How to succeed with Co-production

Experiences from industrial researchers
The rapidly changing world and the technology changes that follow, severely impact which competences that are needed in order for Volvo Group to remain in the forefront of a highly competitive industrial landscape. To build these competences, both Volvo Group and the academia are in a mutual need to share understandings of each other’s relevant problems and challenges. Irrespective of whether you are working within Volvo Group or in the academia, I suggest you read this handbook; it is really worthwhile!

// Lars Pedersen, Director Research & Innovation Policy, Volvo Group

In our work with driving Volvo CE’s innovative capability, collaboration and co-creation together with universities is just essential. However, the collaboration is not always easy as we sometimes have different perspectives and different needs. This handbook will help us to better understand each other, communicate effectively with each other and conduct great research together.

// Jenny Elfsberg, Director Emerging Technologies at Volvo CE

For many reasons there is often quite a gap between Industry and Academia, in some cases almost two parallel universes. However, the closer they work together the more valid the research focus becomes and thereby a true competitive edge can develop through the new knowledge and competence developed. Despite the tremendous opportunity there is so very little written on the topic and how to approach the co-operation so desperately needed. That is why I very much welcome this handbook on ‘How to succeed with Co-production’ – a unique recipe to success!

// Mats Deleryd, Prof. Mälardalen University and CEO & President of the Swedish Institute for Quality
Preface

We have had the chance to get the best out of two worlds. We have done research in an exiting collaborative environment jointly with industry and academia. We are convinced that this is the way to go for doing research of high relevance. However we admit that it has been challenging from time to time. Therefore we would like to share our experiences for you who would like to be better prepared for your collaborative research project.

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Manager manufacturing research department, 2012-2016.

• This handbook is based on experiences by researchers in the department of Manufacturing Research at Volvo CE Operations. A total of ten externally employed Ph.D. students and three senior researchers employed by the Volvo companies have been active during 2012-2018. Some of the students have belonged to the externally employed Ph.D. school Innofacture. The research school has been funded by the Knowledge Foundation to support industry with future skills in the manufacturing area.

• The externally employed Ph.D. students have conducted research at Mälardalen University, Chalmers University of Technology, Luleå Technical University and University West.

• An Academic Preferred Partnership has been established between the Volvo Group and Mälardalen University since 2012, supporting the collaboration.

• The empirical findings presented in the handbook come from discussions and workshops over the years. The presented material has been created in dialogue with practitioners and scholars.

• Several academic supervisors and industrial mentors should be greatly acknowledged for their input.
We live in a time with a high pace of changes in society. New competences and skills are constantly required at the companies, to be reflected in changes in study programmes provided by universities. To stay competitive we need to ensure that the future competences are trained to the right level and content, aligned with the changes in society. It is also important to keep our competence in the existing know-how about production, coming from a long-term and strong industrial tradition. To do so we have to do research in order to fully understand what it means to stay competitive in the rapidly changing world. When meeting societal changes such as further globalisation, technological advancements and sustainability, we need to use our limited resources in the best way. In other words, we need to work smarter. We, and many with us, strongly believe that one way to do so is to join forces, i.e. to increase fruitful collaboration between industry and academia. To achieve success we need to deal with the obstacles that can come in our way while working in two differently organised systems – industry and academia.

The aim of this handbook is to raise awareness of the differently organised systems when collaborations are to be set up between companies and universities. We would like to share the experiences from our time acting in both environments. In the book we present the experiences as opportunities, challenges and solutions to them. The objective of the handbook is to identify areas for reflection and to increase awareness when setting up and performing a collaborative project between industry and academia. However, our intention has not been to present a fully provided solution, but rather to acknowledge different areas for discussion.

We hope that our lessons learned will be useful for persons that are going to work in a collaborative setting, regardless of whether they come from a company or a university. In the end, we hope that the handbook will be used and contribute to better exchanges of knowledge in the collaborations leading to increased competitiveness, including economic benefits but also positive societal and environmental impact.
Co-production creates opportunities

Are you a manager or project leader concerned about finding the right competence for your company? Perhaps you are deciding to appoint a thesis worker or are going to join a research project? This handbook is directed to you but also to you as a thesis worker or a researcher that wants to get in contact with companies. The handbook will also provide some perspectives to reflect upon if you are at the other end of a project; perhaps you have finalised a research project and asked yourself “why didn’t I get the result I asked for?”

In this handbook we have the intention to explain some basic foundations for co-production of knowledge and collaboration between companies and universities. A co-production process according to the Knowledge Foundation in Sweden, is when a research problem is framed in the context of the application and allows diffusion during knowledge production. We also refer to the term co-creation so as to emphasise the view of co-production as equal participation and interaction with the goal of knowledge to be made useful outside the university. We strongly believe that this co-produced knowledge is required to keep up with rapid changes in the world.

Of course we have also seen challenges and we will in the following pages describe these as key areas to reflect upon.

In the handbook our findings are presented as different perspectives, challenges, suggestions and summarised at the end in giving more practical advice when starting a collaborative project.

A fruitful collaboration between industry and academia will be critical to keep up with rapid changes.
Over the years we have discussed and analysed what we see as opportunities with co-creation and the benefits provided to either companies or universities. We see benefits from a collaborative research point of view, but not to forget that, the co-producing process can provide benefits along the research process if managed well.

**An established collaboration can bring:**

- Understanding of the latest level of state of know-how in a field from both practical- and theoretical perspectives.
- Shared risk by joined effort of resources and cost.
- Opportunities to be innovative.
- Alternative ways to identify the cause of a problem and how to solve it.
- Enabling unique understanding and rich data to the objects that you want to know more about.
- Faster exchange of knowledge and results when testing an improvement.
- Research on highly relevant subjects based on a practical problem.
- Greater understanding of the researched subject by understanding the company context as well.
- Feedback and validation of your findings.

The co-production process also brings a lot of benefits during the process:

- Learning and reflecting with a researcher increases the competence in the company.
- It enhances well-grounded ideas and hopefully triggers better decision-making.
- Systematic ways to develop methods, solve and work with a problem formulation.
- It brings awareness to important key features by having non-hierarchical roles in the organisation.
- Expanded networks - international networks and amount of knowledge is huge if utilising the potential to work in a cross-boundary setting.

During the collaboration separate areas can be cross-fertilized, bringing new knowledge in the intersection.

We need to turn the stones on to understand the actual root cause.
Managing the co-production process

Different aims

Our common concern over the years has been how this collaboration can be done. Is there a methodology in how to find a good way of both creating an excellent knowledge production and using the findings practically?

This has been a frequent debate in academia for decades, while perhaps the companies are less concerned about methodology. What drives people in the system can be one of the differences; researchers are in general seeking to understand things rather than understand how to get things done in a practical sense. Perhaps it also comes from the tradition of seeing the researcher as providing knowledge for the educational system. The company will gain by hiring trained students. It is our perception that companies are producing knowledge too. Therefore we have to find methodology combining the knowledge from both systems in order to provide value for both theory and practice.

As a co-producing researcher you influence not only the education but also the development of a company.

Research can be defined as a systematic investigation to establish facts or principles or to create understanding of a subject.
Different levels of collaboration

Different problems also call for different ways to solve them. In some cases, it is enough to move forward in an established way with skills and methods available in the company. In other cases, it is enough to appoint a consultant with the unique expertise required. However, to contribute to the production of knowledge and to solve high complexity problems, the researcher’s skills bring something different. With a systematic approach, critical thinking and the researcher’s tool box they can bring awareness to over-looked key features in the company and thus provide other solutions. They also know how to navigate and bring the latest knowledge from the worldwide published materials. The figure below is presented from a company view. It shows different levels of collaboration that can be set up between a company and a university. In low complexity cases a dialogue, a visit or external analysis can be enough to bring in new perspectives. The university can also provide thesis workers for a period of time, they can arrange seminars and platforms for networking or offer study programmes directed to the company personnel. This requires engagement from the company, to take the opportunity to learn and use the valuable moments for knowledge sharing.

In order to understand high complexity problems, a longer-term research problem can provide a higher value. This value can be another way of identifying the organisational- and technical obstacles that are needed to proceed with a more complex development. The high complexity projects are what we mainly focus on in the handbook, even if some of the key areas are applicable for the other levels of collaborations.

The way to solve the problem depends on its complexity. A research problem (white arrow) can be considered as having a different complexity level than a company problem (black arrow). Therefore different methods can be suitable when seeking for collaboration that provides value for both academia and industry.
Different set ups

Is there one methodology for co-production? Most likely the answer is no; multiple versions of collaboration exist and they are dependent on too many factors to point towards one overall methodology. However we have found the figure below as a guiding help for us when talking about co-production.

First of all, trust and relations have to exist among the persons and organisations involved. The motivation and willingness to step into a co-creative research process is triggered by the results and value that have been generated from earlier research. It can also be ideas from people seeing the potential for new collaboration projects. The conceptual co-creating model is based on three phases.

The process starts with formulating a common problem that both the academic and industrial representatives are interested in from their respective perspectives. The funding and resources phase is important in securing involvement and participation in the research from both industry and academia. Finally, in the collaborative work phase the actual research needs to be conducted collaboratively, demanding relevant research methodologies and project management. The main output from research is the generation of new knowledge with value for society that could be utilised by the academic side in e.g. writing publications or by the industry possibly leading to some form of company improvement.

Key areas

While this cross-boundary setting provides several opportunities there are also some challenges. We have over the years identified a number of key areas that we would like to bring attention to. In the following chapter we have chosen to categorise these as Part I - differentiators in the project and Part II - counter-productive forces in the environments. By counter-productive forces we mean things in the two systems that tend to hinder rather than serve the other one’s purpose. These areas can cause conflict and push the project into different outcomes.

Part I - Differentiators in the project

- Formulate the problem
- Methodology
- Result

Part II – Counter productive forces in the environments

- Reflections of time
- View on knowledge
- Driving forces and rewards
- Power dynamics
- Communication

The figure describes a co-production process and its phases. Trust and relations have to exist among the persons and organisations involved. The main output from research is the generation of new knowledge with value for society.
Project management of your collaborative research project requires additional attention from you who are researching *with* companies as compared to researching *on* companies. It also requires acceptance and skills from both environments you work in. In this page we present our perception of how you could manage your project. While being involved in both academia and industry it is important to strive towards a win-win situation. The partners should be satisfied over time and for example a Ph.D. process could last over several years. The figure below presents the project as an ideal project, as a straight road. We are aware that this is not often the case and the researcher often has to struggle to find the way forward. We have identified these struggles as being caused by forces that can mislead the other one’s expectations in the different environments. As an industrial researcher you can also face the opportunity to choose the level of participation in the different environments, which can provide value for your research. Therefore time management and prioritisation are important to balance your project. To meet the expectations of the stakeholders, good communication is needed.

The figure shows a schematic picture of a research project. To manage the project, different expectations need to be met and to do so over time; activities need different prioritisations. The outlined literature studies and empirical studies bring the project forward. There are also activities that can provide value to the project such as specific research seminars or company meetings. Other activities can be seen as non-value adding. Each researcher has to prioritise what is best for the project and what is required to meet the expectations. The so-called counterproductive forces are visualised by the blue arrows, and which can distract your attention from the intended purpose. These areas can sometimes come into conflict and push a project into another direction than the one intended.
Part 1

- Formulate the problem
- Methodology
- Result
Formulate the problem

Definition
Have you ever found yourself thinking what problems are actually solved with this solution at the end of a project? Did we find the core of the problem? This is a common reflection which can actually end up in some frustration in the organisation. For some people in a company it is so easy to rush through the problem formulation by focusing on the solutions. The problem formulation can be seen as the most important stage of a co-production process, but also a challenging part. It is important to commonly identify what issues we want to know more about to either get rid of, solve or improve in the research area.

Industrial perspective
In a company it is often desired to solve a current problem that is explicit and identified by the organisation as a problem. Problems to solve can be identified on a range from shorter-term to longer-term, where short-term often is easier to find prioritisation for. Several methods for problem-solving exist as guidance to solve problems as they are identified. However, the problem identification is also related, and sometimes even limited by, the people’s understanding. Most commonly we listen to the people who might seem to know what they are talking about and maybe also point out that they have done it before. The solved problem in the past can however be different to the concerns that are ahead.

Academic perspective
As a researcher you are trained to formulate a problem by asking questions. The question can either be formulated based on a problem from practice but more commonly, academia stresses the need to find a research gap. The research gap is based on previous literature, what has been done and published before. This is shown by the chain of arguments, often seen in brackets if you read a paper. The problem is based on striving towards new knowledge; if it works in practice or not is not the primary goal, but knowing why it works or does not work.

“So many people jump to conclusions before understanding the problem. They have fallen in love with a solution. If you have a hammer everything tends to look like a nail” - Senior researcher
Challenges

This fundamental stage needs some consideration. The managers of the company often have clear expectations of the research and what should be delivered. This can lead to misunderstandings. Sometimes researchers or thesis workers are taken for consultants. If the research is initiated from academia, and companies are added along the way, this can lead to companies lacking the motivation to contribute. Another issue is that companies prefer to see things more broadly, while in academia you delimitate a problem into a specific gap. From the industrial perspective the problem can be seen as far too narrow for the resources and the time spent on the research.

Suggestions

This first stage is very important and depends on openness and trust between the partners. It also relies on the understanding of each other’s systems. Time, effort and thinking is needed in analysing what is actually the problem and defining it. What are the external needs from society that should be met? Or is it an internal need in the company to respond to? What do we know in the company? What do we know from existing research and what do we not know? How can we make questions that we both understand, and what terms should we use? What do we both want to achieve in the end? State what expectations are to be met and what measurements should be improved in order to understand when the problem is solved.

If you only have a hammer in your toolbox there is a risk that everything looks like nails to you.

It is really important not to rush through the problem statement. Who needs to make a decision and what is needed to make the right one? How do we know when we have solved the problem?
Methodology

### Definition

Methodology needs to be reflected upon to understand the difference between a company approach and an academic approach. By methodology we mean the fundamental thinking and strategy that outlines the way in which the research is to be undertaken. It also influences the methods to be used to collect and analyse the data and information. In the end, the basic paradigm and the way to conduct research in a collaborative way will influence the outcome and how and where you present your results.

### Industrial perspective

A company often adapts to the traditional way of doing things in the organisation and its culture, perhaps without deeper reflection. Sometimes the way of doing things is formally described and followed, such as processes, tools and methods. These methods are often originated from best practice, experiences and perhaps previous research. Sometimes they are formally described but still not performed in practice. The organisation and culture find their way to do things in the way that makes the most sense to provide the expected desired value to the business.

### Academic perspective

At the universities methodology is one of the key features. It is important how new theoretical knowledge is built in order to legitimise and describe how the researcher has arrived at the result. There is basic research and applied research which use qualitative or quantitative methods. A qualification of the work performed is done by critically reviewing the research process. The methods are therefore a re-occurring discussion, in particular in the collaborative work when you interact with people and might influence the outcome. Research ethics are also fundamental, so as not to harm the relations between people and to provide results based on ethical grounds.

“...solutions were expected from a reductional perspective. It is very complex to solve a systematic problem with reductionistic tools”
- Ph.D. student
This key area is one of the more challenging ones. Not all the methodologies and methods in academia are supportive of collaborating with companies. Some managements prefer to do research on, rather than with companies. It can be good to be aware that this might influence the probability of getting your work published. An academic critique is whether the result is generalisable enough. Maybe it can be hard for an external reviewer to understand the procedure and how the person has interfered with the company. The knowledge gained and the chain of evidence is harder to follow. From a company perspective, having a very structured method when interacting with people can be perceived as strange and impersonal.

More effort is needed to discuss and develop ways of how to choose and use relevant research methodologies. A clear process with good communication is an enabler. When trust and relations exist, the level of participation can be discussed. The work should allow participation of different roles and functions. The roles in the projects need to be defined, in particular if key persons change positions later on. Interaction is encouraged to understand the industrial problems and activities so the personnel in the companies could follow the work to be done and by which method. Be clear that the driving forces and the reward system is different, so people can agree upon the joint benefits and address their expected deliveries and results early on. Discuss them with an open mind set. Also find ways to address these concerns during the course of along the project, for example by having people in the company understanding the academic system.
**Result**

**Definition**

The result is the expected and realised outcome of the project and can be seen from several perspectives, academic and practical but also from the educational and relational. The result from the collaboration can sometimes be misinterpreted as solely a delivery. However, the process itself delivers small steps of achievement, sometimes difficult to pinpoint, that in the end brings value to both academia and industry.

**Industrial perspective**

In companies the result is often valued based on more practical grounds. To be considered successful it should be a solution to an existing problem and preferably possible to demonstrate. The newness can be of less importance compared to the effects it gives and how easy it is to implement. Only to gain knowledge in an area is often not seen as a sufficient result from an industrial perspective. It should at least in the longer term bring benefits to the company, e.g. in the form of improved customer offering or higher productivity. The expected result also needs to be presented in a way that attracts the management’s attention since the resources spent on research are competing with other initiatives within the company.

**Academic perspective**

In the universities, the result of research is rather to contribute to the educational system by providing new knowledge and training students. There is also a strong tradition in publishing your material and thereby adding to the existing knowledge. The material can be published at conferences, which require less effort and provide networks. It can also be published in journals, with more effort and higher requirements. Contribution to the system connects the world’s researchers. There is a grading system evaluating both conferences and journals, with different importance in different countries. The research should be rigorous, complete and novel, no matter choice of publication.

"From an academic perspective it can be more interesting when things are not working than when they are. In industry we don’t find that interesting, only frustrating”

- Industrial manager
Challenges

The different perceptions of the result can be a major concern, and if not handled correctly can bring harm to the sensitive trust between the people involved. If academia focuses too much on publishing the industry might feel that the result departs from their expectations. The project becomes only a paper product. If the focus is too heavy on delivering concrete solutions for the industry, the academic participants might feel like consultancies without possibilities to conduct good research. Depending on the power balance between industry and academia there is therefore a risk that at least one of the parties becomes disappointed. There is also a risk that the participants prioritise tasks closer to their respective result focus, which might cause the entire project to drift away from the initial agreement.

It is necessary to find a balance between the deliverables to make sure both industry and academia get their desired result.

Suggestions

The discussion of result and rewards when starting up a co-production process is important. Since your project is related to a number of months or years, the set-up of indicators can help you find guidance in how to balance your project. The industrial participants can have one set of indicators, while academia most likely has another. To satisfy both partners the indicators are a key to a successful project. The companies are often looking to find the market benefits and the gaps to be improved while academia wants to develop new knowledge to publish. To create a common plan can help, where the different deliverables both from an academic as well as an industrial point of view are included. It is beneficial to be as clear as possible and with relevant details. In the academic case it could be stating details about the study. For the industry it could be as diverse as to describe success stories, showing a demonstrator or having management presentations.
Part 2

- Reflections of time
- View on knowledge
- Driving forces and rewards
- Power dynamics
- Communication
Reflections of time

Definition

Time is something fundamental for us human beings. Many people in today’s society are perceiving a lack of time. The older generation perhaps said “time is all that we have”. A manager most likely says “time is money”. When we are engaged in something at work, time passes very quickly. This shows that time is not only something to measure but basically a perception that can be different and dependent on who we talk to.

Industrial perspective

In companies time is often valued as absolute and like money, by aiming to reduce time in the production or in the development process. In a competitive environment it is also easily translated to see the time a person works valued as money. That means that work effort is measured as a cost, related to the value it brings to the business. The reward system is created to promote feedback within a short time and it is based on expected deliveries. Time is something to control if you focus on short-term decisions. The focus on time and cost influences our decision-making every day. In the longer term it can be unbefitting for a final result. Time for reflection is often rare and based on the individual and cultural needs.

Academic perspective

In academia time is an enabler for reflection which is connected to building knowledge. The researchers divide their time between teaching and other projects. The work effort is planned based on how much data is required to be able to have good and qualified research results. Reflection, analysis and summing up takes time. Also to build relations takes time, which is fundamental to get access to a company. The social environment in academia is important as we can learn in relation to one another, for example by attending conferences. Learning and understanding is a non-linear process, where solutions need to grow and develop over time. The publications system is built on a longer-term perspective, and sometimes it takes years to develop the findings and even longer to get them published.

“I had to spend so many days and weeks working on writing up the research. I had to focus so hard, while I seemed to lose connection with the company project I was told to support. After a few months they stopped sending the invitations to the meetings”

- Ph.D. student
Challenges

The different view of time, the pace of development and what system to entrain actually influence how to solve the problem. Research takes time and the time might be considered as a waste for people in a company, who are used to working under time pressure and to finding solutions faster. As a researcher you process the material over time using longer-term thinking. Therefore the balance between the proportions of being operative in the company versus the theoretical studies is seen as a common problem for collaborative research. By being operative in practice you will find out things requiring physical presence. On the other hand, being reflective in research needs periods of undisturbed attention, and it can appear strange not being present at the company. The quality reviews from journals are also a time-consuming process – it can take years to get a paper published.

Suggestions

When planning your project you should consider the fact that persons work differently in different systems. Try not to control and overload the projects by pushing for quick solutions, i.e. allow for long-term solutions to appear. As a researcher, prepare to be explicit about the time you need to perform the different stages of the research. As a company, prepare your personnel to spend time to discuss with the researcher – do not wait only for the result, but seek opportunities to spend time to learn and reflect with the people from university to get insights along the road. It will take a certain time for the researchers to come with their final model or proposed solutions and often new questions are raised. If the result was not as expected you can most likely use the work done and bring it to the next level in the next project. Remember that reflections also lead to new insight and knowledge.
View of knowledge

Definition

Knowledge can be perceived as something diffuse and complex to discuss when collaboration starts up. This is perhaps because there are so many ways to define and classify knowledge. Knowledge can for example be seen as finding a context-specific and relational meaning, as tacit or explicit, or as a process where you learn things. Research is about knowledge; a common definition of research is that it is a systematic way of creating new knowledge.

Industrial perspective

For a company, knowledge might seem a diffuse term and is often related to the degree of education, assignment, experience or years in the company. Companies as producers need to have a lot of knowledge to be competitive. The knowledge is included in their systems such as their background, history, personnel and management and so forth. But what is knowledge in a company? How do we make use of the knowledge we have? And how do we act when we need other knowledge to be competitive? Is it brought by personnel, the managers or is it managed as a human resources activity? There is a lot of interaction in both utilising, sharing and producing knowledge in a company.

Academic perspective

In academia, knowledge is the core. Every researcher has to ask themselves, what is knowledge for me and how do I create knowledge and for whom? The criterion for a researcher is to find out something new, i.e. not found in existing literature. Could the knowledge be related to the context and do I need to define it for others to understand the same thing? Theory is also a common term which has different definitions. Seeing theory as the currency that researchers use and that drives understanding, researchers can either build new theory or just expand, qualify, report or test existing theory. This influences how the researcher provides the outcome of the project to the company. It provides alternative ways to view the problem.

"Misunderstanding of what we do is common when we work with research in such depth. In the end, we have come so far as to say that people are equal. But thoughts, they are not equal. Some thoughts are just worth more than others”

- Senior researcher
Challenges

Today we are facing a lot of information both from the outside world but also created inside our company. But how can we trust the information? Is it information, data, facts, just talk, interpretations by someone or taken from single events? On what grounds can we then make the decisions? This is relevant and where skilled researchers can give support. One challenge in collaboration is that practitioners and researchers develop a discrete understanding of the problem and facts separately. The different expectations can influence what to study, the analysis results and time plans. Even if research is seen as beneficial to the company, some personnel do not feel that research contributes directly to their work role. Instead their perceived needs are to get prescriptive statements about best practices and actionable advice rather than a reflective analysis.

Suggestions

As a company, prepare to be active in knowledge production. As a researcher, explain the key issues of relevance for your research topic. Discuss the area of knowledge and what you would like to understand. Also clarify what the latest knowledge according to the research community is. It is important in collaboration to understand that the research is about creating well-grounded insights to better understand the problem or situation faced and that we also want to predict outcomes. Be prepared that you might use different terminology for the same thing. Have respect for knowledge as an advancing process. As a researcher, carefully iterate your findings and discuss what you have found out. As a company representative, the findings might sound like common sense so be prepared to ask questions about the meaning and practical impact of the findings.

The research should expand the “mainland” of current knowledge, connecting like a peninsula.
What is it that makes people put in an extra effort, adding time and commitment to a task? By driving forces we mean the motivation from the participants. By rewards we mean the things that you are valued for in your environment, the common goals or the individual goals that are set up for you and that get acknowledged by others.

In the company the driving forces for conducting research are often connected to a problem that can be seen today. If it is related to customer value and financial importance it can be found to be more prioritised. A good result is something that can be used at several places in the company, to bring more value. The reward systems are often decided from the management systems. Indicators point to what is important for the customer or companies to be achieved by the internal departments. The reward system is also influenced by the culture of the organisation. The culture is for example also steered by history, visions and values. For the individual, the better results and skills you have to support the system, the more likely you will get a better position.

In the university the driving forces are based on your ability to identify a relevant problem, to get funding, conduct the research and explicitly express your contribution in a scientific way. A solution that does not work in real life is also interesting from an academic point of view. The reward system is based on knowledge and can for example be the approval of a thesis or a paper in the publication system. This can lead to narrowing down the scope to a tiny piece of the problem to get it published. Many international universities are evaluated according to their get publications in certain international journals. A good journal is based on the number of citations i.e. how many researchers have used your findings. For the individual, the more that is published, the better chances there are to get a new job.

“The main question is ‘What is considered as good research?’ Highly ranked journals often reject your work in the publication process, while others invite you to write a book on the topic. They have read the same text, but have different opinions. This has happened to me more than once and the question of what is good research remains unanswered.”

- Ph.D. student
Challenges

The challenge with the different driving forces and reward systems is that the company is seeking for solutions that can be beneficial and understood on the shorter term. For them publications are of minor interest. Researchers often strive to publish new things in their field, sometimes presented in a narrow scope or not aligned with a practical complexity. Industry wants to have solutions that work. There are pros and cons with the driving forces and reward systems. The publication system enhances the reflection by the writing process. The findings from research are analysed and motivated and opposed in a quality check to see if the findings are explainable, sound and trustworthy. This process also requires patience from companies and to have skilled reviewers.

Suggestions

Be clear on your respective expectations of the collaborative project and remember, for co-production the co-created knowledge is the core. Decide early what academia and industry respectively should strive for as a result and follow up as indicators that they both understand. Try to make a clear case e.g. a demonstrator or model to be used to show the financial impact. Talk about the added value of learning in the process and how to manage the roles that should contribute to the project. By having collaborative researchers, to understand the bigger picture and the problem in the real setting, can motivate the relevance of the research. Conversely, people from companies should take the chance or have the ability to review the knowledge gained from the academic publications.

To make a clear case e.g. a demonstrator or model can be used to show the financial impact of the research findings.
Definition

Do you sometimes feel that some people always get listened to while others never get the chance to speak up? It might have to do with the power dynamics or hierarchy in the organisation. By hierarchy we mean both organisational as well the perceived differences in power between people.

Industrial perspective

There are trends and developments in how a successful organisation should be set up as well as differences between branches and countries. Within an organisation there are often multiple career paths, at least when it comes to management positions. The position and title can be the first thing to view, but behind that is rather your personality, previous achievements, your ideas and your experience. Depending on what culture you act in, people in industry might be reluctant and even suspicious, towards people with long academic experience, meaning their knowledge is not useful in practice.

Academic perspective

In academia the hierarchy is more tangible and the different levels are clearer, e.g. a student is on a lower hierarchical level than the lecturer and the professor. The titles are important because they signal your level of achievement in contributing to knowledge sharing and building. When it comes to making a career in academia there are fewer career paths to choose from. There are different streams and communities in the research areas. If you are specialised in an area there are a limited number of professor positions covering that. In academia it is an important part of quality control to understand, question and argue about the value of others’ research. It is also to find and understand the weaknesses and limitations of the research.

"I have worked in the industry many years in different positions, the latest years in higher management positions. The strange thing is starting to work in an academic context, with all my knowledge - I am considered a nobody."

- Industrial manager
Challenges

There is an obvious risk that there is a misconception when facing the hierarchical levels in academia and industry, that people are not addressing the right issues to the right level of the organisation, which will lead to frustration and loss of progress. For a person working with both academia and industry the balance between the proportions of being operative in the company versus the theoretical studies can be a problem. Since they do not fit into the ordinary organisational and hierarchical structure, neither in industry nor academia, their role can be misunderstood. In academia people are trained to think critically and to be pushed hard to think for themselves. This argumentation can sound like a tough dialogue. In a company it can be uncomfortable to confront people in the same way to challenge them. If the company person seeks for a result or solutions rather than to strengthen the arguments and learning, misunderstandings will occur that can affect the collaboration.

Suggestions

Put effort into understanding the hierarchy both in academia as well as in industry. Get the right people involved in the right forums. That means there might be different people involved in different stages of the process. Some positions can act as door openers and be suitable in a reference group to support important decisions. From a company perspective, do not expect the researchers to be company project participants on the same grounds. They will contribute in the project by other deliveries. Be open to methodology discussions. The same goes for academia, e.g. consider whom to bring in as a co-author for an academic paper. Be open to the differences in communication and understand when arguments are about the facts rather than the person.
Communication

**Definition**

By communication we mean the exchange of information by either speaking, writing, or using some other media to communicate. Just by being in the different environments you communicate by your age, gender, way to dress etc., which means that you can also run into different power dynamics when talking and presenting your project.

**Industrial perspective**

From the company perspective it is important to understand the local, cultural language used in daily talks. In organisations a culture is often dominant. Depending on the culture, different biases can appear that are related to your activities. Sometimes the loudest voice is the only voice heard. Sometimes the more experienced persons are given attention while others can contribute more. The first speaker advantage can appear or a group-think can set the agenda. The culture also influences how to act, dress and behave. It is also a matter of which order you make your statements in and how you receive the attention. Sometimes you have to start with the results in order to get attention.

**Academic perspective**

In academia, different power structures also exist, but are more related to your degree of knowledge. You start your project by addressing relevant questions. Terminology is important and sometimes there are a lot of complex words. For example using definitions is extremely in focus in order to show to others what you mean when talking about the same thing. One of the most important parts of research is the debate, or argumentation, where you have to show the value of your research and argue how and why you have arrived at your findings. It is about discussing another’s work to show the solid ground. Communication also goes with the ability to write and to publish. The researchers are trained in writing and communicating their work orally and it often follows a pre-defined structure.

“They were totally closed to the perspectives that existed in the other parts of the organisation.. It blocked the view and the communication with us researchers. They just didn’t let go of their own perspective ... so difficult it was ...”

- Ph.D. student
Challenges

Communication is a challenge, not only in terms of daily talks and first contacts but also how you define your problem, how you work with your process, what language you choose when you interact and how you present the result. In the end, your research strives to find results that are sound and trustworthy which is one of the more important things. The findings should be related to how you have arrived at your findings rather than who you are. When entering academia with an industrial background you can find that your knowledge is not valued in the same way by them, with it not being said to be scientific.

How can we best communicate?

It is challenging to find ways to communicate to make sure the participants with different backgrounds get a shared understanding.

Suggestions

Think about what terms you use and how you use them in the interaction. Check if you understand each other and be open-minded about it. Create forums for reflections and understand that the researcher asks questions. Be prepared to understand that it is a different language. Also discuss how you would like your result: written or orally? What are you developing; advices, technical solutions, knowledge or theories? Will your work result in a publication, and what does that mean? As a researcher, do not expect the people you work with to read your papers and understand them; rather re-phrase them and create for example a separate report or handbook. Think about your result as being presented in different languages.

It is essential to reflect upon how your research should be presented. It certainly needs to be adjusted to different audiences.
Summary

To summarise, even if there are challenges, we would like to emphasise that co-production between industry and academia creates many opportunities. We see the co-production process having several benefits, which raises the awareness and solves problems in a way that benefits both academia and industry for future competitiveness, for example by:

- Increasing the knowledge in both the company and the university. We can create competence around actual and relevant subjects, to be used instantly in the companies or a few years later by hiring properly trained students.
- Employing collaborative research to solve both a research and company problem at the same time. We see these as non-separable.

However, to succeed requires an adaptation of the way to work, not only for the persons involved but also for the respective organisation in academia and industry.

By being open-minded and having a common understanding of what research can provide we propose further focus on

- Encouraging and establishing contact with people in the company to discuss their problems, their need of future competences and their view on the practical relevance of the results achieved.
- Offering training for companies that consider working with universities.
- Considering mutual respect and understanding for people navigating in both systems; there is no right or wrong, just different perceptions.
- Creating reward systems that both partners can agree on and that can support activities and priorities during the project.
- Bringing attention to the methodology. Perhaps it also requires adaptation of the traditional reward systems in the organisations.
- Considering the long-term relations to build trust over time between the organisations.
Concluding words

For us personally, it has been an experience worth the effort. However, in a cross boundary role it requires personal strengths, acting out of your comfort zone in your respective roles and systems. It is important to have people who can move across borders of their own organisation to bring other insights and share knowledge - into the companies and to educate people but also to get academia to understand the reality faced by the companies. It requires some extra effort from you as an organisation to support and also actively engage in collaborative research. Open up your thinking, reflect and re-think.

We believe that building competences for the future by collaboratively conducting research will be one of the most important skills for future competitiveness. Welcome to join us!

Call for boundary spanners!

Boundary spanning is a term to describe individuals within a system who have the role of linking the organisation’s internal networks with external sources of information.
Further Reading


