inRes – Entrepreneurship in Residence

The inRes program was launched in 2014 as a very early stage acceleration program for entrepreneurial teams working in ICT, in Portugal. Building on previous experience, it was positioned to provide teams with a very specific profile exposure to CMU's innovation ecosystem and enable them to harness its potential to grow their ideas into viable business opportunities capable of reaching relevant markets and succeeding.

The program is built around the concept of providing entrepreneurial teams a structured immersion period in Pittsburgh, anchored at Carnegie Mellon University, in which they benefit from an environment with a high density of world-leading research groups, as well as market and industry specialists, in a variety of high-tech areas. To enhance the capture of the potential of the immersion, a preliminary preparation phase takes place in Portugal, to provide the teams with key insights about the U.S. market, as well as to coach them on how to interact successfully in such a dynamic and vibrant ecosystem. As a final moment, already back in Portugal, the teams present the most recent evolutions of their pitches in a public session.

The focus on the continuous improvement of inRes led to several adjustments in the 2016 edition. The selection process was redesigned to support a more informed acceptance decision for the immersion period at CMU. A new decision point was introduced after the third workshop in Portugal, allowing an assessment of each team's dynamics and engagement during most of the preparation phase.

Building on previous editions, additional mentoring opportunities were provided to the teams both in Portugal and at CMU. In Portugal, additional meetings were provided to each team to improve their absorption of the new information, and accelerate their development process. Adjustments were also made at CMU, with new mentors with entrepreneurial backgrounds joining the team, and cross mentoring of teams.

Partnerships

During 2016, the Program developed a partnership with **Sociedade Rebelo de Sousa & Advogados Associados, R.L.** (SRS Advogados), a leading law firm in Portugal. A full-service law firm with specialized departments in commercial and corporate law, and also labor, competition, intellectual property, administrative and regulatory, financial, fiscal, telecommunications and media and new technologies law, among others, SRS Advogados will support inRes participants in the legal procedures associated with the first stages of launching and developing new technology-based businesses. The firm will be represented by Paulo Bandeira, partner in the commercial department and responsible for the firm's startups practice. The partnership agreement was formally signed in January 2017.

Hovione Capital, a venture capital firm focused on Health Sciences, also approached the Program to develop a partnership. The relationship had been building since Hovione Capital invested in Adapttech, a 2015 inRes team. Hovione Capital specializes in high-potential seed/early-stage investments in medical device, medical technology, diagnostic, chronic disease monitoring, and IT-integration opportunities. Additionally, the firm searches for, and invests in projects that leverage patented differentiating technologies and address global markets. The Program's profile and the experience with Adaptech were key for the development of the partnership, which includes support to inRes provided by Hovione, and the opportunity for the firm to have earlier insight into the projects, as well as the possibility of approaching them for investment.

Applications and Selected Teams

The entrepreneurial teams selected to participate in the 2016 edition of inRes were the following:

- **All in Surf**, from Porto. The team developed and patented a device that allows capturing data during a water sliding session. Detected by an embedded sensor, all of the athlete's movements and the flow of the water moving below the sailing object are recorded. The data is analyzed by an intelligent algorithm that assesses the performance and allows the athlete to evolve consciously. More recently it is also being applied to land based sports, such as skate. The team included Márcio Santos, CTO and co-founder of All in Surf.

- **Helppier**, from Porto. The project focuses on accelerating user experience by enabling companies to create interactive walkthrough guides and useful tips in three steps, without coding or programming skills. The team consisted of Daniela Lopes (Marketing Manager) and Marco Garcia (Software Development Manager).

- **SoftBionics**, from Coimbra. The team develops new technological devices to be used mainly in medical applications using innovative methods and materials. Pedro Lopes (CTO) and João Lourenço (co-founder and CTO) were the team members selected to participate in in inRes.

- **Twevo**, from Leiria. The team operates in the telecommunications R&D sector, providing consulting services for the semiconductor industry, and designing and commercializing high-end technology, including software, firmware and hardware solutions. The team consisted of Carlos Ribeiro, CEO, and Eduardo Castañeda, COO.

The competitive selection process, which included an individual interview with each of the candidate teams, picked these four teams from a pool of nine applicants to the 2016 edition of inRes.

Outcomes

Full success was the global assessment of the teams that participated in the 2016 edition of inRes. The initiative incorporated multiple feedback moments, namely through regular meetings, a final review and a final report, all contributing to building a stronger inRes experience, and whenever possible to impacting that experience immediately. The positive comments came as a validation – the 2016 edition teams presented lower maturity levels but significant technological potential, a combination that was still found to perfectly suit the founding premises of inRes of supporting very early stage technology based projects. The assertive and continuous training provided in the preparation phase in Portugal allowed the teams to achieve very quickly a minimum threshold of ability to communicate the value of their projects, and target the right audiences.

As part of their preparation for the immersion, the 2016 teams contacted extensively with teams from the previous editions. This allowed them to optimize their immersion experiences, in particular in the development of contacts and in looking beyond the borders of Pittsburgh. Some explored to the maximum extent their location. But in the case of Helppier, this led them to explore New York's Tech Week to pitch to a different audience, make relevant contacts, and establish the foundations for later partnerships. All in Surf, focused on sports such as skate and surf, also travelled more broadly, to the WC, for contacts with institutions of reference in surf and high-performance sports, in search of experts and connections to major brands. The team came out of the experience with strong technological and business partnerships for the development of its product.

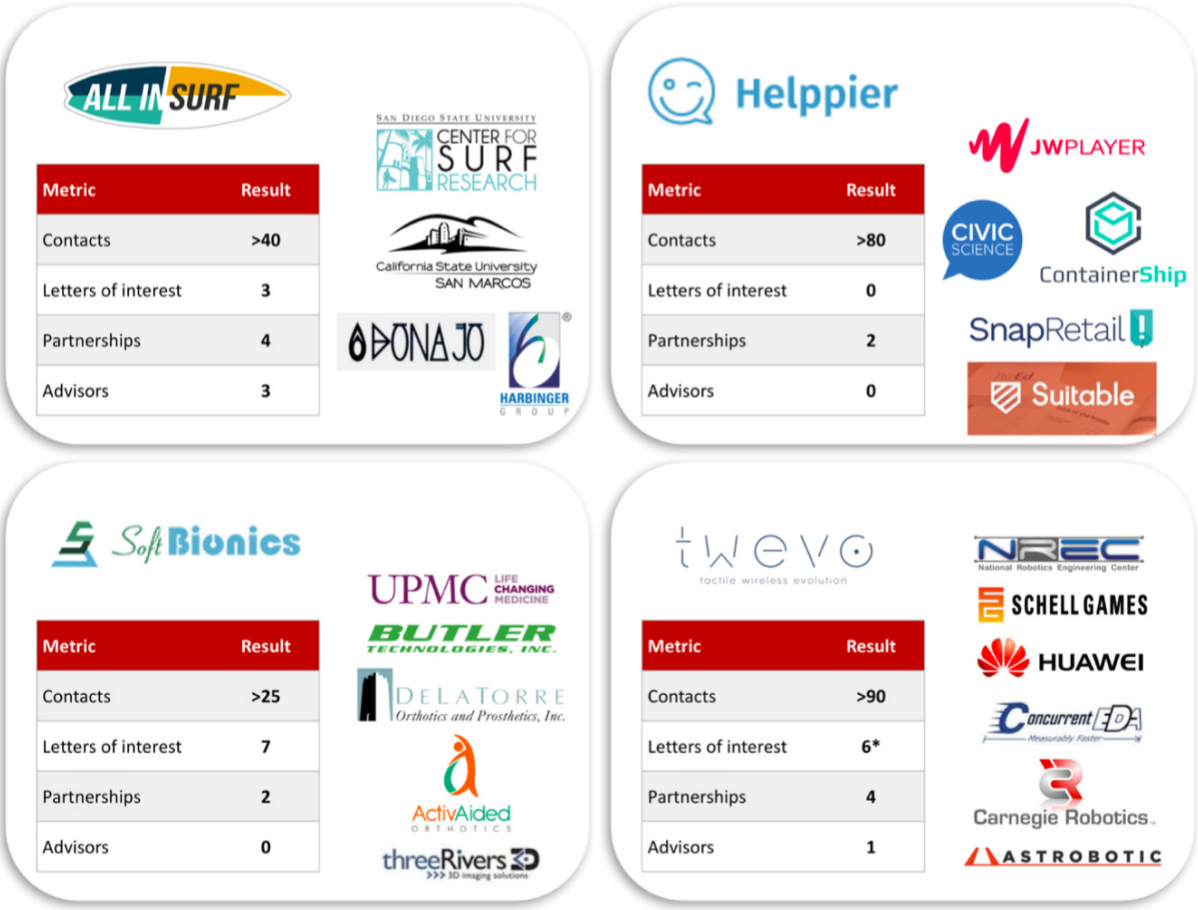
In the various modules of inRes, in Portugal and at CMU, the participants were exposed to diverse profiles of entrepreneurs, open to telling their war stories and sharing experiences. The different profiles, given the diversity of technology, industry and business backgrounds of the teams, had varied levels of importance for each individual team, but all the teams had the chance to develop relevant insights into their potential futures. For Twevo, these interactions led to a contact who would soon became a critical advisor, and whose expertise has helped the team to navigate industry contacts and better understand the inner workings of the industry.

An adventure such as participating in inRes goes beyond the professional dimension, and quickly becomes a personal journey. The opportunity to experience and better understand the reality of the U.S. culture, at the technological and business levels, but also at the personal level, has a major role in the development of an international outlook for the projects, and may be critical in the future to support relations with US partners and customers. A very interesting development in the 2016 edition of inRes was the collaboration that emerged between two of the teams in the scope of their technological and manufacturing development, with the SoftBionics team members mentoring and advising All in Surf.

The 2016 teams were unanimous in highlighting the importance to inRes at CMU of Project Olympus, which remains a key asset and source of significant support. As Carnegie Mellon University's accelerator, Project Olympus has hosted the teams from the various editions of inRes, and excelled at providing not just a space but a supportive community committed to providing useful insights, from fellow entrepreneurs, expert advice, from experienced specialists in a wide range of fields (business as well as technological), and contacts and open doors, namely through

the support of its director, Kit Needham. The space, which truly works as headquarters for the teams, has also allowed a faster embedment of the inRes teams in the CMU ecosystem, through their integration in its regular community of entrepreneurs.

The results of the investment in preparatory work and support infrastructure emerge when the teams very quickly establish multiple connections and engage with the contact opportunities for their fields in the local ecosystem, but also in other states. The different teams matured significantly as a result of these interactions, across the board, from technology, to product, to operations. The validation of product concepts and the sharpening of market insight have effectively led to significant improvements in the teams' business models. To complement the valuable information and feedback collected, some of the teams were able to secure letters of intent and enter into partnerships with potential customers and partners.



Key outcomes of inRes for the 2016 edition teams

In 2016, the 2014 edition startups Addvolt and Xhockware raised new funding for their ventures: Addvolt received a second round of investment, while Xhockware was able to secure a European Commission Grant to further develop their business. Followprice, in a move that is unusual for such an early stage startup, acquired another startup, PepFeed. The 2015 edition startup Adapttech also raised its first investment round, from Hovione Capital.

inRes Impact

Between November and December 2016, the Program office carried out a study of the impact of inRes on the teams from the 2014, 2015, and 2016 editions.

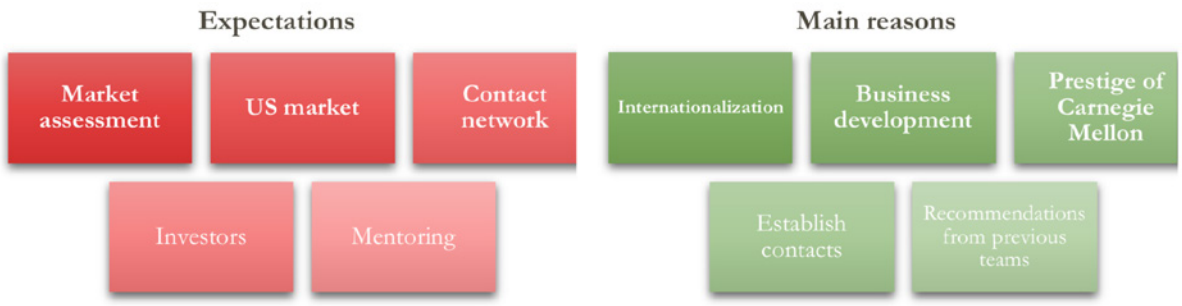
The study was based on a survey and personal interviews to the team members that participated in inRes. The survey consisted of two parts, one focused on the team, and the other focused on the individual team members. We collected information for 11 out of the 12 inRes teams (Table 4), and 20 out of 23 team members that participated in the program. One of the teams from the 2015 edition was not able to participate in the study, and one of the team members from the 2014 edition also was not able to complete the individual part of the survey.

In this section, we briefly present the main outcomes of this study, focusing on the expectations, reasons and characteristics of inRes that led the teams to apply, the impact of the initiative on business models and entrepreneurial self-efficacy, and the evolution of funding and number of jobs for the startups associated with the teams that participated in inRes. Appendix 3 contains a full description of the study, and a detailed presentation of the results and the analysis.

inRes Team	Project Creation (Year)	Company Creation (Year)	Industry	City
inRes2014				
AddVolt	2013	2014	Automotive	Porto
Displr	2013	2013	Media	Braga
Followprice	2013	2015	e-commerce	Lisbon
Xhockware	2014	2014	Retail	Porto
inRes 2015				
Adapttech	2014	2015	Medical devices	Porto
Playsketch	2014	not created yet	Videogames	Coimbra
Sceelix	2015	2016	Computer graphics	Porto
inRes 2016				
All in Surf	2015	2015	Technology	Porto
Helppier	2013	2014	Software Development	Porto
SoftBionics	2016	2016	Medical devices	Coimbra
Twevo	2016	2017	IT	Leiria

Identification of inRes teams by edition (years 2014, 2015, and 2016)

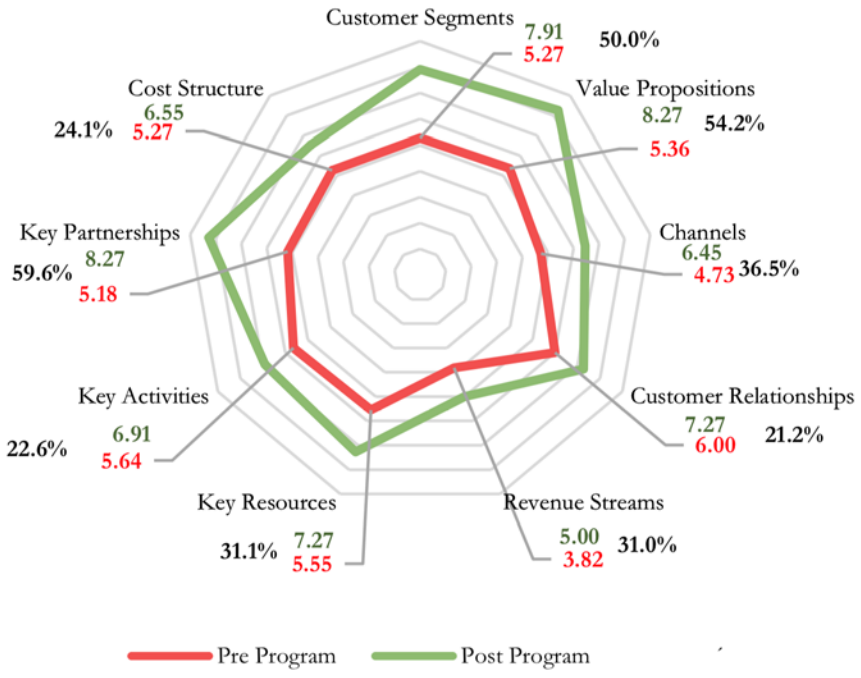
There is a variety of expectations and main reasons that led the teams to apply to inRes, but market assessment and internationalization were naturally the most highly ranked.



Expectations and main reasons to apply to inRes

The teams considered the contact with the US, the international outlook, and the networking opportunities as the most important characteristics that led them to apply to inRes. The training programs in CMU and Portugal, the improvement of managerial competences, the access to contact networks, the internship at Project Olympus, and the access to industry experts were considered to be the most beneficial components of the initiative.

One of the key objectives of inRes is helping the teams discover and validate their business models. In order to assess the impact of inRes on this process, we asked the teams to rate their level of evidence-based confidence for each of the nine building blocks of the Business Model Canvas, a reference framework for describing business models, prior to participation and post completion. The results suggests Key Partnerships, Customer Segments, and Value Propositions as the building blocks most highly influenced by inRes.



Pre- and post-inRes level of evidence-based confidence on the business model

For these three building blocks, the reasons offered by the teams for the significant improvements were the following:

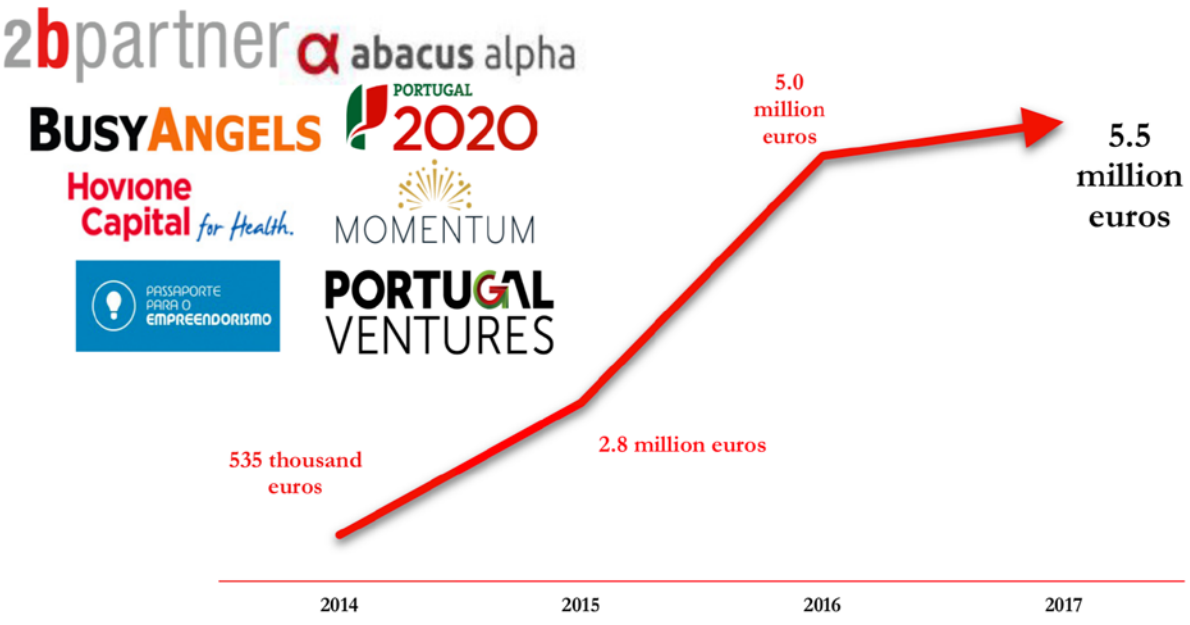
- **Key Partnerships** – Networking with experts, partners, and industry, and the establishment of several partnerships in the USA;

- **Customer Segments** – Market segmentation obtained from the feedback of mentors and experts, clear knowledge of the prospective customers resulting from several meetings with potential customers from different sectors, and market focus;

- **Value Propositions** – Feedback from prospective customers, the training program in CMU and Portugal, and the workshops, enable the inRes teams to fine-tune the value proposition to fit customer needs.

The startups associated with the inRes teams have been cumulatively receiving significant investment rounds since 2014. Six of the seven surveyed startups created in 2014 and 2015, have received successive investments, currently totaling 5.5 million euros, from investors such as 2bpartner, Abacus Alpha, Busy Angels, Hovione Capital, Momentum Holding, and Portugal Ventures, and public investment programs such as "Passaporte para o Empreendedorismo" and H2020's SME Instrument. The startups associated with the 2016 inRes teams expect to start raising funding during 2017.

When asked how the participation in inRes contributed to raising funding, one of the teams explained that the introduction to investors via inRes and the letters of intent received in the USA were the only reason why it was able to get the investment, while other teams mention the recognition provided by inRes and the prestige of Carnegie Mellon University as instrumental in that process.



Funding raised by the startups associated with the inRes teams

Regarding job creation, one of the startups, created in 2014, has almost 20 employees, while the remaining 10 startups have on average five employees. Until the end of 2016, the 11 startups had created an estimated total of more than seventy highly qualified job positions, a significantly fast growth in job creation, for such recent startups.

At an individual level, entrepreneurial self-efficacy, i.e., an individual's belief in his or her ability to perform on the multiple dimensions of skills required to start and grow a new venture, has been shown to have an important influence on entrepreneurial success. We used a multi-dimensional instrument[2] to survey the team members about their ability to perform in entrepreneurial activities, pre- and post-inRes. The instrument considers 18 entrepreneurial activities or tasks, grouped in five dimensions: searching, which includes the capabilities to perceive and exploit opportunities; planning, involving a set of actions to convert an idea into a business; marshalling, i.e., identifying the assembly of resources required to bring the venture into existence; implementing people, which includes the skills needed to grow a business and sustain the business past its infancy; and attitude toward venturing, i.e., the perception of the attitude toward creating a business.

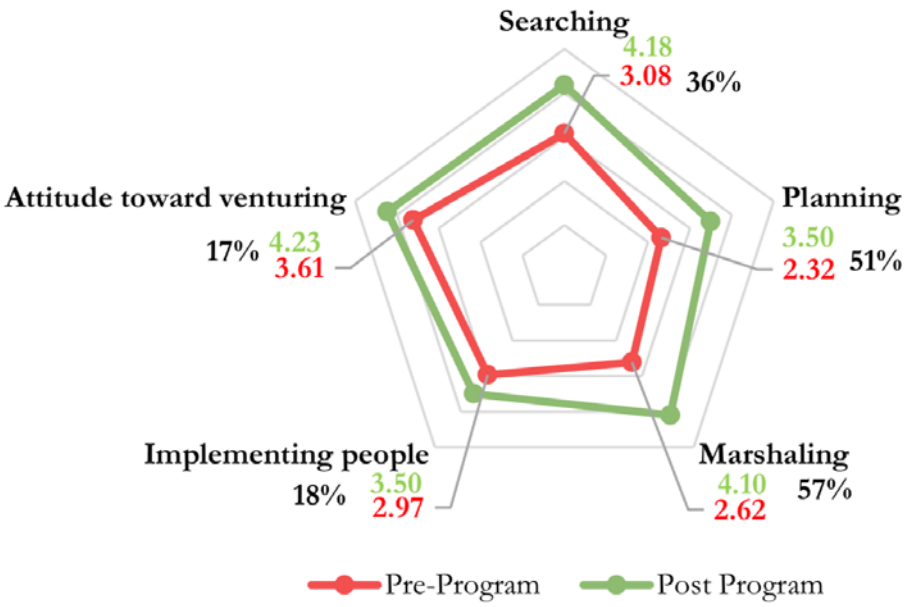
The results suggests that marshalling, planning, and searching were the dimensions which were most influenced by inRes. For these three dimensions, the reasons offered by the team members for their perceived evolution were the following:

- **Marshalling** – Experience and confidence created by the practice of pitching for investors and customers, improvement of communication skills in Portuguese and English, and increased confidence when making network contacts created by networking events and life in the USA;

- **Planning** – More experience and a different mindset, feedback from mentors and companies, good understanding of the challenges of pricing provided by the training program, improved understanding of the process of starting a new company (USA v. Portugal) due to mentorship and pitches, and familiarity with techniques to grow a user base community;

- **Searching** – Brainstorming capabilities developed through multiple contacts, tools to identify new products provided by the workshops, business-oriented mindset developed by the training program, helping improve products and balance the market v. technology focus.

2 McGee, J. E., Peterson, M., Mueller, S. L., & Sequeira, J. M. (2009). Entrepreneurial self-efficacy: refining the measure. Entrepreneurship Theory and Practice, 33(4), 965-988.



Pre- and post-inRes levels in multiple dimensions ofentrepreneurial self-efficacy

Overall, the results in the multiple dimensions of this assessment confirm the rationale and the design of inRes. The direct impact reported by the team members on business model discovery and validation, as well as their self-efficacy, and the indirect impact on the strengthening of their ability to raise funding, in particular, confirm the effectiveness of the immersion model in accelerating and strengthening their customer discovery process and the development of technology startup management competences.

We conclude this summary of the assessment with word clouds built from the words that the team members chose to describe their individual experiences in inRes, and inRes globally, and quotes from a free text part of the survey, relative to how the teams felt that inRes contributed to their venture:

> *"80% thanks to inRes. This includes, but is not limited to funding, contacts, customers, mentoring, and follow-up." "The program has helped us in developing a clear overview of the market, and an international ambition."*

> *"inRes was paramount to help the founders develop their business and partnership skills, and quickly establish an initial US contact network."*

> *"From inRes we learned to iterate continuously with our customers in order to generate more value."*

> *"inRes contributed by helping us find the right market and by pushing us to accelerate our development. In addition, it developed our business skills, which were almost none before the program."*

"inRes helped by giving us the background to support part of the significant confidence and competencies that are needed."

Word clouds describing individual experiences in inRes (left), and inRes globally (right)