs.

The activities of a TTO seem to play only a marginal role in stimulating academics to start new ventures (Clarysse et al. 2011). Transforming university goals, practices or structures towards increasing start-ups led by faculty might not be the most effective way for universities to stimulate entrepreneurial economic development (Åsterbro et al. 2012).

Creating a stimulating environment towards entrepreneurial students in transforming business opportunities into start-ups may be a better approach increasing entrepreneurship within the university and in the region. Up till know, students can freely choose their business idea. Matching the entrepreneurial spirit of students with inventions from Ghent University's research lab's can be an approach for increasing the rate of creation of high tech start-ups. An example is that of the

Chalmers School of Entrepreneurship. This school has an entrepreneurship teaching programme, very comparable with that of Ghent University (combination of learning and doing), but with the obligation to work on university inventions (a double-sided competitive matching process where students select inventions and university researchers select student businessplan teams). Each year, approximately 4 to 5 of the innovation business plans being developed by student teams are being incorporated into real companies (Jacob et al. 2003).

#### 4.2 An increasing role of the University in stimulating creative industries

The Ghent region is known for its strong presence of creative companies and abundance of creative talent. In the city of Ghent, more than 500 companies belonging to the creative sector<sup>1</sup> provide employed to about 6,000 people, next to 3,700 self-employed creative professionals (Buck Consultants International 2011).

Universities are the most important source of highly qualified creative talent. The main goal of the University still is to attract the most talented people and to give them the best scientific education and training. Both by performing highly qualified scientific research and by teaching the latest scientific insights in a lot of different fields, universities deliver graduates with state-of-the art knowledge and skills.

One can expect a natural symbiosis and a lot of cross fertilization between the creative companies in Ghent and the talent available at the university.

It is clear that the creative companies in the Ghent certainly benefit from the vast pool of highly skilled and talented people that graduate every year. The 'student' ecosystem of Ghent creates a cultural environment that attracts artists, performers and other creative people and companies.

Nevertheless, the impact of the university as a knowledge producer on the creative sector seems to be quite limited. (The dense network of media related ICT companies have been created in the slipstream of two major companies, Teletlas/TomTom and Netlog.)

In reality there is very little collaboration between the university and the creative companies and organizations. Scholars

<sup>1</sup> Translating the UNCTAD (2008) definition of creative industries towards the Belgium industrial sector NACE codification, the creative sector is here defined as all companies active in Audiovisual Art and Entertainment, New Media, Design, Fashion, Jewelry, Creative services, Publications and Prints, and Cultural activities. We explicitly exclude here in this definition the New Technology Based FIRMS ('NTBF'). We thus focus on 'cultural' creativity. Of course, NTBF's are also very creative in translating S&T research results into new products and services.



like Mateos-Garcia and Sapsed (2011) report the following barriers:

- Most of the creative companies are small companies and lack the resources to set up collaborations with the university.
- Their flexible and “project based” business model based on freelancers makes it difficult to create long lasting relationships with university laboratories. They also lack the absorptive capacity to implement academic research results into creative products.
- Academics and policy makers focus on the science and technology intensive sectors and are unaware of the creative and cultural industries as potential beneficiaries of academic research results.
- The fast changing pace of creative technologies and markets make it difficult to co-operate with universities that have a more long-term orientation.
- The difficulties measuring the impact of academic research outside the classical S&T fields (f.i. irrelevance of patents).

The University and faculty staff are becoming aware that there is a huge potential in the cross fertilization between academic research and the creative sector. In view of the increasing importance of the creative aspects of technology innovation, the development of a real and lasting competitive advantage lies in the integration of research, industry and creativity.

That's why on several levels initiatives for stimulating cross-fertilization have been taken:

- i) Integration of science and creativity in education and training
  - Integration of the Master's in Textile Technology with the Bachelor in Fashion into one educational track Bachelor/Master in Textile and Fashion (University College Hogent).
  - The industrial Design Center (Ghent University with University College Howest) organizes the bachelor course Industrial Product Design and the master course Industrial Design Engineering. Every student project implements the ‘research through design’ philosophy. In this way, the students integrate creativity in product design with the newest research findings in fields of rapid prototyping, materials and lightning technologies.

ii) Creative student community building

- Rec Radiocentre is a non-for-profit organization sponsored by Ghent University. This initiative evolved from a local student radio towards a meeting place for students experimenting with the latest possibilities for creating (internet) radio programs.
- The University facilitates creative student communities by providing them free access to university facilities (experimenting space, prototyping and testing infrastructure, ...). Examples are Zeus (open source software programming), Ceneka (building electronics devices, organizing robot competitions), VTK (building concrete floatable objects).

iii) Integration of science and creativity in research

- Some university laboratories, most of them from Arts & Humanities, try to integrate creative or cultural elements into their research. For instance, the Laboratory for Psychoacoustics and Electronic Music (IPEM) does research on human behavior towards music and the role of technology such as musical instruments and electronics.
- In 2012 a Media Innovation Center (MiX) was created within iMinds<sup>2</sup>. MiX deals with media innovation by closely following fundamental research developments in this field. These developments are translated towards the Flemish media sector into concrete, feasible and pre-competitive innovation projects with a limited time horizon of one year.
- The IMinds Art&D program provides yearly about 8 to 10 grants to projects of about 25,000 EUR, to be submitted by artists, that are sufficiently innovating, have creative potential and explicitly encourage interaction between artists/designers and researchers. The artists are asked to integrate the Ghent University/IMinds software related research results (video, image analysis and compression, 3D, wired and wireless networking, distributed software, metadata, security, ...) into the development of their experimental artistic application.

<sup>2</sup> Iminds is a strategic research organization created by the Flemish government together grouping most ICT research departments of the 5 Flemish universities. Iminds has its headquarters in Ghent and works for 5 ICT Ghent University research departments (300 researchers) in the fields of internet technology, multimedia and image processing.

iv) Building networks

- Gent BC, abbreviation for ‘Gent Big in Creativity’, is a networking organization created by the University, the City of Ghent and the regional development agency, with the aim to stimulate the economy, based on new knowledge and creativity. Gent BC achieves this by organizing networking moments, by making laboratories and research centers accessible for entrepreneurs and to creative professionals and to actively help researchers, entrepreneurs and the government find each other.

v) Stimulating entrepreneurship

- With the “Dare to Venture” project students are stimulated to create a company during their studies. A special ‘student entrepreneur statute’ gives them flexibility for exams and free access to a wide range of coaching services and facilities such as office space and meeting rooms.
- In co-operation with IMinds, a special incubator, the “Start-up Garage” is created intended for students developing ICT applications and putting them on the market. The Start-up Garage provides students free office space, access to university expertise and opportunities to discuss their business plans with peers and coaches.

## 5. PARTICIPATION IN THE SONGDO GLOBAL UNIVERSITY CAMPUS PROJECT

In 2009 Ghent University received an invitation to participate in the Songdo Global University Campus project of the Incheon Free Economic Zone (IFEZ). This project aims at attracting high-level international programs in English at Songdo, a newly developed district of the city of Incheon. Subsidies are available from the Korean authorities. With this project the Korean authorities want to increase the capacity of Korean higher education and at the same time reduce the considerable brain drain (more than 10,000 students each year) to the United States.

The campus will be located in the new city of Songdo, south of the “old” city of Incheon (the second largest city in Korea, in the immediate neighborhood of Seoul). Songdo is a new city development, largely financed by the Korean authorities, and exclusively dedicated to research, innovation and new technology. The city is in full construction and consists of res-

idential areas, research facilities, incubation centers, industrial complexes and educational institutions.

One of these educational institutions is the Songdo Global University Campus. On this global campus different international universities are invited to organize educational programs. All universities are invited for a specific list of programs and the universities should offer programs which are complementary. Besides Ghent University, the following international universities were invited and have tangible plans to open a branch in the upcoming years: State University of New York at Stonybrook (computer sciences, opened in March 2012), George Mason University (economics and business), University of Utah (social sciences).

After consultation with the Korean partners and with the Ghent University schools involved, Ghent University proposed to offer four-year bachelor and two-year master programs in a limited number of life science disciplines, viz. Molecular Biotechnology, Environmental Technology and Food Technology. The programs will require Ghent University staff (academic and administrative) residing in Songdo. They will be joined by a small number of Korean professors and administrators. In addition, academic staff members (mainly professors) from Ghent University will provide teaching modules during regular stays of 4-6 weeks.

These high-level, English-language programs are primarily intended for Korean students, but, given the strategic position of South Korea, also China and, to a lesser extent, Japan will be regarded as recruiting grounds. Ghent University envisions an optimal capacity for the branch campus of 1,000 students.

Opening a branch campus is uncharted territory for Ghent University but next to risks and challenges we see a lot of opportunities. Ghent University is sure that because of the fact that the programs offered fit into the development of Songdo as a center of innovation, in particular with regard to the life sciences, possibilities in research and technology valorization will become realities. The Ghent University branch campus will provide a foothold in an important growth region and facilitate cooperation with educational institutions and industry in Korea and the surrounding countries.

## 6. CONCLUSION AND FURTHER DIRECTIONS

In this paper, we have indicated how a rapidly changing and

globalizing world has put stress on our regional innovation system and obliged the university to:

- Play a more efficient and pro-active partner in commercializing research results by re-organizing our internal valorization support structure;
- Find more 'open innovation' and efficient ways of collaborating with industry through f.i. long term framework agreements and sharing of R&D infrastructure;
- Foster entrepreneurship and stimulate the creation of spin-offs by stimulating entrepreneurial students to set up companies;
- Identify new opportunities like simulating co-operation with the locally growing creative sector and the organization of education, research and valorization activities abroad (Songdo project);

These initiatives are already creating results. Contract research is increasing, and the number of creation of spin-offs has been doubled. This has led to a 100% occupation of both incubators at the science park. Companies, authorities and other stakeholders recognize the university as a dynamic and entrepreneurial university.

In this paper, we have also described how the science park has matured from a local initiative needing public money towards an international hub of innovation attracting international R&D companies as well private real estate partners willing to invest in further growth. The science park is becoming a cluster of innovation that is organically growing on itself is a big opportunity for the university.

In order to further stimulate the organic growth of the science park and to make it more attractive to companies, but also to increase the benefits for university academic research and education, the university is currently reorganizing and restructuring the science park with the following objectives:

## I. Spatial integration of the company activities with academic research groups.

The science park area (22 ha) and the university campus (30 ha) were originally planned in two separate areas. A new urban plan has been drafted and will soon be approved by the city government abolishing this spatial distinction<sup>3</sup>. We will then have one integrated Technology Park of 52 ha, allowing com-

pany R&D and academic R&D on both areas. This allows the housing of university research groups and company R&D departments into the same buildings (of just next to each other), facilitating common use of expensive R&D equipment and skilled staff. This close proximity effect will hopefully also further stimulate the exchange of ideas, creation of common R&D projects and technological spill-overs (Siegel et al. 2003).

The 52 ha Technology Park enables us also to spatially cluster the Park in a cluster of 3 clusters (see <Fig. 6>).

## II. Expanding the provision of facilities and services

As the number of companies and research organizations has been growing, the need for additional services has been increasing. A park management consultant is now investigating the economic feasibility of centralized facilities for catering services, a small shopping mall, child care service, central parking space, central waste disposal units and so on.

We would like to conclude with the most recent Science Park project, the product development and testing center. Because of the presence on the Technology Park of both the ICT research groups and materials research groups active in additive manufacturing and 3D printing, and the advent of the innovation center of TPVision, the idea arose to create a product development and testing center focusing on rapid prototyping and testing of electronic device casing equipment.

This center will plug in on the expertise and equipment of Ghent University in the fields of electronics, additive manufacturing and materials testing and will also integrate R&D and electronics casing test equipment provided by TPVision.

This test center is the first formal initiative bridging the ICT cluster and the Materials cluster, and made possible by financial support and provision of equipment of companies residing on the Technology Park. A business plan is now being made to expand the test center with the following components:

- A testing center delivering test services to all companies developing electronics products.
- An incubator building focusing on spin-offs and start-ups commercializing niche tools and methods for materials simulation and testing. This project is being set up together with the business developer working for the composites cluster, who succeeded in creating an innovation community in this field.

<sup>3</sup> Although not yet formally fully approved, certain principles like the abolishment of the distinction "company science park"/"public university campus" can already be legally implemented

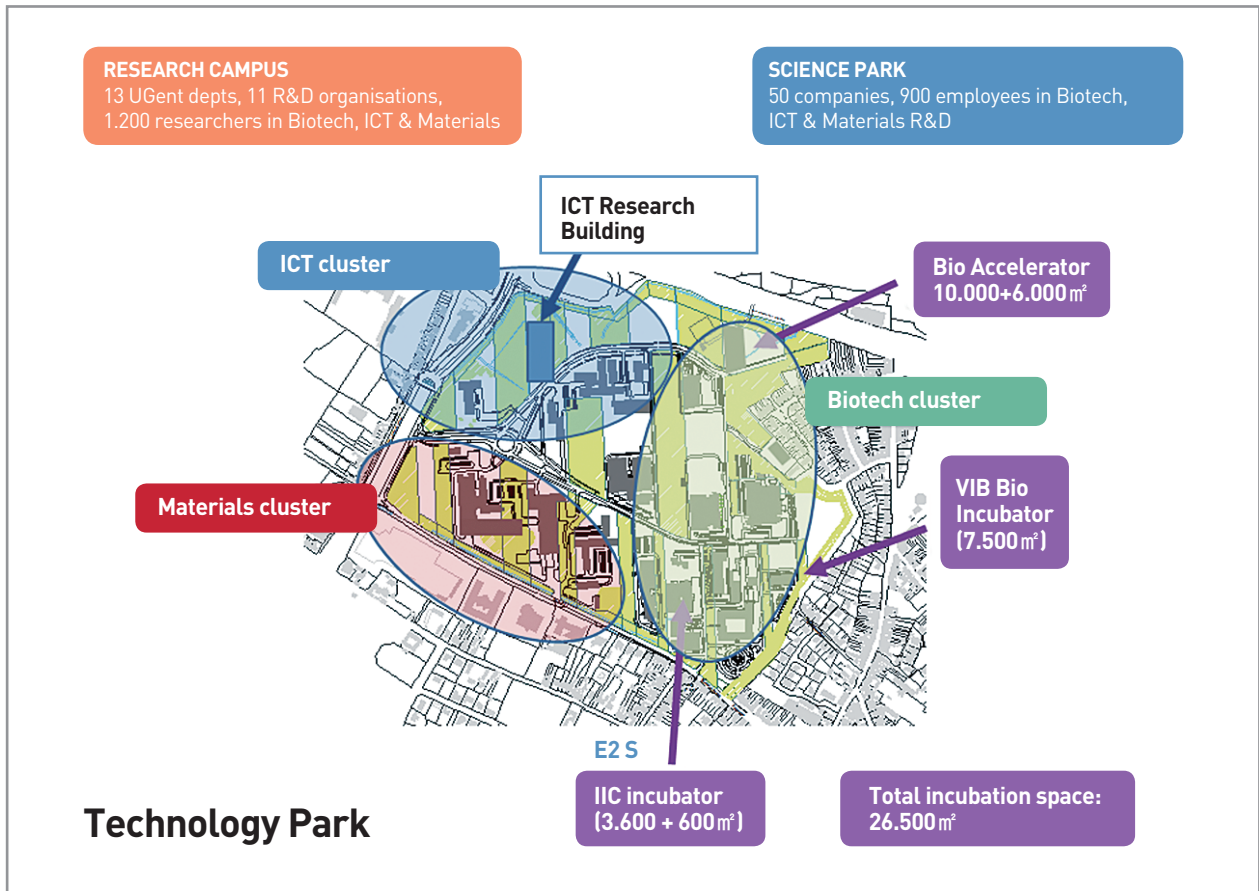


Fig. 6. The 3 clusters on the Ghent University Technology Park

- Creation of a “fablabXL”, a professional fabrication laboratory accessible for entrepreneurs, students and creative people needing professional 3D printers, laser cutters and other manufacturing tools suitable for small series of prototypes. With fablabXL, we want to attract the interest of the urban creative community for the activities on the Technology Park hoping to create synergies between the vast amount of available technology and the creative industries.

This project provides all the synergies we want to create:

- Cross disciplinary innovation
- Stimulating interactive long-term co-operation between university research lab’s and companies and between companies
- Creating efficiencies by co-financing and co-using R&D infrastructure and technical personnel.

- Stimulate co-operation between spin-offs and established companies
- Lower the barriers for creative professionals using professional R&D equipment, integrating Science and Technology based innovation with creativity

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