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Aalborg Universitet

Measuring University-Society Collaboration

Recommendations for University of Aveiro

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STRATEGIC PROJECT REPORT FOR
UNIVERSITY OF AVEIRO (UA)

Measuring University-Society Collaboration:
Recommendations for University of Aveiro

ECIU-LEADERSHIP PROGRAMME 2016

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Summary

This document is a strategic project report for the University of Aveiro (UA) that addresses the university's ambition of institutionalizing and measuring collaboration with society. In recent years, responding to developments in Portugal's higher education policy UA has developed institutional data in order to support performance monitoring, strategic planning and decision-making. The university is well equipped with performance indicators as regards research and education. But how can UA assess the work that faculty and students are doing within the broader regional community and how can impact of collaboration be measured? Based on research literature, the report discusses the prospects and pitfalls of measuring universities' third mission. The report then compares how four other European universities manage university-society collaboration including how they measure impact. The report finalizes by presenting a number of recommendations for UA.

1 Introduction: University of Aveiro and the Third Mission

University of Aveiro (UA) is one of 14 public universities in Portugal. It was established in 1973 during a period marked by social tension and political uprising against the authoritarian regime that had ruled the country for over four decades. In 1974 Portugal became a democracy with a modern constitution and in 1986 the country joined the EU.

Born in the midst of a revolution, UA became a reflection of the embracing of new ideas of how to build institutions in an open, socially balanced and democratic society. In contrast to the traditional Portuguese universities, the institutional architecture of UA bears a modern profile with a decentralized campus structure, collegial rule, and many ties to actors outside the university.

The aim with the establishing of UA was indeed to contribute to the cultural, economic and social progress of the central Portuguese region. Research and education at UA was thus rooted in a societal context already from the very birth of the university. Research, for instance, was closely linked to local firms within construction and civil engineering. The rise of many ICT-companies in the region in 1990s also happened in close collaboration with UA scientists. The university's curricula of educational programs, for instance in telecommunications, ceramics engineering, environmental engineering, industrial management, tourism, music, and regional and urban planning etc., also bear witness of a university that has long been closely integrated into the regional business structure and cultural life.

Besides research cooperation and educational programs, several initiatives and structures inside and outside the university has been developed since the 1970s to promote cooperation with society. At the governance level, the university has a vice-rector for university–society cooperation and a pro-rector for regional development. Both are involved in local and regional boards that provide counselling for policy-making concerning city planning, social policy and economic development.

At the operative level, UA has built networks that promote business and cultural entrepreneurship, innovation, and technology transfer to companies. And it has developed programs that aim at lifelong learning of Aveiro's citizens, community service and institutional capacity building. As such, the UA and the university campus are today in many ways deeply embedded in the city of Aveiro and the surrounding central Portuguese region.

In recent years, the higher education sector in Portugal has been marked by challenges stemming from fiscal consolidation and increasing focus on the returns of investments in research and human capital. Portugal was hit hard by the 2008 Global financial cri-

sis and subsequently suffered from unsustainable growth in borrowing costs that forced the country to seek help from the IMF and the European Union's financial stability mechanism. The austerity measures accompanying fiscal aid from the IMF and EU have not been implemented without affecting the country's universities.

While funding for research and education have been reduced, Portuguese universities' roles as drivers of innovation and economic growth have become more explicit in national policy strategies. The attention of the central government and de-central decision-makers on how they 'get more for less' has reinforced the idea of university-society collaboration but also brought about a pressure for universities to be able to account for the wider impact they have on society.

For UA, these post-crisis policy developments do not pose a fundamental challenge. UA has always been a university working in close cooperation with business life and other actors from the surrounding community. Thus, in many ways the university is very fit for responding to the new priorities. However, if there is a challenge, it lies in the fact that the university has not yet developed a detailed system for documentation and assessment of the range and impact of its partnerships and outreach to regional actors.

A ministerial law from 2009 obliged each university to have a system to evaluate staff performance. The UA response to that in 2012 was to develop a systematic process of collecting data regarding staff activity. This model is based on several indicators considering different types of staff activity, including teaching, research, artistic and cultural creation, cooperation, knowledge transfer, and university management. Some of the indicators are centrally collected from the university information system. Others, especially those related with cooperation and knowledge transfer, are directly provided by staff.

Although this work started in 2012, the university's institutional data system does not yet provide adequate information of the work that academia is doing within the region and what the impact of this work is. The information that is provided identifies some of the quantifiable outputs that most easily can be provided. Examples are the yearly number of contract services, spin-offs, start-ups, patents, and social projects that are derived from university-society collaboration.

These kinds of data are definitely relevant, but they do not provide information about whether or not UA is actually contributing to cultural, social or economic progress in Aveiro or the central Portuguese region. Neither do they capture the day-to-day interaction, information sharing, and knowledge transfer that take place in a variety of formats between faculty, students, and agents outside the university. A central question

for UA that remains unanswered is therefore how to keep track of these less visible activities?

Another question is related to impact. Although the university is working closely together with the local government, the business sector, and Aveiro's cultural life, it does not have a clear idea of the difference that it makes. How would things be, if there wasn't a university placed in the middle of Aveiro? Besides the development of a better and more holistic instrument to capture all the activities that can rightly be said to fall within the 'third mission', the task is to develop tools that can assess the wider outcomes of university-society collaboration and provide consistent data of the actual impact – socially, economically, or culturally – the university has on the region.

In this report we develop a number of recommendations for UA as to how the university can improve the measurement of university-society collaboration and get valid information of impact. We first make a brief review of the literature published on collaboration and outreach. This review presents some of the prospects as well as some of the pitfalls that can occur when universities try to develop performance indicators related to the third mission. Next the report provides examples of how four other European universities comparable to UA in recent years have worked with how to institutionalize the third mission. We present examples from the University of Twente, University of Stavanger, Linköping University and Aalborg University that could complement the efforts of UA. The report finalizes by developing a discussion and a number of recommendations for UA.

2 Measuring University-Society Collaboration and Impact

Whether their origins in a Humboldtian or a more liberal model, the *raison d'être* of the universities in the Western civilization can today be said to encompass all of the following three activities; 1) research, 2) education and 3) cooperation with society. But whereas 'the university' always has been synonymous with research and education, cooperation – or the 'third mission' – is many places a somewhat novel ball game.

2.1 Growing attention to university-society collaboration

Nevertheless, universities' cooperation with society is an area that has been attracting growing attention in recent years. That goes as well for university managers and staff as for stakeholders outside the University's walls. Firstly, since the 2008 global financial crisis most of the western countries have been in a state of austerity. This has promoted increasing expectations of the returns from public expenditure, including investments in research and higher education. A related idea is that universities are a key factor in the ongoing transition to a knowledge-based economy with more sustainable economic growth and better jobs (Healy et al, 2012). This is a European – if not world-wide – trend, not just a feature of Portuguese higher education policy (Grove, 2014).

Secondly, a number of grand challenges that cannot be solved alone by governments or business have emerged over the last three decades. Climate change, the ageing population, influx of refugee, etc. are challenges that require advanced multi-disciplinary approaches and solutions. Therefore, there is a call for mobilization of the research community and the formation of so-called triple-helix cooperation (university-government-business) (Brennan, 2004).

Finally, the higher education systems have for some years been subject to increased marketization. This is due partly to the competition over research grants that constitute an increasing share of the gross funding of public research. But marketization also stems from the fact that student demands have increased, and that students are more mobile than earlier. Today's students are not only (if at all) concerned with the virtues of academia. A university degree should also offer good employment opportunities and career prospects hence the curricula of universities must nowadays to a higher extent be aligned with the demands of business and those parts of the public sector that employ people with a university degree (Barber et al, 2013).

As university-society cooperation has become a focal point for political awareness, so has the desire to account for performance in regard to the third mission. The pressure

for measuring comes sometimes directly from policy-makers, but it can also be universities' own response to growing political awareness. In any case, the last years have marked a development in many western countries towards a stronger focus on evaluation, performance, and effect analysis of public policy and interventions (Brignall & Modell, 2000; Bouckaert & Halligan, 2008; Hood & Dixon, 2016). In spite of the saying 'weighing the pig doesn't make it fatter' there seem to be a belief across governments and administrations that performance management is a way to make the public sector better, cheaper, and more effective at the same time.

As such, there are obvious and direct reasons for why universities should develop indicators and measure their third mission activities and impact of collaboration. It is an area of increasing political attention and the measuring itself is seen as a booster of activity and growth. Moreover, most universities already measure and evaluate research and education. Nowadays it is a widespread norm that researchers and research units are continuously assessed in regard to publication and citation records in high ranking journals. The fact that research indicators are already present – whereas collaboration indicators are not – could lead to a paradoxical situation, where researchers in spite of the abovementioned increasing focus on university-society collaboration are more and more preoccupied with scientific excellence and publication. So, in order to create an incentives structure that mirrors all three objectives, universities should also institutionalize the third mission and construct indicators that can measure progress in this regard.

However, universities are complex organization and the third mission is not an easy task to manage. There is not a one-way recipe to go by or a simple concept for sale that can be adopted by everyone. Universities' collaboration with society can also be conflict laden. Hence, the steps taken to institutionalize collaboration activities should be thoroughly thought through by university managers and based on deliberations with staff and stakeholders. In the following, we will report some of the real-life problems and dilemmas that have been documented in relation to measuring universities' collaboration with society.

2.2 The challenges of measuring collaboration

2.2.1 Irregularity

The first challenge is *irregularity*. While it is relatively manageable to describe and measure the activities involved in research and education, the third mission is far more difficult to grasp. An indicator of this is the great variety of concepts used in the literature to nickname the third mission: University-society collaboration, university-business cooperation, community engagement, community outreach, triple helix, and alike. This variety signalizes that the third mission is a very complex issue with a mul-

titude of forms of engagement going on from formal partnerships in one end to informal knowledge exchange in another.

The challenge of irregularity requires a sensitive approach to measuring. On the one hand, collaboration in the technological sciences tend to be easy to quantify (patents, equipment sharing, contracts) whereas in the social sciences and humanities collaboration is more likely to occur as counselling, dialogue or as media appearance. Attempts to define collaboration risk capturing only a fraction of the activities that take place, the informal and less measurable ones being those most easily omitted. In turn, this could result in discontent and feelings of inferiority among scholars whose cooperation fall outside the definitions adopted by the management (Olmos-Penuela, 2015).

On the other hand, if the third mission is institutionalized and university-society collaboration widely defined, covering both formal and informal aspects, we may end up comparing *apples and bananas*. When production and impact is measured it is often used to allocate funds in the university budget. But in regard to the third mission it will be impossible to do so in a fair way, because the collaboration conducted, say by political scientists, cannot be valorized by the same means as that conducted, for instance, by civic engineers.

2.2.2 Underlying economic interests

Next to the university internal tensions that can arise, there is a risk that institutionalization can compromise relationships between university staff and external partners due to *underlying economic interests*. Besides their university job, many researchers also have one-man private business consultancies. Often there are close yet informal ties between university professors and external organizations; both profit from this relationship and often professors are able to make a substantial additional income because of these arrangements. However, if ties to external partners are formalized, many university employees could fear that their relationships – and their access to an additional income – may be undermined (as it would be inappropriate that professors are paid twice for the same work) (Benneworth et al, 2015).

2.2.3 Diverging interests between management and staff

A third tension arise because of the *diverging interests* of the top university management – that tend to favor collaboration of high symbolic value, for instance ties to big corporations – and university staff that tends to favor more functional relationships with the surrounding community. Examples of this conflict of interest are documented in the literature, for instance ones where academic staff simply has resisted to follow-up on connections established by the top management (Ibid.)

2.2.4 Output versus impact

The fourth challenge is the difficult distinction between *output* of collaboration and actual *impact*. When universities commence on developing indicators of cooperation with business, they often get obsessed with counting the direct results of cooperation such as the number of spin-off companies, patents, or articles in the local newspaper, etc. Although such measures can be very useful, they do not provide any knowledge about the wider outcome or impact that collaboration has on society.

Following Healy et al (2014), what universities should be focusing on when trying to measure the third mission is to capture the beneficial outcomes that are generated in the longer run as a result of collaboration, rather than counting the collaborative activities per se. Outcomes can be economic outcomes, such as growth in income and jobs, but they could also include social or cultural criteria. The question is, how to provide evidence that the university is actually making a difference in the local and regional community in terms growth, jobs, equality, life satisfaction, etc.

Healy et al (Ibid.) suggest survey panels that include representatives of businesses, alumni, and other stakeholders as a way to systematically and repeatedly gather information about collaboration outcome. But more advanced methods could also be applied, for instance quasi-experimental studies using a matching-method to evaluate impact (Vedung, 2010). In a quasi-experimental study the goal is to isolate the effect of an intervention by comparing a treatment group with a similar non-treated control group. Quasi-experimental designs have been used in social sciences to evaluate the effect of labor markets policies but more recently also to assess the impact of European structural funds on growth in companies. In a study conducted by the Danish Business Authority (Erhvervsstyrelsen, 2016), some 11.000 companies that had received support from the structural funds between 2007 and 2011 were compared to companies with similar characteristics that had not received support. The two groups were then compared on financial turnover and job creation between 2011 and 2015. A similar approach could be applied when trying to evaluate impact of collaboration between universities and businesses.

2.2.5 Not all outcomes are measurable in quantitative terms

Finally, collaboration could also lead to outcomes that *cannot be measured in terms of numbers and metrics*. In the UK, under the so-called Research Excellence Framework (REF), the British Research Councils assess the quality of research in the UK higher education institutions by means of in-depth impact case studies. In 2014, the REF produced more than a thousand impact case studies of which many used qualitative research strategies to document impact. One example is an impact case study within political science that documents the impact of research by Professor Robert Garner on

the ethics and politics of animal protection. The impact case study shows how Robert Garner;

“... has provided a springboard for political debate and decision making both in the UK and internationally. In particular, Garner's work has impacted upon the debate within the animal protection movement, and has helped to shape aspects of government policy on animal welfare issues”¹

As such, universities' impact on society can be said to be generic in the way that research, education, and collaboration provides information and enlightens the surrounding community, also without targeted, intentional activity or measures. This kind of impact may be hard to document through surveys or quasi-experimental designs, but instead require more qualitative approaches that can trace how knowledge produced by university researchers (or students) sometimes travels outside the university walls and affect dialogue, discussion, deliberation, decision-making and other communicative artefacts of human behavior.

¹ <http://impact.ref.ac.uk/CaseStudies/Results.aspx?UoA=21>

3 Experiences from Four European Universities

In this section we review how four European Universities comparable to UA have grappled with the third mission and the challenge of measuring collaboration and impact. We include examples from the University of Twente in the Netherlands, the University of Stavanger in Norway, Linköping University in Sweden, and Aalborg University in Denmark.

Like UA, and other universities in the ECIU-network, these four universities are relatively young institutions with a high degree of interaction with society and a strong commitment to entrepreneurship, problem-solving and innovation.

3.1 University of Twente

In the Netherlands the third mission of universities is known under the name of *valorization* (and mostly translated in English written documents as ‘knowledge transfer’; in this section we will use the term valorization). In practice, valorization at Dutch universities is an old phenomenon. However, only since 2005 it has been an officially recognized core activity of the Dutch universities.

Recently, Dutch universities were asked by the government to give more insight into their valorization activities. In consultation with the government and other stakeholders the universities have therefore developed a framework for the development of indicators for valorization. Currently the universities are working on a first set of indicators to experiment with in the upcoming years.

Valorization has always been rooted in the culture and the genes of the University of Twente (UT). The subject is made explicit in the policy of faculties, institutes, and the University as a whole. All major policy documents, such as the overall strategy (Vision 2020²) and the strategies of the research institutes and faculties, include by default a paragraph on valorization.

In addition, more recently a separate vision of valorization has been developed. The organizational integration of valorization is institutionalized through the *Knowledge Park* that facilitates valorization, among other things by financial support of spin-offs. The UT has also a *Central Commission for Innovation* (CCI).

² <https://www.utwente.nl/en/vision2020/>

Also with agreements on indicators for valorization, the UT has a lot of experience. The existing performance agreements with the Ministry of Education, Culture and Science contain some valorization-indicators, for instance about capacity to attract external funding, shared infrastructure, spin-offs, etc.s Between the executive board and all research institutes, key performance indicators are agreed upon. When the realization is below what was agreed upon, this may have consequences for the financing of the institutes. The agreed indicators are part of the planning-and-control cycle and of the annual plans and reports of institutes. The universities of technology make also optimal use of indicators in processes of accreditation and visitation.

The three technical universities in the Netherlands (including the UT) have taken up the task to draw up indicators together and developed a provisional set of valorization indicators. This joint effort made use of a framework that does justice to all three dimensions of a nation-wide framework for development indicators: people, cooperation, and output.

Within the UT, the proposed indicators are aligned with the research institutes and the ‘valorization ranch’ of the University. The indicators were found to fit well with the ambitions and the profile of the UT.

As a result of this joint exercise, a set of final eight indicators and associated sub-indicators were identified (see annex 1 for an overview) covering the three dimensions from the framework for development indicators in the following manner:

- three indicators for people (training entrepreneurship, double appointments, career alumni)
- two for cooperation (external resources, co-publications) and
- two for output (intellectual property, business activity).

Two additional indicators remain undecided upon. These include ‘internships in non-academic settings’ and ‘relevance to society in the research reviews’.

The UT measures the identified indicators and will improve the registration procedures. The information is stored in central systems. Where necessary, classifications of information will be improved. Finally, access to this information within the University will be greatly improved, so that there can be better monitoring.

Finally, as part of an internal exercise, in 2016 the Strategy and Policy unit of the UT identified and formulated more than 600 indicators of valorization. The indicators represent different perspectives and different dimensions, and help to get a more concrete understanding of the multiple aspects of valorization. At the same time the exercise revealed that data for most of the indicators are not readily available or lack unequivocal definitions to allow proper measurement.

It is important to underline that the above exercise is very much driven at the governance level of the university and in connection with other universities; and in the context of the national academic context of valorization and the societal role of universities. The effort towards measuring is less strong on the level of faculties and by academic staff themselves. It is up to the faculties to further take up similar exercises at lower levels of the organization, which so far is done to a very limited extent. However, such an exercise could further stimulate and strengthen the activities towards valorization within the faculties.

3.2 University of Stavanger

For the University of Stavanger (US), building and maintaining collaboration with society regionally, nationally, and internationally has long been a core value. Broad cooperation and selected strategic alliances are also among the main pillars in the 2013-2020 strategy. The purpose of collaboration is described as;

“... to help enhance our visibility and reinforce research-based innovation and value creation”.

In implementing the strategy for collaboration, one of the main priorities is the promotion of public relations and triple helix cooperation. To strengthen the regional collaboration as well as to boost the development of the university’s primary activities, a specific Council for Collaboration with Working Life has been established. In 2015, the Council was transformed into a Forum for Value Creation, led by the Rector of the US.

Concluding from the contents of the US strategy and the documentation of the strategy process, it appears to have been tailored by ‘thinking globally but acting locally’. Two factors have been significant sources of inspiration for the strategy. The first is the research and education policies related to the EU Lisbon Strategy (adopted in 2000) – even if Norway is not a member of the EU. Innovation and the importance of its regional anchoring have been among the leading ideas in the EU since the beginning of the third Millennium. For example, the European Innovation Scoreboard (EIS) (since 2011 the Innovation Union Scoreboard) was established 2001³.

The second factor is related to the national energy policy and the fact that Stavanger is the metropolis of the Norwegian energy production and offshore industry. By necessity, the oil industry has always built on innovation and creativity since the start of the ‘age of the black gold’ in Norway. Much of the technology and know-how had to be

³ https://en.wikipedia.org/wiki/European_Innovation_Scoreboard

created to adjust to the circumstances of the new production. Another side of this coin is the necessity of cooperation with the globally leading actors within offshore.

Of the five activity goals set in the strategy plan, one covers also collaboration with working life and society. According to the US 2015 annual report, cooperation is extensive and contributes to the development of the region. However, the US does not have a specific activity plan for regional cooperation in the current strategy plan (as it had in the previous period 2012-2014). Thus, no quantitative steering parameters are currently set in the area of university-society collaboration. This is in contrast to all of the other activity goals in the US strategy with specific measures for monitoring development.

Progress in the area of regional collaboration is instead presented in an annual report by listing of all the collaboration activities with different actors and describing them in qualitative terms. These resemble the ‘impact cases’ at Linköping University, albeit without this being an explicit intention.

In the efforts to promote collaboration US has also made an assessment of some of the main challenges on the road to implementing and fulfilling the US strategy. These include:

- recruitment difficulties and high age-profile among the staff
- lack of interest in cooperation with US
- expectation gap between outside university actors and what US researchers have been able to deliver in the past
- low success-rate with external research funding, as well as sinking rate of public and private assignments and commissions
- weakened implementation capacity due to unclear leadership and steering structures.

Consequently, the US is working on how to tackle these challenges, a process that must be completed before the US develops more quantitative targets for the third mission.

The process is further complicated because the problems at stake are very diverse when looking across the faculties. Especially in the social sciences and humanities, the university management is facing resistance against departing from the ‘ivory tower’ tradition in favor of a more entrepreneurial approach.

In the technical sciences, the big challenge is the current economic downturn in the oil industry due to falling oil prices. The crisis has also proven to be a big challenge in the strategic work of the university, because as the oil companies must cut costs, also from

funding of their research, external research funding becomes one of the easiest ways of improving the budget.

3.3 Linköping University

Linköping University (LU) adopted some years back a third mission policy that was later renamed to ‘collaboration’. At LU, collaboration is defined as:

“...relations with, and activities performed together with, actors from the surrounding society with the purpose to actively contribute to the diffusion and use of knowledge, strengthen each other’s development and attraction, and by that improve the quality of education and research”

The goal of the policy is that collaboration with society increasingly becomes an integrated part of both research and education, and accordingly the university has established an organization to promote this.

The background for this development was a call by the government for how to make collaboration activities more visible and manageable. The Swedish Research Council established a group to investigate how this could be done in the Swedish context, but the report from the group received so much critique that no decisions were adopted on the matter.

However, parallel to this the Swedish research council for innovation (VINNOVA) made a call for universities interested in preparing their organizations for a future where collaboration would be taken more into account when funds for research and education would be allocated. Linköping was one of the universities that answered to this call and received funds for building an organization that stimulates collaboration and provides documentation about collaboration results.

Accordingly, LU now has a vice-rector for collaboration, a director for collaboration, and all departments have collaboration coordinators. A further result of the effort is that LU have signed contracts with four different organizations for long-term strategic collaborations, including Saab (aircraft industry), ABB (engineering industry), Tekniska Verken (municipal energy company), and VTI (national transport research centre).

With regard to measuring collaboration, LU has particularly been inspired by work done in the UK and Australia on how to assess impact. At LU the work conducted by the new collaboration organization, including the collaboration coordinators, focuses on so-called ‘impact stories’ or ‘impact case studies’ (like the ones conducted under the REF in the UK).

An impact case study (ICS) is in this case a description of university research results and how the results have been diffused and used by organizations outside academia. The ICS draws on quantitative as well as qualitative data. One example of an ICS is a study of how visualization techniques developed at LU have been applied in areas such as medicine and urban planning. For instance, the visualization techniques have improved the communication procedures between different medical professions at a number of Sweden's public hospitals.

3.4 Aalborg University

Aalborg University (AAU) in Denmark's North Jutland region was founded at the same time as the UA and also as part of a regional development strategy. In the middle of the 1970s, North Jutland was characterized by many sunset industries and high unemployment. The idea behind the establishment of a university was that it would directly boost the region by attracting researchers and students, and indirectly stimulate a positive economic development by raising the innovation capacity in the regions' companies.

Over the years, AAU has established a number of innovative institutions to promote collaboration, for instance university-society contact committees (CCs). The CCs constituted a forum for interaction between representatives from the local firms, public authorities, and university staff. The CC's agenda was to discuss the content of the university curricula and provide input to program revisions and educational reform. To a large extent, the CC's are identical with today's university advisory boards that have been mandatory in the Danish university sector since 2007.

Another example is the creation of the North Jutland Science Park (NOVI) in 1987. The goal with NOVI was to create a center from where university researchers could disseminate knowledge about ICT to employees and workers from the regions' companies. NOVI offered training courses in ICT and could be consulted in regard to how companies could utilize ICT to improve services, production, HR-functions and the like. In the beginning, NOVI's activities were funded by EU grants and support from the County of Northern Jutland, but quickly it became a financially viable business. Today, NOVI functions as a huge science park and incubator environment that hosts more than 100 high-tech companies and serves as workplace for more than a 1000 employees that work in close cooperation with researchers and scientists from the AAU's technical faculties.

Like UA, AAU is currently in the process of grappling with the problem of how to measure collaboration and impact. AAU is the frontrunner of the Danish universities

when it comes to collaboration, but like in Aveiro the task of institutionalizing the third mission is complex.

Hitherto, the most ambitious plan in regard to institutionalizing collaboration is found in the new university strategy 'Knowledge for the World' that runs from 2016 to 2021. In this new strategy, collaboration is identified as a key element in the university's 'DNA'. Collaboration is also one of five areas that form AAU's 2021-vision;

"We are an attractive collaboration partner for private companies and public authorities and institutions, and our carefully selected knowledge-sharing partnerships are based on mutuality and a shared focus"

In relation to the collaboration vision, the university management has set up a task force that focuses on how the AAU can make a stronger 'organizational anchoring' of collaboration including evaluation and documentation of impact. The task force initiated in 2015 an internal as well as an external evaluation of AAU's third mission.

The internal evaluation focuses among other things on the effect of collaboration on firms' innovation capacity. The effect-analysis was carried out by comparing innovation capacity in companies collaborating with AAU researchers with non-collaborating firms. An interesting result is that there is no difference in the prevalence of innovation among the two groups of firms (measured in terms of the number of new products introduced). However, in the collaborating firms innovation was much more radical than in the non-collaborating firms (measured in terms of the introduction of new products that are new on a world-wide scale) (Drejer et al, 2014).

Besides the evaluations that have been conducted in connection with the implementation of the new strategy, AAU has in recent years developed different instruments that also help keeping track of the third mission. Like other Danish universities, AAU has developed a huge knowledge database maintained by the university's library services (www.vbn.aau.dk) and staff that keeps track of a large number of activities, ranging from research output (journal articles, book chapters) and student projects conducted in cooperation with external partners to spin-off enterprises derived from research, media appearances, etc.

On a higher level, the university's development contract with the Danish Ministry of Science sets up 8 targets among which 4 are more or less related to third mission:

- Target 2: Greater relevance and increased transparency
- Target 5: Increased social mobility
- Target 6: Increase innovation and research collaboration with the surrounding community
- Target 7: Research dissemination

Each target has a number of benchmarks that are estimated on a yearly basis. Target no. 2, for instance, has three benchmarks. The first is to increase the number of PhD-projects that are fully or partially funded by external sources from 48 % percent in 2015 to 50 % in 2017. The second benchmark is to increase the share of master theses that are prepared in cooperation with external agents from 42 % in 2015 to 44 % in 2017. Finally, a third benchmark is related to graduates' employability in the private sector that should reach the level of 60 % in all years 2015-2017.

3.5 Summary

Summarizing the experiences from the four European universities, we can conclude that all experience the third mission as a very complex task. However, as shown in table 1, the approach to boosting and measuring diverges a lot between Twente, Stavanger, Linköping, and Aalborg.

Table 1 Comparing the institutionalization of the third mission in four European universities

	Twente	Stavanger	Linköping	Aalborg
Keywords / concepts used to name the third mission	Valorization or knowledge transfer	Collaboration	Collaboration	Knowledge cooperation
Is the third mission underpinned organizationally?	Yes	Yes	Yes	Yes
Challenges in regard to boosting and measuring collaboration?	Collaboration very widespread. Difficult to include all aspects	Low rate of collaboration in the social sciences and humanities faculties / Crisis in the oil industry, a main partner for the US' technical faculty	Resistance toward measuring in the Swedish research community (national level)	Collaboration very widespread. Difficult to include all aspects
Indicators of collaboration?	Quantitative	Qualitative, if any.	Qualitative (impact case studies)	Mostly quantitative (Output registers, targets, benchmarks, impact analyses)
Nation-wide system of indicators?	Yes	No	No	No
Collaboration performance linked to pecuniary rewards?	Yes	No	No	No

4 Recommendations to the University of Aveiro

Given the desire of Aveiro University to improve the way university-society collaboration is measured, including the impact assessment, we have outlined six concrete recommendations. These are induced on the background of the research literature on collaboration and on experiences from Twente, Stavanger, Linköping, and Alborg Universities. At the end, a few practical suggestions are given to exemplify university-society collaboration in a relative easy manner.

4.1 Develop a clear definition of the third mission

It is very important to develop a clear definition of collaboration. Universities' third mission is a more complex issue and harder to define than research and education. Often, collaboration has many faces and it varies across different branches of science. It is also closely related to the types of industries and public authorities prevalent in the geographical region, where the university is situated. Hence, the character and content of collaboration can diverge enormously between different universities. Therefore, regardless of the existence of nation-wide systems to measure collaboration (as is the case in the Netherlands), universities need to develop their own particular concept of collaboration. It should be aligned with the external environment and attention should be paid to the different shapes and practices that take place in the various corners of the university organization.

4.2 Involve broadly the internal stakeholders in the process

In order to make a successful mapping of the various types of collaboration taking place, including the development of a collaboration measurement concept, the university management is more likely to be successful if it includes staff from all faculties and from all levels of the university. By including the staff, the management can also possibly prevent some of the misunderstandings and myths that easily flourish in the corridors and lunch-rooms of the university departments. University employees, in particular researchers, may be skeptical towards management. They are self-motivated – and sometimes even self-obsessed – individuals than have been raised with the classic virtues of academia, including freedom of research, deliberation, and critique. If they should embrace a concept of collaboration, including impact assessments, it is important that they are involved in the concept development process.

4.3 Complement output indicators with impact analysis

When universities institutionalize performance measuring, they often fall into an ‘activity trap’, which means that they start counting what is most easily countable, namely output. Output indicators can be very useful and can have positive motivational effects on employees. However, output measurements do not provide insight about the wider impact collaboration has on society. They do not answer to the question, what difference does a university do to a region? A valid concept for measuring university-society collaboration should therefore also include indicators of effect. Furthermore, such a concept should not only address the standard economic indicators – such as growth and jobs – but also take into account social, cultural, and environmental aspects.

4.4 Consider more evidence-based methods for measuring impact

Valid impact assessments require a scientific methodology, for instance longitudinal data that enable researchers to study a development over time, or surveys that can provide information that is representative of a certain population. However, a persisting problem is the so-called ‘attribution problem’, which has to do with how a certain development or effect can be closely attributed to a concrete activity, such as collaboration. In other words, if a region is experiencing a positive development, for instance an increase in innovation capacity in its manufacturing sector, how can we be sure that this development is due to collaboration with the university? A survey among managers in the industry may indicate that there is causality between collaboration and innovation, but this does not rule out that the same companies would have been innovating anyway. A way to solve the attribution problem is by doing quasi-experimental analysis, in which a participation – or treatment – group is compared to a similar non-treated group. If the two groups show significantly different results/outcomes, this could indicate a participation or treatment effect. However, there are only very few real-life examples of this type of effect-analysis of universities’ collaboration activity. At Aalborg University in Denmark, a collaboration task-force is looking at different types of impact studies that maybe could be of inspiration to UA.

4.5 Combine quantitative data with more qualitative approaches

Sometimes impact is best assessed by use of more qualitative data. Collaboration between researchers and external actors can take place and have impact in various ways. For instance, a dialogue between a research community and public service agencies could lead to adoption of new working procedures. Sometimes, research also has im-

pact on public policy-making or may lead to adjustments of collective agreements between labor and employer organizations. Collecting and analyzing qualitative data can be a more laborious process than with quantitative data, but provided careful planning it is well worth the investment.

4.6 Use performance indicators strategically

Concepts for measuring university-society collaboration should be used strategically, rather than as ‘peacock feathers’. In the Netherlands, the system of valorization indicators is used to impose direct economic incentives on departments to engage in collaboration. In Denmark, all the universities have so-called development contracts formulated in cooperation with the Danish Ministry of Science. The development contract outlines different targets, including those about collaboration that can be used to underpin strategic decisions at the level of faculties and departments. But incentives and rewards could also be applied on the individual level. Many universities reward outstanding research or teaching performances, so why not adopt similar practices in the area of collaboration and the third mission?

4.7 Some additional suggestions

Finally, we will make a few practical suggestions to exemplify university-society collaboration in a relative easy manner.

Ask for *brief annual reports*, in a visual manner, from each department of the university on their societal impact. Avoid additional bureaucracy and further reporting requirements, but stimulate the departments to demonstrate their successful achievements. A possible frame or template can be provided, but allow departments and staff room for creativity and innovate formats to present their successes.

Map success stories and produce *impact case studies*. Ensure that success stories are constantly being identified, documented, and shared throughout the university. This can contribute to an internally shared understanding and awareness of the importance and scope of university-society collaboration. Furthermore, these stories are very helpful for accreditations and external assessments of the impact of university activities. Finally, these stories can be used in public relations activities.

Develop markers to celebrate achievements in the area of university-society collaboration. For example, introduce an Annual Award on University-Society collaboration, perhaps in cooperation with the regional authorities. Such of an award will make the

university-society collaboration more visual, thereby further stimulating staff to develop innovative measures towards improved university-society collaboration.

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Annex 1 Dutch valorization indicators

	Indicator	Value
1	Extent 2nd and 3rd source of funding	1 st source of funding
		2nd source of funding
		3rd source of funding
2	Internships and final projects at non-academic organisations	Bachelor
		Master
		PD Eng
3	Co-publications	CWTS Leiden Ranking – UIC
		% University Industry Co-publications
4	Intellectual property	Invention disclosures
		Patents
		Transfers
		Licences
5	Entrepreneurial activity	Spin off with TU-IP
		Start up TU started by (ex-) TU staff without TU-IP
		Start-ups non TU started by third parties with TU-IP
6	External activities	Professors with an non-academic external jobs
7	Entrepreneurship in education	Minors Entrepreneurship (30 EC per minor)
		Other education/courses on entrepreneurship (5-8 EC per course)
		Totaal ondernemerschapsonderwijs
8	Careers alumni	Percentage working in non-academic setting